NUTRITION
made
SIMPLE

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Caribbean Food and Nutrition Institute
Caribbean Food and Nutrition Institute (CFNI) is the sole institution of its kind in the English-speaking Caribbean region dealing with Food and Nutrition. It is responsible for a range of publications, audio/visuals and training programmes in food and nutrition, designed for Caribbean communities. Its Resource and Documentation Centre is heavily utilized by students, teachers and tutors in schools and colleges as well as by researchers at the University of the West Indies where it is physically located.
NUTRITION MADE SIMPLE

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by

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We all know that food is important to our health, and that we should eat properly, or we will get sick. The big question is, how? What choices do we have? What are the right foods? What are the nourishing substances (nutrients) which they contain? What exactly do they do for us? How much of them do we need and in what combinations? How exactly does diet affect our health? Are we at the mercy of large food suppliers and “market forces”? Or can we exert some control as consumers? How can we empower ourselves to make responsible food choices, and so safeguard our health? This book responds to some of these questions.

Nutrition deals with how the food we eat and drink nourishes us and affects our health and well-being. That food must be produced, acquired, prepared, allocated or shared, eaten and utilized by the body before it nourishes us. Various factors influence each step of these processes and many disciplines of study and actions are involved, making the field of nutrition a very dynamic one. Knowledge of nutrition changes continuously as researchers discover and understand more. The search goes on because there are still many unknowns, but there are general principles that remain.

In this book we remind you of some of those principles; share some new scientific findings; and urge you to eat well, prevent some of the illnesses through sound dietary practices and be healthy.

This is the fourth edition of Nutrition Made Simple. In the 1980 edition specific articles from the weekly Nyam News series were put together as a basic nutrition resource. It was well received, used primarily by people working in health and education, and others involved in public education programmes. The emphasis then was on malnourished children. Their plight has greatly improved. Presently, obesity (fatness) and diseases like diabetes, high blood pressure, heart attack, stroke and cancer in adults have taken our region like a storm. These diseases, we now understand, also have direct connections with the way we eat. Once inflicted, they carry very grave consequences. Thus, “an ounce of prevention is better than a pound of cure”. Many of these diseases are preventable through sound dietary practices.
This updated version of Nutrition Made Simple is intended to reach many more people because we all eat and we all need to know what we eat, what happens to the food we eat, what happens to us if we get too much or too little and how we can make economical food choices for good health and general well-being. Thus, the subject of nutrition is also examined in wider social and historical contexts. We try to guide readers on these issues, with a strong emphasis on relationships between diet and health, since our watchword must be prevention.

The development of the book was also guided by numerous requests received by CFNI. These requests have come over a number of years from students and teachers, among others seeking further information on the subject.

As the name implies, Nutrition Made Simple breaks down complex scientific information for day-to-day use. In so doing, it provides a comprehensive overview on the basics of the science of nutrition. In short, it deals with how the food we eat and drink promotes our health and well-being. The publication is directed at a general audience, but aimed specifically at high school students who are preparing for the CXC examination and their teachers. In fact, it covers all the elements in the syllabus and so is an excellent source book for CXC students.

This book, therefore, places a great deal of emphasis on the prevention and control of diet-related illnesses. The chapters are organized in four parts: Part One provides knowledge of what nutrients and foods we need, how much we need and why we need them. What happens if we do not eat properly is explained in Part Two. Part Three attempts to personalize the knowledge — how to assess whether we are eating properly; how to improve if we are not, and even if we are eating properly; how to avoid mistakes in the future. So, assess, correct and monitor.

Part Four gives you tools to empower you to translate the knowledge into practice. Ultimately what you practise is what matters and not how much you know. It has annexes with information on food composition, household measures, recipes and other useful topics. Some words and terms used in the text are explained.
Some of the ideas are illustrated so that they will be clearer. There are several other publications from this Institute which go into more detail on specific aspects of diet and health. We urge you to read them also.

Remember, this book is designed to help you to judge how well you are eating and to make adjustments if necessary. Some myths are clarified and the consequences of too little and too much food are outlined. Making sound food choices, even if it means giving up some of your favourites, such as sweet, greasy and salty foods, and instead eating more fruits, vegetables, peas, beans and ground provisions (starchy roots, tubers and fruits), may mean a big difference to your health.

*Nutrition Made Simple* is a useful source of knowledge for you, as well as a tool to help you to put that knowledge to work. We hope that it will bring you pleasure as well as enlightenment and health.

*EAT WELL AND STAY WELL!* 
The efforts of many people, over many years, are represented in this publication. CFNI acknowledges with gratitude the sterling contribution of all.

Mrs. Versada (Sadie) Campbell, CFNI's former Nutrition Educator, and Dr. Dinesh Sinha, former Nutrition Advisor authored the first two editions of this publication. However, several other staff and other PAHO colleagues, past and present, need to be singled out for the part played in suggesting topics, researching, writing, critiquing, editing and producing the Nyam News features which were incorporated into the first edition.

Others have, over the years, periodically revised the information to reflect current scientific knowledge and trends.

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PART ONE

THE BASICS OF FOOD AND NUTRITION
WHY WE EAT THE WAY WE DO

Cultural habits, family traditions, modern "fashions", persuasive advertisements, what's available, what we can afford, hunger, appetite and the allure of the food itself — all these influence the way we eat. But the way we eat has a direct effect on our health and strength! Let's not leave that to chance. This chapter provides valuable insights on how to develop healthy eating habits for a better, more productive life.

Old Habits Die Hard

Our food habits are formed in childhood, based on the patterns of our parents or guardians. As we grow older, those habits may be modified by various factors. These include, our social and economic circumstances, how much food is available, the size of our appetites, our level of education and the effect of food commercials heard on radio and seen on television and billboards, in newspapers and magazines.

Most adults eat meals using the same basic food items throughout their lifetime. Even when they are in a different environment they clamour for these familiar foods and will even pay high prices for them. It is natural to favour some foods over others and to miss such foods if we do not have them, because we have our individual likes and dislikes.

This tendency to choose familiar foods results from the culture or traditions and ideas/beliefs handed down by the older generations. It is good to keep the valuable elements of this culture. In our case in the Caribbean, this includes growing and preserving some of the foods we eat, and having as wide a variety of foods as possible, depending on which ones are accessible, available and economical.

At times some of us follow the latest "fashions" in eating, in the same way we try to wear "trendy" clothes. People who wish to reduce weight
fast are most likely to try the “potions” which they think will help them shed a pound here or there. Alas! This usually turns out to be mere fantasy. Sometimes the result is a nightmare, and a lot of money is wasted.

How Much Can We Afford to Spend on Food?

Like everything else nowadays, food is expensive and many people do not have the funds to buy the basic foods they need. Others have the funds but may not necessarily buy and eat nutritious, healthy mixtures of food. Suggestions for making the food dollar “stretch” and getting value for money are discussed in Part 3 of this book.

Different Eating Patterns

Most of us eat meat and other foods from animals, but there is an increasing trend towards vegetarianism. Also, because of the many ethnic groups which make up our society, different eating patterns have emerged. There are health benefits to choosing Oriental and vegetarian cuisine. The Oriental pattern of mixed dishes with small amounts of meat, fish or eggs; large amounts of rice or other starchy staples, and vegetables cooked quickly by stir-frying, accompanied by thin soups and sugarless beverages, are considered healthy.

Vegetarianism among religious and other groups is increasing rapidly. Groups of vegans consume only foods from plant sources, such as cereal grains, nuts, fruits, vegetables and ground provisions. Other vegetarians are simply non-meat eaters as they also consume animal foods such as milk and milk products, eggs and fish. They avoid alcoholic beverages. Rastafarians are mostly vegetarians who prefer foods in their natural, fresh or unprocessed state. They avoid salt and alcohol.

There are many advantages to vegetarian diets. Some of these are increased dietary fibre intake, low fat intake, especially of the hard type of fats from animals, moderate to low food costs and the tendency of these diets to help keep a person’s blood pressure and blood cholesterol levels normal.
Advertising

Advertising often lures us into purchasing non-essential foods which we cannot afford. We are all familiar with the techniques used by the commercial advertiser, such as catchy jingles, bright colours, attractive presenters and claims of health benefits to be derived. Also, the ads often suggest, in a subtle way, that success, romance, popularity and happiness are associated with their products — which, of course, may not be true.

Let us be aware of the power of advertising, which can persuade us to buy items that may be unnecessary or too expensive. We need to be constantly on our guard. Some items do not really do what the ads claim. On the other hand, advertising can teach us new ways of serving familiar foods, which can help us to vary our meal patterns and make meals more pleasing.

Likes and Dislikes

We tend to eat the foods we like most and these are usually meats and starchy and sweet foods. So the staple cereals — bread and flour served in other ways such as dumplings and rice — occupy pride of place in our diet. Some may favour large portions of meat, fish or chicken, or salty, snack-type foods. Eating too much of any one food — it does not matter what — will disturb the balance of nourishing substances we need for good nutrition.

Not many of us are fond of ground provisions and cooked or raw vegetables. It is fair to say that we reject some of these outright. Because we may have limited incomes, we tend to buy those foods which give us greatest satisfaction and to omit the ones we do not like. Often the foods we do not get around to purchasing are ground provisions, vegetables and fruits. Luckily, these are items which we can grow ourselves, but how many of us really do this? Vegetables and fruits are excellent sources of vitamins and fibre and ground provisions are rich in starch and fibre. Let us grow these foods and eat some at every meal.

Flavour and Attractiveness of Foods

Flavour is also a factor in our acceptance of food and this in turn, influences our nutrition. It involves the taste and smell of food. Colour,
Hunger and Appetite

Hunger and appetite affect our food habits too. The desire to eat arises from both hunger and appetite. However, appetite may function long after hunger is satisfied, and cause us to over-eat. This could be one reason why so many people are fat.

Snacking

Many adults and children “nibble” all the time. Women who stay at home are especially guilty of having many snacks in a day. Unfortunately, many of the foods “nibbled” on are high in calories and the eaters end up being obese (too fat) and hence more at risk of the chronic diseases which we will discuss in Part 2 of this book.

Some parents believe that eating in between meals is bad for their children’s health, but this is not necessarily so. What is important is the amount and the kinds of foods they eat. In general, snacks have a place in children’s daily pattern of eating. The body uses small, frequent meals more effectively than two or three large meals. It is important that snacks provide good nutrition while being tasty, exciting in shape, texture and colour, not overly expensive, and easily eaten. So properly planned, nutritious snacks can have a positive influence on our nutrition and health.

Eating Out

The increasing trend to “eat out”, the proliferation of “fast food” outlets, street vending of foods and the wide choice of processed foods are having a significant effect on our eating patterns. The amount of food served and food choices offered when eating away from home may not be the most appropriate for good health; and having made a purchase, a consumer feels obliged to consume the lot, eating far too much fat, animal protein, sugar and salt.
We should aim to practise healthy eating habits in order to prevent rather than having to treat or control the diseases associated with our food habits. Healthy eating always has specific benefits for all of us. A well-nourished person who practices good food habits has a better work attendance record and is more productive than those with poor food habits. He or she also gets sick less often.

So, why do we eat the way we do — culture, beliefs, habits, likes, dislikes, cost, sales pressure, attractiveness, social pressure, hunger and appetite? We eat for all sorts of reasons, but not for the major reason we should. Generally, we all know that we cannot survive or be healthy if we do not eat properly; but properly means different things to different people. What in food makes us survive and be healthy is not what makes us eat. Maybe, we need to know more about those factors in order to make the right choices. The next chapter is an overview of these factors and in the following eight we examine each factor in greater detail.
Food! Some of us love it; others neglect it; some over-indulge, and still others use it as a status symbol. One thing is certain, none of us can survive without it! This chapter tells why. Among the valuable lessons offered here are the different types of nourishing substances or nutrients, which foods provide them, how the body uses them and how much of each we need.

Our food may be solid or liquid, derived from plants or animals, cooked or raw, traditional or new, hot or cold, home-grown or purchased, imported or locally produced, prepared at home or elsewhere. It may be too much, too little or just right to meet our needs. We may eat alone or in the company of family and friends. Some people say they are vegetarians and cannot eat things which have a face; others say they cannot live without meat, morning, noon and night.

What we eat is our choice, but how far can we stretch this personal choice? Scientists are convinced that there are limits, fairly wide limits, and that we must stay within these limits. Crossing the upper or lower limits spells disaster in the long run.

What Food Does For Us

Food does the same for all of us. It satisfies hunger, nourishes the body and gives us a feeling of comfort and satisfaction. Eating certain foods tells who we are and where we are from. Some of us prefer to eat the traditional foods of our parents and grandparents — and there is nothing wrong with this, provided they meet our nutritional requirements. In fact, in many instances the foods our ancestors ate, as a result of hundreds of years of experience, were healthier than some which we eat today. Some people buy expensive or prestigious foods to show that they are better off economically.
Most of all, food provides us with energy to work, play, do our daily tasks and live. Even when we are at rest, the mere act of being alive uses energy derived from the food we eat. Our hearts keep on beating; our lungs keep working; our blood keeps circulating throughout our bodies and many other vital functions are carried out, from the day we are born to the day we die. These activities take up about two-thirds of the total energy our bodies use every day. Food also helps to build, repair, and maintain our bodies. Eating right helps us to keep healthy, well-nourished and alive.

We need many different kinds of food. This is so because foods are complex substances which give us a range of nutrients or nourishing substances. A particular food may be rich in only a few nutrients, but a good combination of foods will provide all that we normally need. We do not know of any pill that can replace our diet. As we keep on discovering more nutrients and new functions for those we already know, we continue to improve our diet.

The same nutrients are needed by all individuals, but depending on whether we are male or female, young or old, big or small, work in the field or sit behind desks (our level of activity) and our general state of health, some nutrients will be required in greater or lesser proportions than others.

How Food Nourishes Us

Food keeps us healthy by providing energy or fuel, building or structural materials and protective substances for our bodies. All these come from six different groups of nutrients namely, carbohydrates, proteins, fats, minerals, vitamins and water. Other substances, such as fibre (found only in plant sources of food) are not considered nutrients but they play important roles in keeping us healthy. Carbohydrate, fat and protein provide energy and are therefore called the fuel nutrients.

The food we eat must first be digested, or broken down into simple components, which are then absorbed into the blood. The blood takes these components to the body cells. In the cells, the nutrients interact, and some are even transformed, before being built into the kinds of substances the body needs. So, the basis of how food keeps us healthy lies mainly in how the body obtains and manages its nutrient and energy supplies. Details of the specifics are given in succeeding chapters but a summary of the nutrients and how they nourish us follows.
Fuel Nutrients and Energy

The tiny bundles of energy in food are measured in kilocalories or calories for short. The word calories is often written with a common “c” as it is now well understood that calories in food are kilocalories or large calories. Now that we have gone metric we have to convert calories to joules. Joules are smaller than calories — approximately 4.2 joules (really kilojoules) are equal to 1 calorie.

Calories or joules are units of energy representing the heat given off when food is burned. Foods are burnt in the body but not as completely as when they are burnt in a laboratory; so the laboratory results must be corrected to show the value of a particular food to the body. It is these corrected values that we find in Food Composition Tables. We can also arrive at the energy value of foods by calculating the amount of carbohydrate, fat and protein that a particular food contains. Carbohydrate and protein each provide 4 calories per gram, but 1 gram of fat provides 9 calories. The alcohol from alcoholic beverages provides 7 calories per gram.

Carbohydrates

Carbohydrates are the most important source of fuel for the body. They include sugars and complex starch/fibre combinations. When we eat, the carbohydrates (except fibre) are broken down into their simplest form — a sugar called glucose. With the aid of the chemical messenger insulin, glucose is transported by the blood to the cells of the body. In the cells, glucose interacts with oxygen breathed in from the air, and produces energy.

The sugar glucose, is the only form of energy used by the brain and other parts of the nervous system. A certain amount of glucose must be in the blood at all times if we are to feel alert and well. That is why breakfast (a morning meal) is so important as it replenishes the blood glucose used up by basic body functions during sleep. If we eat enough carbohydrate the body will not have to use protein for energy, but if we eat too much the extra carbohydrate will be stored, mostly as fat.

It is perfectly healthy for older children and adults to get about three-quarters of the energy they need from carbohydrate-rich foods such as whole grain cereals, peas, beans, ground provisions/produce, vegetables and fruits.
These foods also provide protein, minerals and vitamins as compared to sugars and sweets which provide energy alone.

Fibre is not digested, yet it is invaluable to our bodies. There are two types of fibre — soluble and insoluble. Insoluble fibre tends to let food pass quickly through the digestive tract while soluble fibre slows it down. Both types absorb water thereby softening and enlarging the stool, and so can prevent and treat constipation. Insoluble fibre also helps to prevent cancers of the colon and rectum, while soluble fibre helps to lower total blood cholesterol (a fat-like substance) and thereby protect against heart disease.

Proteins

Proteins are essential for the development, maintenance and life of every cell in the body and thus for life itself. So, proteins build the body and supply the materials for manufacturing substances which help the body to use food well, regulate growth and guard against disease. Proteins will also help to provide energy in the body if there is an inadequate supply of carbohydrate and fat.

The smallest ‘building blocks’ of proteins are amino acids. These amino acids are found in a range of foods. The main foods are peas, beans, meat and other animal products (except butter and other fats) and cereals. So, proteins are widespread in the foods we eat.

When our food is digested, a pool of amino acids is provided. From this pool, the body makes the kinds of proteins it needs by combining different types and proportions of amino acids. There are about 20 different amino acids that form proteins. The body can make about 11 of these; the other 9 must come from food and are therefore called essential amino acids. The essential amino acids all have to be available at the same time and in the correct proportions so the body can produce the others and the protein it needs.

The greatest amounts of these essential amino acids are found in food from animal sources, except gelatin. Protein from plant sources is often low in one or more essential amino acids; but when eaten together in certain combinations such as in rice and peas made in a ratio of 1:1 or 2:1, the amino acids complement each other. This results in high quality protein which the
body uses well, in the same way it uses protein from animal sources. The exception, of course, is gelatin from the skin, feet, tail and head of animals. Gelatin does not have a good balance of the essential amino acids. That is why we do not get much nourishment from the gelatinous, tasty mass which results on cooking these items.

Babies, toddlers, school children, adolescents and pregnant and nursing women need more protein than others because of their fast rate of growth and development. Yet, moderate intakes of protein-rich foods will supply all their needs. Other persons who need even less protein often get more than they need from their diets. It is therefore not necessary to eat large portions of meat, fish or chicken or to drink lots of milk, because accompaniments such as rice, peas, dumplings, bread, pasta and vegetables provide additional protein. It should be good news that we need not eat too much protein, because of the high cost of food from animal sources and the amount and type of fat most of those items contain.

Fats

Fats provide twice as much energy as the same weight of carbohydrates. They line or cushion all the organs of the body, carry the fat soluble vitamins, make food taste good and slow the digestion of foods.

Fats are made up of chains of fatty acids which are linked by the alcohol glycerol. Most of the fats in the body and in foods have three fatty acid chains and are called triglycerides. There are different types of fatty acids in any one fat. Other features of fats include differences in the length of the fatty acid chains and in their chemical components. All these affect the physical characteristics of fats and even how the body uses them. The saturated fats are the 'hard' fats which are found mostly in food from animals, except fish.

Fats with a high ratio of unsatisfied or unsaturated fatty acids are liquid even when refrigerated and come mostly from plant sources and from fish. Two of these unsatisfied fatty acids called linoleic acid, and linolenic acid stand out above the rest. They must be supplied by food as our body cannot make them. Linoleic acid promotes normal growth in the young. It is a part of all cell membranes, thus regulating their functioning, and plays a major role in muscle contraction, in the digestive process and in the control
of blood pressure and blood fat levels. Linolenic acid promotes healthy membranes in the eye and the brain. So, it is very important to include foods which have these fatty acids in our diet. Good sources of linoleic acid are soya oil, corn oil, cottonseed, sunflower and sesame seed oils. Linolenic acid is found in abundance in fish and shellfish.

**Cholesterol**, a waxy, fat-like compound, plays many useful roles in the body. The body makes most of its own supply so we do not have to get much from foods. It is found only in food from animal sources, so most people take in cholesterol in the foods they eat. Too much cholesterol spells trouble, especially when it is linked with saturated fats.

When fats are digested they separate into fatty acids and glycerol. Fatty acids with 12 or fewer carbons are absorbed directly and go to the liver. The other acids must link with proteins to form lipo-proteins to be transported by the blood. The high-density lipo-proteins (HDLs) have lots of protein and less cholesterol, while the low-density lipo-proteins (LDLs) have less protein and lots of cholesterol. They have even more cholesterol when the diet is high in the saturated or hard fats. The LDLs tend to be part of the ‘blob’ that clings to the arteries and hardens them, resulting in heart attacks and strokes. The HDLs tend to clear cholesterol from the blood and take it to the liver where it is dismantled or broken down.

**ENERGY BALANCE**

Irrespective of the source — carbohydrate, fat or protein — unused energy provided by all three are stored in the body as fat and thus increase body fat and weight. Too much body weight puts us at risk of many health problems. We can reduce stored fat if we use up more energy than we put in. Physical activity such as exercising is the way to use up more, and by eating less we put less energy into the body store.

We should eat a variety of foods to provide all the nutrients we need for the body processes. It is likely that extra energy will be taken in above normal requirements, so daily exercise is required to maintain energy balance.

On the other hand, the underweight person has not eaten enough to meet his or her energy needs, so fat stores will be depleted. To gain weight, such persons must eat more. They, like everybody else, should continue to
exercise, because of the health benefits from exercise, other than helping to maintain energy balance (see Part 4, Annex D). Energy balance is illustrated on page 13.

**How the Body Uses Energy**

The body uses energy in three ways:

1. For basic body functions such as heartbeat, breathing, circulation, digestion and making use of nutrients. Energy is also required for storing fat and other substances which the body needs. These functions go on even when we are asleep.

2. When we are awake we use additional energy for our day-to-day activities such as housework, dressing, playing, shopping, and office or other work.

3. We use a considerable amount of energy when we exercise and play games.

The energy needed for body functions is called **basal energy**. Basal energy needs are different for men and women at different ages and sizes. This basal need for energy gradually decreases, by a few calories per year, beginning at about age 25. By age 75 it may be 10-15% below what it was at 35 years. It is estimated that a normal young adult uses basal energy at the rate of about 1 calorie every hour for each kilo (2.2 lbs) of body weight. There is a 10% reduction during sleep, so the more hours the person sleeps the less energy is used. In a person who spends a lot of time sitting down, about two-thirds of the energy (calorie) needs is used to support basic body functions.

A physically active person, by virtue of his or her profession/occupation (e.g., farming, athletics) or by voluntary daily exercise, obviously uses more energy than a person who is not as active.

Researchers have taken the basal energy need and the energy required for moderate physical activity and come up with “recommended allowances” for energy and nutrients for males and females of various age groups. See Part 4, Annex E.
ENERGY BALANCE

A.
ENERGY INPUT (FOOD) equal ENERGY OUTPUT
(Vital body functions, daily activity, exercise)

B. TOO LITTLE ENERGY
ENERGY INPUT \downarrow \hspace{1cm} \text{ENERGY OUTPUT} \uparrow
\hspace{1cm} \bigtriangleup \hspace{1cm} \text{UNDERNUTRITION}

C. TOO MUCH ENERGY
ENERGY INPUT \uparrow \hspace{1cm} \text{ENERGY OUTPUT} \downarrow
FOOD CONTAINING
\hspace{1cm} \bigtriangleup \hspace{1cm} \text{OBESITY}
Fat \hspace{1cm} \text{OBESITY} \uparrow \hspace{1cm} \text{FAT}
Carbohydrate
Protein

Controlling our body weight through eating the right types and amounts of wholesome foods and fluids, and being physically active, are the cornerstones of good health.
Minerals

Minerals perform a wide range of functions in the body. Based on their major functions, the essential minerals can be divided into four groups:

1. **Minerals that strengthen** — calcium, phosphorus, magnesium and fluorine — are mainly in bones, teeth and the nervous system. Fluorine helps to protect the teeth against decay as it hardens the enamel and reduces the solubility of tooth minerals.

2. **Minerals that regulate body fluids** — sodium, potassium and fluorine. Sodium which is found in salt and in some foods is a major mineral outside the cells of our body. There it helps to maintain the balance of water and the acidity and alkalinity of body fluids and regulates blood pressure.

   Potassium stays chiefly inside the cells and helps to maintain the balance of fluids, heart beat and the health and vitality of the cells.

3. **Minerals that make special materials which cells need to work** — iron and iodine. Iron builds haemoglobin, the material which gives the blood its red colour, and which carries oxygen to our body cells. Iodine is essential for growth and the functioning of the thyroid gland which regulates the rate at which the body uses energy.

4. **Minerals that trigger chemical reactions in the body to help keep us healthy** — trace elements such as zinc and copper. Zinc is important in the digestion of protein and in the body's use of carbohydrate. It promotes growth and helps wounds to heal. Copper is a part of the enzymes or catalysts associated with the body's use of iron.
Vitamins

Vitamins are necessary for normal growth and the maintenance of life. They do this by serving as helpers to regulate the processes by which carbohydrates, fats and proteins are digested, absorbed and used in the body, and they protect the body against infections. In order to do these tasks, some vitamins function in a watery medium while others do so in a fatty medium. They are called water-soluble and fat-soluble vitamins, respectively. The water-soluble vitamins include the B-complex group and vitamin C. The fat-solubles are vitamins A, D, E and K.

It takes only a tiny amount of any one vitamin to start the necessary chemical reactions in the body — so the need for them is small. They are vital. We must get them from the food we eat.

Water

Then there is water which constitutes 50-60% of the weight of the body. It carries digested food, gases, waste products and all the other substances from one part of the body to the other. It also gives the body cells form and structure by preventing them from collapsing, while keeping them moist.

To get the right types and amounts of all these nutrients, we must pay attention to the quantity and variety of food we eat, to the times when we eat and the amount of water we drink.

How Much, What and When We Eat are Important

It is important that we control the amount of food we eat. It is more desirable and healthier to eat larger portions of peas, beans, starchy items, fruits, vegetables and fish than to eat lots of meat, chicken and other fatty foods from animal sources. The more fat and food that we eat overall, the more calories we will get. Most of those calories will be stored as fat if we are not active enough to use them up. Because of the difference in fat content and hence caloric levels, a serving of meat is about two ounces (60 grams), while a serving of fish can be double that. One cup of cooked rice
provides as many calories as a 60-gram portion of medium fat meat or chicken. It is unwise to say “I'll have more meat then” and omit the rice or other starchy food. The starches provide mostly carbohydrate and fibre, which the meats and other food from animal sources do not offer, except for milk, which provides the carbohydrate, lactose.

When we eat large meals once or twice a day, we tend to convert and store calories as body fat to a greater extent than when we have 3 or 4 small meals containing the same total amount of food.

A varied diet is best. The wider the variety or range of foods we eat, the better, because the nutrients which may be lacking in some will be present in others. What is meant by variety and how do we control our intake of calories? This will be explained in the chapters which follow.

Eating small meals regularly — three or more times per day — and having more fruits, vegetables, starchy foods and fish and less meats, fats, sugar and salt, make our diet healthy. We should also drink lots of fluids — the best of which is plain water, also known as “crystal punch”.

Guidelines For Eating

Certain guidelines have been suggested to help us assess how well we are eating. Our plan using the six food groups, shown in the chart on page 150, is the chief way of helping us to make wise choices while keeping an eye on the amounts, particularly of items which contribute calories (energy). Within each food group, we can exchange one food for another, and we can combine foods from the different groups according to what we call the multimix principle. In applying the multimix principle, remember to eat less meat — especially fatty meats — less sugar, salt and refined cereals, and more peas, beans, fruits, vegetables, ground provisions and whole grain cereals, and drink more water.

We must also limit our alcohol intake, having no more than 1-2 standard drinks per day, if any at all, control our weight and be physically active to help our body use up some of the energy it gets from food. Let us look at what and how much we are eating and focus on the guidelines.
Do you know what are the most important “body fuels”? These are carbohydrates, better known as sugars and starches, and there are both simple and complex varieties. Clever plants make their own, using sunlight, water and carbon dioxide. Clever people obtain their supply from the right mix of foods, in the appropriate amounts. Informative details are presented here on carbohydrates, their sources, the way they “fuel” good health by playing their major role of providing energy for the body, how they help in the production of energy from fats, and spare proteins to do their maintenance, repair and growth jobs, and the body functions which benefit.

Carbohydrates are our most important body fuel. All carbohydrates break down into different sugars and ultimately to the simplest sugar, glucose, which breaks down further to provide energy. We get most of our carbohydrates from plants. The common sources in nature are fruits and vegetables; cereals such as rice, corn and wheat, from which we make flour and flour products such as bread, biscuits, crackers, noodles and macaroni; peas and beans and ground provisions like yam, potato, breadfruit, plantain and bananas (also called figs). Honey and molasses also provide sugars. The only animal source of carbohydrate is milk which provides a sugar called lactose. Carbohydrate that is stored in the body is called glycogen. But our body can store only a limited supply of glycogen; enough for only 12-18 hours and when that is gone we have to supply it again through food.

We also take in carbohydrates in the form of refined sugar when we eat and drink processed foods such as jams, jellies, candies or sweets, pastries, puddings, syrup, fruit-flavoured drinks and “sodas” or carbonated beverages.
What is a Carbohydrate?

A carbohydrate is made from water and carbon dioxide. Plants use sunlight to make carbohydrate from these two ingredients. The carbohydrate made is the plant’s own food. Plants store this food in their seeds, stems, roots and fruits. Carbohydrates are made up of the elements — carbon, hydrogen and oxygen.

The way plants make carbohydrate is shown in the following equation and diagram.

Water + Carbon dioxide + Energy from sunlight $\rightarrow$ Carbohydrate
$(H_2O) + (CO_2) \rightarrow (C,H_2,O_4)$

The simplest type of carbohydrate is called sugar. There are different types of sugar:

1. The most basic types are glucose, fructose (or fruit sugar) which we find in fruits and galactose in milk. These sugars are sweet-tasting and dissolve easily in water. Glucose is also called dextrose or blood sugar. As a group, these simple sugars are called monosaccharides.
2. Slightly more complex is sucrose or regular table sugar (which is made from fructose and glucose combined); lactose, found in milk (made up of glucose and galactose together) and maltose which comes from grains during the brewing or fermentation process, such as that used to produce beer. These sugars are called disaccharides.

3. The most complex carbohydrates are starches and glycogen. These are often called polysaccharides (meaning many saccharides or many simple sugars). There are also non-starch polysaccharides, which as a group, is called fibre. Starches and fibre together are called complex carbohydrates.

Some fibres dissolve easily and others do not. Starch is found mostly in the seeds and tubers of plants and fibres are a part of the structure of plant cell walls. Glycogen occurs in the muscles and liver of animals.

All carbohydrates must be converted to their simplest form — glucose — before the body can use them as fuel. The carbohydrates can only enter our bloodstream as the simplest sugar, glucose, no matter what their origin. So, glucose in the body is called blood sugar.

Why are Carbohydrates Important?

As an Energy Source: Carbohydrates are the basic fuel for our bodies. We get about 4 calories (units of energy) from every gram of carbohydrate we eat. Our brain and nerves need the carbohydrate glucose to function efficiently. Foods containing carbohydrates are usually available in large quantities. We can grow many of them all year round. They are often inexpensive. The way we prepare them will determine how they nourish us, but in general, the complex carbohydrate foods are low in fat and high in fibre. Eating them in only moderate amounts should help us keep our weight down and avoid diseases associated with being overweight, as well as reduce tooth decay.

Many foods with complex carbohydrates also contain other valuable nutrients. Whole grain cereals, for example, are rich sources of the B vitamins and fortified wheat flour also has iron. Yellow vegetables such as pumpkin and carrots provide carotene for vitamin A formation and for use in its own right as a valuable substance possibly in cancer prevention. Other
nutrients are also available in varying amounts. In many Caribbean countries, cereals which are rich in starch provide not only significant amounts of energy, but also substantial amounts of protein for the diet.

**As a Primer:** Carbohydrates serve as a “primer” for the body to utilize fat. Fat provides the major part of body energy, but for it to do so, substances from the breakdown of carbohydrates must be available.

**For Sparing Protein:** Carbohydrate in the diet is well known for its “protein-sparing” action. When adequate amounts of carbohydrates are eaten, they will give the body enough calories so that it will not have to use protein for energy. In other words, the carbohydrate calories allow the protein to be “spared” for its vital body-building, maintenance, growth and protection functions.

**For Flavour:** Refined sugar makes food taste good. However, we should not indulge in eating too much sugar as it provides only calories or energy.

We can satisfy our caloric needs by having large amounts of refined sugar but if we do this we lose out on getting our calories from other sources which in addition to calories, contain many vital nutrients. Thus, if it is a choice between refined sugar and other sources of sugar such as complex carbohydrates, it is the refined sugar which will have to be reduced to a minimum as it does not contain anything else but “empty calories”.

**Sugar in Foods**

Sugar occurs naturally in foods or may be added to processed foods. The sugar we buy is only one of the many types of sugar. The names and food sources of some sugars are shown below:

<table>
<thead>
<tr>
<th>Lactose</th>
<th>Milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fructose</td>
<td>Fruits, cornstarch, honey, syrup</td>
</tr>
<tr>
<td>Glucose/Dextrose</td>
<td>Cornstarch, corn syrup, fruits, soft drinks, honey, syrup</td>
</tr>
<tr>
<td>Maltose</td>
<td>Grains</td>
</tr>
<tr>
<td>Sucrose</td>
<td>Sugar cane, sugar beets, syrups, table sugar, sweets, canned fruits, juices, dried cereals, chocolates, cakes, pies, puddings, soft drinks, jams, jellies, condensed milk.</td>
</tr>
</tbody>
</table>
We should read labels on processed foods carefully. Names ending in ‘ose’ are likely to be sugars. Also, “sugar free” or “sugarless” means no sucrose or regular sugar added but there may be other types of sugar.

Here is an idea of how much sugar there is in some foods. The quantities are expressed in teaspoons (tsp).

The Amount of Sugar in Some Foods

<table>
<thead>
<tr>
<th>Type of Sugar</th>
<th>Large Amounts 5-8 tsp</th>
<th>Moderate Amounts 2-4 tsp</th>
<th>Small Amounts Less than 2 tsp</th>
</tr>
</thead>
<tbody>
<tr>
<td>NATURAL SUGAR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30g (1 oz) raisins/prunes/other dried fruits</td>
<td>1 cup unsweetened yoghurt</td>
<td>1 medium-sized orange</td>
<td>½ cup cooked vegetable</td>
</tr>
<tr>
<td>1 medium sized ripe banana</td>
<td>½ grapefruit</td>
<td>½ small pawpaw</td>
<td></td>
</tr>
<tr>
<td>1 thick slice fresh pineapple</td>
<td>1 tablespoon honey</td>
<td>1 large otaheiti apple/plumrose</td>
<td></td>
</tr>
<tr>
<td>SUGAR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>prunes/other dried fruits</td>
<td>1 medium-sized mango, guava, naseberry/sapodilla</td>
<td></td>
<td></td>
</tr>
<tr>
<td>½ medium sized ripe banana</td>
<td>½ grapefruit</td>
<td>½ small pawpaw</td>
<td></td>
</tr>
<tr>
<td>1 thick slice fresh pineapple</td>
<td>1 tablespoon honey</td>
<td>1 large otaheiti apple/plumrose</td>
<td></td>
</tr>
<tr>
<td>ADDED REFINED SUGAR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (340 ml) bottle cola-type soda</td>
<td>1 (60g/2 oz) slice plain cake</td>
<td>1 Tablespoon Ovaltine/malted milk/ketchup/Milo</td>
<td></td>
</tr>
<tr>
<td>1 boxed/bottled (240 ml - 350 ml) fruit-flavoured drink</td>
<td>½ cup ice cream</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (240 ml) bottle Ribena</td>
<td>½ cup canned sweetened fruit juice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 50-60g (2 oz) bar chocolate</td>
<td>½ cup Jello</td>
<td>1 Tablespoon Ovaltine/malted milk/ketchup/Milo</td>
<td></td>
</tr>
<tr>
<td>NATURAL AND REFINED SUGAR</td>
<td>½ cup canned fruit cocktail and other canned fruits in syrup</td>
<td>½ cup baked beans</td>
<td>1 teaspoon jam/jelly</td>
</tr>
<tr>
<td></td>
<td>2 tablespoons sweetened condensed milk</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Given the quantity of sugar in these food items, you can easily see how much energy is provided by sugar alone.
One level teaspoon of sugar provides 15-20 calories.

The amounts of carbohydrate (both sugar and starch) in given amounts of some foods we eat often are as follows:

**The Amount of Carbohydrate in Foods**

<table>
<thead>
<tr>
<th>Food Groups</th>
<th>Food Serving</th>
<th>Amount of Carbohydrate in grams (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Staple Cereals</strong></td>
<td>1 cup cooked white rice</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>1 boiled dumpling made from 60g/2 oz wheat flour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 slices/50g white bread</td>
<td>25</td>
</tr>
<tr>
<td><strong>Staple Ground Provisions/Produce or Starchy Fruits, Roots and Tubers</strong></td>
<td>2 medium-sized/100g green bananas/figs, peeled</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>100g/3½ oz sweet potato, peeled</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>100g/3½ oz yam, coco/eddoe/tannia, peeled</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>100g/3½ oz breadfruit, peeled</td>
<td>20</td>
</tr>
<tr>
<td><strong>Legumes/Nuts</strong></td>
<td>½ cup cooked dried peas/beans</td>
<td>20</td>
</tr>
<tr>
<td><strong>Fruits/Vegetables</strong></td>
<td>1 large/100g ripe banana</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>1 medium-sized/100g mango</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>1 slice/100g pineapple</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>1 medium-sized/100g orange</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>100g/½ cup carrots</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>100g/½ cup pumpkin</td>
<td>7</td>
</tr>
<tr>
<td><strong>Food from Animals</strong></td>
<td>1 cup/250 ml full cream milk</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>1 tablespoon/15g sweetened condensed milk</td>
<td>8</td>
</tr>
<tr>
<td><strong>Other Foods</strong></td>
<td>1 cup/250 ml sugar cane juice</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>1 tablespoon/15g honey</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>1 tablespoon/15g syrup</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>1 teaspoon/5g sugar</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1 teaspoon/5g jam, jelly</td>
<td>4</td>
</tr>
</tbody>
</table>
Ground Provisions are Less Starchy and Less Fattening than Many People Think

Ground provisions are starchy, but much less so than rice, wheat flour and cornmeal. Let's compare. In the raw or uncooked state, three-quarters of rice, wheat flour and cornmeal is starch. Peeled ground provisions have one-fourth to one-half less starch: cassava and green plantains are one-third starch and green bananas, yams and cocoyam, Irish potato and breadfruit are one-fourth starch.

Did you know that you also get protein from foods rich in the complex carbohydrates? How much there is in given amounts is shown on the next page.

You are sure to get minerals and vitamins too. Like any other food that provides energy, we should be careful not to have too much. But we should not ignore ground provisions either. They are healthy, local foods.

Carbohydrates in the Body

After food is digested, carbohydrates, except fibre, are converted into the simple sugar glucose. The blood takes glucose to each body cell, which depends on it for functioning properly. So, a certain amount of glucose must be in the blood (70-120 mg/100 ml) at all times if we are to feel alert and well. It is the only form of energy used by the brain and the nervous system, so there is always a demand for glucose. Our brain cells are always active even when we are asleep. If our blood glucose gets higher than normal, we may feel sleepy and if it falls below normal we may feel tired, hungry and shaky. Sustained low blood sugar can cause irreversible brain damage.

A normal, healthy person can store only about 300 grams of glucose. This amount of glucose is enough to provide energy for only 12-18 hours. So, if a person has dinner at 8 o'clock at night, by 8 o'clock in the morning he or she has almost exhausted the glucose store and needs to eat. Breakfast is therefore a very important meal.
### Protein Content of Foods Providing and not Providing Carbohydrate

<table>
<thead>
<tr>
<th>Foods</th>
<th>Serving</th>
<th>Protein (g)</th>
<th>Carbohydrate (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Providing both Carbohydrate and Protein</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cereals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>60g/2 oz uncooked</td>
<td>4-6</td>
<td>46</td>
</tr>
<tr>
<td>Flour</td>
<td>1 cup cooked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cornmeal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starchy Roots, Tubers and Fruits</td>
<td>100-120g uncooked or ½-¾ cup cooked</td>
<td>2-3</td>
<td>25-45</td>
</tr>
<tr>
<td>(e.g., yam, cassava, breadfruit)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legumes/Nuts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dried Peas and Beans</td>
<td>30g/1 oz uncooked</td>
<td>6-8</td>
<td>18</td>
</tr>
<tr>
<td>Peanuts</td>
<td>30g/1 oz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peanut butter</td>
<td>2 Tbsp/30 ml</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Green Leafy/Yellow Vegetables</td>
<td>120g/4 oz uncooked</td>
<td>4-8</td>
<td>8-9</td>
</tr>
<tr>
<td>(e.g., spinach, callaloo, carrot, pumpkin)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruits</td>
<td>1 medium-sized</td>
<td>0.5-1</td>
<td>12-15</td>
</tr>
<tr>
<td>(e.g., mango, orange, guava)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stored glycogen and blood glucose are the prime contributors of energy in the early minutes of exercise, sometimes up to 30-40% of the total energy exercising muscles need. *We can help to maintain a normal amount of blood sugar in our body if we have good eating habits.*

The sensation which develops when blood glucose concentration is low urges us to eat. After we eat, our blood glucose level will rise again. This rise is detected by the pancreas which produces the hormone, insulin which carries glucose inside the cells. Here, glucose is broken down to carbon
dioxide (CO₂), water and energy. If the glucose is not needed immediately, it is stored in the muscles and the liver in the form of glycogen. The liver cells also convert extra glucose into fat which is stored in various parts of the body. The stored glycogen can be broken down to glucose to keep replenishing the blood glucose used up by the brain and other cells. But only limited amounts of glycogen can be stored, so it is necessary to eat at frequent intervals to maintain normal blood glucose levels.

Blood glucose regulation may fail in some people, even though they try to eat regularly and well. Low blood sugar, which is called hypoglycemia, or consistently high blood sugar which is called hyperglycemia, may result.

**RICH SOURCES OF COMPLEX CARBOHYDRATE**
It's indigestible and it is not a nutrient. Grandma called it “roughage” and knew it helped the “bowels” to work properly. We call it “fibre” and know that it also helps to prevent cancer of the bowels. That's the insoluble type of fibre. The soluble type may also prevent heart attack. Fibre is found in fruits, vegetables, grains and ground provisions, and has many other advantages. Read about them, and learn which foods are richest in this prized plant component.

Fibre is that part of food from plants that our body cannot digest. It was originally called roughage but that is changing now as two types of fibre — soluble (able to be dissolved) and insoluble — (unable to be dissolved) — have been identified. Together they are referred to as dietary fibre. Most of the insoluble portion is what is called crude fibre. Almost all the fibres are complex carbohydrates. They include the skin, roots, stems, leaves and seeds of plants.

Insoluble fibre includes the woody or more solid parts of plants such as cellulose. It is found mostly in the skins of fruits and vegetables and in the bran or outer coating of grains such as wheat, corn and nuts. Whole wheat bread, unrefined cornmeal, cassava and dried coconut are good sources of insoluble fibre.

Soluble fibre includes pectin and gums. These are substances that dissolve and thicken in water to form gels. Peas, beans, lentils, oats, barley, citrus fruits, guava, pawpaw/papaya, chocho (christophene), carrots, okras, apples, cabbage, broccoli and most ground provisions contain soluble fibre.

Why Fibre?

Fibre is important for our health and well-being. Insoluble fibre tends to let food pass quickly through the digestive tract while soluble fibre slows
it down. Both forms of fibre absorb water thereby softening and enlarging the volume of stool. Therefore, these fibres can help to prevent and treat constipation. Insoluble fibre also helps to prevent cancers of the colon and rectum. Soluble fibre helps to lower total blood cholesterol and to protect against heart disease.

High fibre diets can help fat (obese) people to lose weight and maintain that loss on a long-term basis. Here are some ways in which fibre does that. High fibre foods generally take longer to chew so that the total food intake may be less. Some fibres slow the emptying of foods from the stomach, making us feel full. Fibrous foods are bulky and are usually low in fat and calories. Thus, they give a feeling of fullness and help us to reduce our intake of total calories. When we have a vegetable salad at the beginning of a meal we have less space left to fill with the main meal which generally has more calories than the salad.

Dietary fibre plays a role in controlling diabetes too. In diabetes, high fibre diets help to lower blood glucose and insulin levels, thereby helping to keep the blood sugar level near normal. (The diseases mentioned here are explained in Part 2 of this book).

Many people say that the white variety of chocho (christophene) is “good for” or “cures pressure” or high blood pressure. Could it be that the soluble fibres and the lots of water in that fruit do affect blood pressure in a good way? It is possible, but we have no scientific proof. There is certainly no harm in eating that fruit as a vegetable, especially if we have our home-grown supply or we can buy it cheaply.

It is better to get the fibre you need from a variety of foods that contain complex carbohydrates than from a single source such as bran.

Different methods of analysis give different fibre values. The following figures for the amount of fibre in portions of food we eat regularly are taken from a range of sources.
The Amount of Fibre in Some of the Foods We Eat Regularly

<table>
<thead>
<tr>
<th>HIGH FIBRE (5-8 grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>½ cup all bran cereal, shredded wheat</td>
</tr>
<tr>
<td>½ cup cooked or canned dried peas and beans</td>
</tr>
<tr>
<td>1 cup cooked “turned” cornmeal (cornmeal mush)</td>
</tr>
<tr>
<td>100g (3½ oz) green or ripe plantain, breadfruit</td>
</tr>
<tr>
<td>100g (3½ oz) ‘greens’ — spinach/callaloo/dasheen leaves</td>
</tr>
<tr>
<td>100g (3½ oz) boiled corn</td>
</tr>
<tr>
<td>100g (3½ oz) cassava bread (hammy)</td>
</tr>
<tr>
<td>100g (3½ oz) dried fruit — raisins, prunes</td>
</tr>
<tr>
<td>30g (1 oz) passion fruit with seeds, dried coconut</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODERATE FIBRE (2-4 grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100g (3½ oz) fresh fruits — pawpaw, mango, guava</td>
</tr>
<tr>
<td>1 medium sized orange, apple</td>
</tr>
<tr>
<td>1 large ripe banana</td>
</tr>
<tr>
<td>100g (3½ oz) raw/cooked cabbage, watercress, turnip tops</td>
</tr>
<tr>
<td>100g (3½ oz) boiled yam, pumpkin, string beans</td>
</tr>
<tr>
<td>100g (3½ oz) avocado pear, eggplant, beets</td>
</tr>
<tr>
<td>2 slices wheat bread*</td>
</tr>
<tr>
<td>3 cups popcorn</td>
</tr>
<tr>
<td>1 cup cooked oats</td>
</tr>
<tr>
<td>½ cup carrots, broccoli, cauliflower, canned green peas</td>
</tr>
<tr>
<td>30g (1 oz) peanuts, peanut butter, almonds</td>
</tr>
<tr>
<td>1 small Irish or sweet potato eaten with skin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOW FIBRE (less than 2 grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100g (3½ oz) fresh or canned pineapple, lychee, tangerine, grapefruit, peach, pear, watermelon, cantaloupe, strawberry</td>
</tr>
<tr>
<td>60g (2 oz) tomato, sweet pepper, squash, lettuce, cucumber, radish</td>
</tr>
</tbody>
</table>

*Wheat bread includes both white bread and whole wheat bread, the whole wheat having the higher fibre content.
How Much Fibre Do We Need?

Infants and young children should get very little of the insoluble fibres so that they can absorb well the nutrients from their meals and therefore grow and develop well. Older children and adults need about 20-40 grams of dietary fibre per day.

This means that they need at least:

- 2 servings of fruits, such as banana or orange, grapefruit or guava
- 1 serving of vegetables, e.g., ½ cup cooked callaloo or spinach
- 1 serving (½ cup cooked) peas or beans with the skin on
- 2-3 servings of staples e.g., 1 large potato, 2 fingers green banana (fìg), half of a medium-sized plantain, 2 slices of bread
FACTS ABOUT FATS AND CHOLESTEROL

Many of us are confused about fats, cholesterol and the way these nutrients affect our health. Some foods, once thought of as healthy, are now “suspect”. Others, which we were told only recently to avoid, now seem to be necessary again! This chapter tells us in simple terms, what fats are made of, where they come from and how they are used by the body. It also explains “good” and “bad” cholesterol, and the link with hardening of the arteries, heart attack and stroke. Most important, it offers practical advice about the control of fats and cholesterol in our everyday eating patterns.

We now understand more about the principles of nutrition than we did 30 years ago and will continue to know more as scientists find out more. The more we know, the more critically we can look at the role of nutrients in our diet and health. We are reluctant to give up old ideas easily and are slow to incorporate new ones. So we are confused. There is a lot of confusion about the amount and nature of fat in our diet, and the effects on health. Below are some important facts about fats.

- Fats make a positive contribution to health.

- They provide a direct source of energy for all body cells, except the red blood cells and the cells of the brain and nerves.

- Most of the stored energy in our bodies is in the form of fat. Fats serve as a cushion to protect vital organs and keep us warm in cold environments.

- Fats serve as carriers for some of the vitamins (e.g., vitamins A, D, E and K).
- They form a part of the body structure and provide important chemicals the body needs for its functions.

- They also make food taste good as they absorb and retain flavours and influence the way food feels in the mouth.

| It can be harmful to eat too much fat. Too much leads to obesity which makes us prone to many serious diseases such as diabetes, high blood pressure, stroke, heart attack and others described later. Too much fat in our diet is likely to make us prone to certain kinds of cancers (e.g., cancer of the large bowel, prostate and breast). Some types of fat are responsible for the hardening and blockage of blood vessels, leading to heart attack and stroke, while other types are helpful in preventing these deadly diseases. |

We cannot live without fats in our diet, but we must not have too much.

What are Fats?

Fats belong to a large group of substances termed lipids (from the Greek word lipos meaning fat). They, like carbohydrates, are made up of carbon, hydrogen and oxygen, but the linking of those elements is different and the proportion of hydrogen to oxygen is considerably higher in fats.

Fats can be placed in one of the three main groups:

1. Simple fats
2. Compound fats
3. Derived fats

Simple Fats

Most simple fats are mixtures of fatty acids linked to an alcohol called glycerol. Most fats contain three fatty acids and are called triglycerides. More than 95% of the fat in foods and in our bodies is in this form. The structure
of the fat determines its taste, type and nature. That structure depends mainly on the proportion of hydrogen to carbon each fat contains. Also, the length of the fatty acid chain varies according to the number of carbons present, giving rise to short chain fatty acids having less than 6 carbons; medium chain with 6-10 carbons, and long chain with 12 and more carbons. The carbons are always in even numbers.

The two major types of fatty acids found in nature are saturated and unsaturated. A third kind, trans-fatty acid, is made artificially by incorporating hydrogen into an unsaturated fatty acid in the making of margarine. The process is called hydrogenation.

Saturated Fatty Acids

A saturated fatty acid contains only single bonds or "strong links" between the carbons; all the remaining bonds are attached to, or saturated with hydrogens, thus the name saturated fatty acid. In other words, the carbons are "satisfied" with their full quota of hydrogens. It is like dunking or soaking bread in your tea. When the bread is soaked and can hold no more liquid it is saturated.

Palmitic acid from palm oil is a saturated fat in which no site is missing hydrogen. Stearic acid from beef, butyric acid from butter and lauric acid from coconut oil are other examples of saturated fatty acids.

Saturated fats are found primarily in animal products including beef, lamb, pork and chicken. They are also present in egg yolk, milk and milk products, such as butter, cheese and cream. Fish does not contain much saturated fat. Saturated fats remain solid even at room temperature. That
is one of the ways you can distinguish a highly saturated fat from one that is unsaturated.

Coconut oil and red palm oil (abohy fat) are the only fats from plant sources which are highly saturated, but in the case of coconut oil, the level of medium-chain fatty acids it contains seems to cause the body to use it differently from other saturated fats. Contrary to present thinking in the scientific community, ongoing research seems to be indicating that coconut oil is not as potentially harmful to our bodies as others in this category of fats.

**Unsaturated Fatty Acids**

These contain one or more double bonds or “weak links” along the carbon chain. Each double bond in the carbon chain reduces the number of hydrogens which can bind with those carbons. Therefore, the fatty acid is **unsaturated** or “unsatisfied” with respect to hydrogen. Again, think of dunking bread in your tea. When the slice is merely damp, that is, it could hold more tea, it is unsaturated.

![Diagram of an unsaturated fatty acid](image)

*Oleic Acid, a mono-unsaturated fat showing one unsaturation (i.e., hydrogen missing in one site.)*

![Diagram of a poly-unsaturated fatty acid](image)

*Linoleic acid, a poly-unsaturated fat showing more than one unsaturation (i.e., hydrogen missing in more than one site.)*

If only one double bond is present along the carbon chain the fatty acid is called **mono-unsaturated**. Peanut oil and olive oil have high levels of this type of fatty acid. If there are two or more double bonds along the carbon chain, the fatty acid is said to be **poly-unsaturated**. Corn, soybean and sunflower oils are good examples of this type of fat. The term **PUFA** which is on some food labels means **poly-unsaturated fatty acid**.
Fats from plant sources are generally unsaturated and tend to be liquid. They are called oils. The less firm the fat, the greater the degree of unsaturation. The proportion of different fats in some foods is shown below.

### Amount and Type of Hidden Fat in Food

<table>
<thead>
<tr>
<th>FOOD ITEM</th>
<th>QUANTITY</th>
<th>GRAMS FAT IN STATED QUANTITY</th>
<th>PROPORTION OF FAT/CHOLESTEROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full cream/whole milk</td>
<td>8 oz (1 glass)</td>
<td>10</td>
<td>High saturated fat</td>
</tr>
<tr>
<td>Pork loin</td>
<td>60g/2 oz</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Milk chocolate</td>
<td>30g/1 oz</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Ice Cream</td>
<td>1/4 cup (1 scoop)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Fast Food - chicken</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>thigh fried in batter</td>
<td>90g/3 oz</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>extra crispy thigh</td>
<td>90g/3 oz</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Beef roast (well trimmed)</td>
<td>60g/2 oz</td>
<td>6</td>
<td>High saturated fat and cholesterol</td>
</tr>
<tr>
<td>Frankfurter</td>
<td>1 whole/40g</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Regular hamburger</td>
<td>2 oz/60g (fat meat)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Whopper</td>
<td>4 oz/120g (&quot;&quot;&quot;)</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Cinnamon/raisin</td>
<td>4 oz/120g</td>
<td>21</td>
<td>Usually high saturated fat</td>
</tr>
<tr>
<td>Danish pastry</td>
<td>4 oz/120g</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Cheese (Cheddar)</td>
<td>30g/1 oz</td>
<td>10</td>
<td>High cholesterol, moderate fat</td>
</tr>
<tr>
<td>Egg</td>
<td>1 large</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2% milk</td>
<td>8 oz (1 glass)</td>
<td>5</td>
<td>Moderate saturated fat</td>
</tr>
<tr>
<td>Sardine in oil</td>
<td>60g/2 oz</td>
<td>6</td>
<td>Low saturated fat, moderate cholesterol</td>
</tr>
<tr>
<td>Peanut butter</td>
<td>2 Tbsp/30g</td>
<td>16</td>
<td>High mono- and poly-unsaturated fat</td>
</tr>
<tr>
<td>Ackee (Jamaican)</td>
<td>3 pods (9-10 arilli)</td>
<td>15</td>
<td>High poly-unsaturated fat</td>
</tr>
</tbody>
</table>
**Trans-fatty Acids**

Unsaturated oils can be changed to semi-solid or solid substances by the chemical process of **hydrogenation**, which means adding hydrogen. This process reduces the double bonds in the unsaturated fat to single bonds, allowing more hydrogens to attach themselves to the carbon chain. The resulting fat, although basically of plant origin, behaves like saturated fat. Margarine is a good example of hydrogenated fat. Depending on the degree of hydrogenation, the margarine may be hard or soft.

**Simple Fats in Health and Disease**

The different simple fats behave differently in our bodies. The more saturated fat we eat, the greater our chances of getting heart attacks and strokes. On the other hand, unsaturated fat reduces the chances of getting heart disease. Lately, we have found that mono-unsaturated fats are even better than poly-unsaturated fats.

These findings have led to the thinking that we should replace all the saturated fats in our diet with unsaturated fats. This is not advisable. We need to balance both saturated and unsaturated fats for good health. When we reduce our total fat intake, particularly saturated fat, we reduce our chances of heart disease. People who have low-fat, high-carbohydrate diets have less heart disease, less high blood pressure, less stroke, less diabetes and less cancer than those who have high-fat, low-carbohydrate diets.

**Essential Fatty Acids**

Our body can make almost all the fatty acids it needs from carbohydrates and proteins, or by mobilizing the stored fats. Then, why not eliminate all fats from the diet? For one thing, the body cannot make two fatty acids — **linoleic acid** and **linolenic acid**. We must get these fatty acids from food. They are available from plant sources of food but linolenic acid is also found in seafood. Both of these essential fatty acids are important for the regulation of several body processes. Linolenic acid is primarily concerned with the health of the membranes in the brain and eye.
Linoleic acid is found mainly in vegetable oils such as sunflower, corn, soybean, cottonseed and sesame oils. It is also found in wheat germ, oats, peanuts and other types of nuts, and to a lesser extent in cashew nuts. Fats in avocado pear and olives have less than 10% linoleic acid and coconut and chocolate fats have a mere trace. So, we get most of this essential fatty acid, which the body cannot make, from the oil seeds (except coconut), whole grain cereals (with the germ intact) and nuts.

We also get small amounts of linoleic acid from animal sources of food, such as poultry fat (chicken, duck, turkey) and fat from pork, lamb, beef, milk and butter. The fat in human milk in our region contains about 10-15% linoleic acid. The amount varies according to the mother’s diet. It is believed that the higher levels are due to the shift from using butter and other solid fat to soft margarine and vegetable oils rich in linoleic acid.

Linoleic acid is particularly important for the proper growth of young children. Luckily, human milk has much more than cow’s milk. Here are some of the chief functions of linoleic acid:

- It regulates the making and use of cholesterol by the body;
- It helps to form substances which regulate body processes;
- It prevents the drying and flaking of the skin, and the clumping together of certain blood cells;
- It protects against coronary heart disease, and
- It is involved in the formation of membranes in the brain and the eye.
Its involvement in brain development begins early in life, and deficiencies at that time may lead to abnormality in the nervous system. That is why it is important that infants get breast milk. Much as industry has tried, it has not yet been able to totally duplicate the linoleic acid content of breast milk.

**Compound Fats**

Compound fats are made up of a simple fat and other chemicals.

**Phospholipids:** These consist of one or more fatty acids, phosphoric acid and nitrogen. They are formed in the liver. They help to maintain the structure of the cells, form the insulatory sheath around the nerves and help to clot blood.

**Lipoproteins:** These are formed primarily in the liver by the union of either triglycerides, phospholipids or cholesterol and protein. The lipoproteins are important because they are the main means of transporting cholesterol in the blood and they play the most important role in determining our risk of getting heart disease. These are discussed in detail later.

**Derived Fats**

This group of fats includes substances formed from simple or compound fats. The most important and widely known of the derived fats is cholesterol. It does not contain any fatty acid but it has some of the physical and chemical characteristics of fat.

Cholesterol and lipoproteins play important roles in health and disease. They are described in detail.

**Cholesterol**

Remember cholesterol is an important, waxy, fat-like compound which has many functions in the body:

- It is a part of *bile* which helps to digest fats.
- It is a starting material for the making of hormones (chemical messengers).

- It is used in the making of vitamin D, which takes place with the help of sunlight on the skin.

- It forms part of the structure of brain and nerve cells.

- It forms a part of every cell.

The body makes most of the cholesterol it needs. Only small amounts should come from food. When there is too much cholesterol in the blood, it forms the major part of the "build up" that narrows the arteries (blood vessels which feed the cells with oxygen and nutrients), resulting in the killer disease atherosclerosis (hardening of the arteries). It is the hardening of the arteries that is primarily responsible for serious and largely fatal conditions such as heart attack and stroke. In recent years, these conditions have become the major causes of death in the Caribbean. You will find out more about this a little later when we talk about fats and cholesterol in the body, and in Chapter 15 on Heart Attack.

**Food Sources of Cholesterol**

Cholesterol is found in egg yolk, shellfish, brain, organ meats — liver, kidney, heart — fish roe and meat and milk fat as shown below. Should we avoid eating these? Not at all. The cholesterol-rich foods are also rich in many nutrients. What we need is to eat small amounts of them.

![SHRIMP](image1)

![LIVER](image2)

![KIDNEY](image3)

![HEART & BRAIN](image4)

![EGG](image5)
Fats and Cholesterol in the Body

The body makes three-quarters (70-80%) of the cholesterol it needs, so only about one-fourth (20-30%) should come from our diet. An excess of cholesterol in the diet naturally leads to excess cholesterol in the blood.

Fats and cholesterol are not soluble in water, so they cannot travel in our blood by themselves. They therefore link up with specific proteins, forming compounds called lipoproteins, and move around the body in that way. Four types of lipoproteins circulate in the blood carrying fat and cholesterol to and from the various parts of the body. Each of these lipoproteins is different in make-up and performs different functions.

Most of the cholesterol is transported in the body by the low-density lipoproteins (LDLs) and the high-density lipoproteins (HDLs).

LDLs carry about 60-70% of the cholesterol from the liver and deliver it to the body cells. The LDLs are sometimes called the “bad” cholesterol.

HDLs help to remove excess cholesterol from the body cells and return it to the liver where it can be excreted in bile. The HDLs are therefore called the “good” cholesterol.

We need both the “bad” and the “good” cholesterol, but not too much of the “bad” LDLs. Too much of the LDLs causes cholesterol to build up on the walls of the arteries. Over time this build up leads to fatty streaks, plaques or thick sheets of fatty material and finally to blocked arteries. If the blocked artery is in the brain, the person gets a stroke and if it is in the heart, a heart attack occurs.

High levels of both total cholesterol and LDL cholesterol put us at great risk of getting hardened arteries and consequently heart attacks. Lowering LDL-cholesterol and raising HDL-cholesterol levels can prevent the hardening of the arteries and also help to remove cholesterol from the walls of the already hardened artery.

We must therefore control the amount of fat, especially saturated fat and cholesterol, and thereby the LDL levels, if we are to avoid getting the deadly artery-hardening disease. Remember that we may reduce the choles-
terol in our diet to the very minimum, yet, if there is a high level of fat and saturated fat in particular, we may still get a high level of cholesterol in our blood.

| What is high cholesterol in the blood? | For adults the desirable level is 200 mg/dl (5.2 mmol/l)* of blood. Cholesterol levels ranging between 200-239 mg/dl are defined as border line to high. So amounts above that are too high. |

You can find out what your cholesterol level is by taking a blood test. Ask your doctor to prescribe the test for you. The risk of heart attack increases with cholesterol levels greater than 240 mg/dl (6.2 mmol/l) of blood.

The following factors are associated with raised blood cholesterol levels.

- high intake of saturated fats
- high intake of cholesterol
- high intake of refined carbohydrates (sugars, sweets)
- low intake of dietary fibre

Replacing saturated fats (mostly from animal sources) with unsaturated fats (mostly found in plant sources) causes a substantial drop in LDL levels. LDL levels can also be controlled by eating less high-cholesterol foods. Unfortunately, we cannot raise the good HDL-cholesterol levels by diet but we can raise it by physical exercise, as described in Chapter 15 on Heart Attack.

*Units of measurement of cholesterol could be either milligrams (mg) per decilitre (dl) or one-thousandth of the molecular weight (mmol) per litre (l).*
It is therefore recommended that our diet be low in saturated fats (mostly animal sources and manufactured margarine, shortening); that we substitute mono- and polyunsaturated fats for some of the saturated fats we usually eat, and that we reduce our cholesterol intake. We should not, however, eliminate fats completely or replace the saturated fats totally with unsaturated fats. Both saturated and unsaturated fats are required for good health.

Here are some suggestions to help you control the amount and type of fat in your diet:

- Eat generous amounts of staples such as ground provisions, corn, oats and whole wheat products, also peas, beans, fruits and vegetables.
- Eat less meat preferably eat lean meat; remove the skin from chicken.
- Boil, bake, roast, steam or broil foods and fry less.
- Use skimmed milk, low-fat cheese and yoghurt.
- Use less butter or margarine on bread and in recipes.
- Use very little oil in cooking or oily dressings on salads.
- Skim the fat from soups and hot chocolate. A good way to do this is to prepare the soup or chocolate the day before, refrigerate it and lift off the slab of fat before reheating.
- Buy fewer ‘fast foods’.
Everybody’s talking about protein - but how important is it? What exactly is protein? What is it made up of? What does it do and how do our bodies use it? Which foods provide us with protein? How much of it do we need, and how can we select our foods to combine proteins and other nutrients for a wholesome diet? Let’s put the puzzle together, show where mistaken ideas from the past have been corrected, and learn how to “mix and match” proteins for good health!

Protein seems to get more attention than any other nutrient. Note that protein is a nutrient, not a food. Very often when you ask someone what they have eaten, they say protein when they really mean foods such as meat, chicken, fish, etc., which are high in protein. It is also felt that many people are badly nourished because their diets do not include enough of this important substance — not so at all. Protein is important and we need adequate supplies every day, but we need other nutrients as well. Protein stands out as an essential nutrient because it contains the element nitrogen, which is vital for the development, maintenance and life of every cell in the body and thus for life itself.

Protein also comes into the limelight because in the past many children did not get enough and suffered from malnutrition or more accurately, energy-protein malnutrition (EPM). EPM has been controlled a great deal in the Caribbean, but the image persists that we lack protein in our diet. This again is not generally true.

How Important is Protein?

- Protein makes up the basic material of the body. Blood, muscle and body cells, are made of protein. Even our skin, hair and fingernails are all protein.
A most important function of protein is to build the body. It helps to provide new tissues for growth, and to replace old and worn out tissues.

Protein also supplies the materials for manufacturing substances called enzymes which help to digest food, and others which help the body to function well. The significant others include hormones or chemical messengers which help the body to use food well and regulate growth, and antibodies which guard against disease.

If there is not enough fat or carbohydrate in the diet, protein will be used to provide energy, and the growth, repair and other functions will suffer.

Protein cannot carry out these functions alone. It must team up with other nutrients such as carbohydrates, fats, vitamins and minerals, which we get from a variety of foods.

What is Protein?

The smallest units of protein are called amino acids. They are made up of carbon, hydrogen, oxygen, nitrogen and sometimes sulphur. They are the "building blocks" of protein. Amino acids are joined to form different types of proteins. The proteins we eat in foods are not the same as the proteins in our body. When we eat protein in foods, the body breaks them down to form a pool of amino acids. From this pool, the body then assembles the kinds of proteins it needs for various purposes.

There are about 20 different amino acids. Nine (9) of these are essential, that is, the body cannot make them. They have to be provided by way of food and drink. If the body gets these nine amino acids it can make the others. The important thing is for all the essential amino acids to be available at the same time and in the correct proportions, so that the body can produce the other amino acids and ultimately the proteins it needs.

Sources and Quality of Protein

Foods differ greatly according to the amino acids they contain. In general, foods from animals, except gelatin, provide considerable amounts of all the essential amino acids. Proteins from plant sources such as peas and
beans, wheat, corn and rice, are often low in one or more of the essential amino acids. But when eaten together, such as in rice and peas in a ratio of at least 1 cup dried peas to 3 cups rice (uncooked), the amino acids complement each other because what is missing from the rice is supplied by the peas. A ratio of 1:1 or 2:1 of rice, corn or wheat (cereals) to peas or beans (legumes) is even more nutritious. So we have a nutritious mixture even without meat. When dried cereals such as rice, and legumes such as red peas/red kidney beans are combined in a 1:1 ratio, the protein provided by 1½ cups is equivalent in quality to 70 grams/2½ ounces of meat. We need to choose plant protein sources carefully, know how to combine them, and eat a large enough quantity to be sure our bodies get all the essential amino acids.

In the past, these differences in protein quality were identified by calling animal-source proteins “complete” or “first class” and plant-source proteins “incomplete” or “second class”. This distinction was misleading and is no longer used.

Remember! When cereals are combined with legumes in the right ratio, the quality of the protein in the mixtures is as good as most animal proteins, and better than gelatin. Gelatin has very, very low levels of some of the essential protein building blocks, and is therefore poorly used by the body. So the protein we get from cow’s foot or chicken feet or from “jello”, is not as nutritious as protein from meat, fish, cheese, milk and good mixtures of cereals and legumes.

The amount of protein in some foods is shown on the next page. Note that some of the best sources are foods from animals, which are used very well by the body. Dried peas, beans, seeds and nuts are also very good sources of protein; cereals such as wheat flour, rice, corn, cornmeal and their products have moderate amounts, while fruits, vegetables, ground provisions and high-gelatin animal products are low sources of protein.

How Much Protein Do We Need?

The amount of protein a person needs is estimated in two ways:

1. as a percentage of total calories in the diet, and
2. per unit of body weight.
Protein Content of Commonly Used Foods

<table>
<thead>
<tr>
<th>High Protein (15g and over per 100g/3½ oz of food)</th>
<th>Moderate Protein (6-14g per 100g/3½ oz of food)</th>
<th>Low Protein (5g or less per 100g/3½ oz of food)</th>
</tr>
</thead>
<tbody>
<tr>
<td>cheese, powdered milk, meat, chicken, fish, eggs, liver, kidney, heart, nuts, dried peas and beans, cashew nuts, almonds, peanuts, melon seeds, sunflower seeds, sesame seeds, pumpkin seeds</td>
<td>wheat flour, cornmeal, bread, rice, oats, macaroni and other pasta, dried corn, noodles, green peas and beans, crackers, biscuits</td>
<td>liquid milk, chicken feet*, cow’s foot*, pig’s trotters*, dried coconut, fruits, vegetables, ground provisions, cakes, doughnuts, green corn, canned corn</td>
</tr>
</tbody>
</table>

Per unit body weight is more reliable and more widely used. The interaction of protein and energy (calories) in the body varies according to demand, hence calculations based on percentage of total calories could be misleading.

However, as a rough guide, protein is assessed as about 10-15% of total calories per day. The lower figure is for adults while the higher percentage is for growing children. This means that if an adult takes in about 2,000 calories, he or she should have about 200 calories as protein. That is 50 grams protein at the rate of 4 calories per gram of protein.

When we calculate protein needs by body weight, we allow 1 gram of protein for each kilogram (2.2 lbs) of body weight. A person who weighs 50 kilograms (110 lbs) would therefore need about 50 grams of protein daily.

Babies and toddlers need about 2 grams per kilogram body weight because of their fast rate of growth and development. Adult men may get by on less than 1 gram per kilo of weight per day while the school child and adolescent need about 1.5 grams per kilo per day.

* Contain lots of gelatin, a type of protein which has low levels of some of the essential amino acids and therefore is not well utilized by the body.
It's hard to visualize a gram of protein when you see the needed amount specified in grams per kilogram of body weight. Look at the table in Part 4, Annex B, to see how much protein there is in everyday servings of food. So you can see that adding an egg and some milk to the diet of a growing child makes it possible for him or her to get the protein needed for growth and development, even if most of the rest of the food comes from plant or vegetable sources. You can also see that it is not necessary to eat large servings of meat, fish or chicken, because accompaniments such as rice and peas, dumplings or bread provide additional protein.

Mix and Match Proteins for Good Health

Now that the price of many animal protein-rich foods is so high, you may be worrying that you're not getting enough protein. This could happen if most of your supply comes from vegetables and ground provisions which have very little protein.

A good way to be sure that you and your family are getting enough protein is to serve more of the old "family favourites" which combine mixtures of peas, beans, vegetables, corn and other cereals. Add small amounts of chicken or fish if you have them. A good thick soup or stew made with peas, beans or other legumes can provide as much as 8 grams of protein for each cup served. To increase the protein quality and quantity, serve the soup with dumplings, wheat or corn bread or another cereal product.

Choose from two or more of these columns to obtain a good mix of plant proteins.

<table>
<thead>
<tr>
<th>GRAINS</th>
<th>LEGUMES</th>
<th>SEEDS AND NUTS</th>
<th>VEGETABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>cornmeal,</td>
<td>dried beans</td>
<td>cashew nuts</td>
<td>leafy greens and</td>
</tr>
<tr>
<td>dried corn</td>
<td>dried lentils</td>
<td>other nuts</td>
<td>yellow ones</td>
</tr>
<tr>
<td>oats</td>
<td>dried peas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rice</td>
<td>peanuts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>whole grain</td>
<td>peanut butter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>breads</td>
<td>soy products</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Some nutritious combinations of foods from plants are as follows:

**Legumes + Grains**

1 cup stewed beans or peas +
2 slices bread

1 cup cooked peas +
1 cup cooked rice/noodles/macaroni

1 cup stewed peas +
2 small cornmeal dumplings
   or
   pieces of cornbread

**Seeds + Legumes**

30g/1 oz shelled sunflower seeds +
30g/1 oz peanuts

30g/1 oz sesame seeds +
1 piece tofu (soybean curd)

**What About Milk?**

Another aspect of the protein puzzle is our concern about milk in our diet. There is concern about milk because we have grown to believe that milk is a 'perfect' food. So if it is perfect we must have it, and the more we have, the better for us. But it is not necessarily so. Milk is an all-rounder, so it contains a range of essential nutrients such as water (85%), protein, the minerals — calcium and phosphorus — vitamins A, B-group and D, sugar (lactose) and fat. As a first food for the newborn, mother’s milk is excellent, but as the child grows there should be less dependence on milk for essential nutrients. The child should be encouraged to eat a variety of foods for balanced nutrition from 4-6 months onwards. Children between one and three years old who are fed too much milk and very little of other foods often get too little iron and become anaemic. That is, their blood is weak. It cannot carry as much oxygen as it should to help the body tissues burn calories.
Milk is a nourishing food but drinking too much to the exclusion of other healthy foods, does not lead to the right balance of nutrients according to the needs of the particular age group. This is why milk is not singled out from other foods in the Food from Animals group in our Caribbean food grouping system as you will see in Part 3, Chapter 17.

Except for babies who need their mothers’ milk, a person can live a healthy life without drinking milk. The major nutrients found in milk can also be found in other foods as you will see in this chapter and in the chapters on carbohydrates, minerals and vitamins. Note particularly, the other good sources of calcium on page 68. Milk as a source of fat is discussed on the next page.

Yoghurt is a fermented milk — a thick, custard-like, smooth product with a tangy flavour. It is becoming increasingly popular in our region as its fine curds make it more digestible than plain milk. It also has less lactose which some people do not digest well. So they tolerate it much better than milk. Yoghurt has the same nutritive value as the milk from which it is made, but it is much more expensive than the same amount of milk. This is so because of the processing it undergoes and the packaging. Hints on how to make yoghurt at home are given in Part 4, Annex A.

Could a Person Have Too Much Protein?

Yes. It is easy to have too much protein as proteins are found in varying amounts in a wide range of foods. There is no known advantage to taking excessive amounts of protein. Some people believe that if they have lots of protein by eating large amounts of protein-rich foods and even take supplements, they can build stronger muscles. This is not true. Exercise builds muscles, not excess protein. Of course, if you do vigorous exercise you may need extra protein in keeping with your extra calorie needs.

We are beginning to realize that too much protein may be harmful. High intakes of protein may promote excessive loss of calcium from the body and even speed up an age-related decline in kidney functions.
Many High Protein Foods are Also High in Fat

Meat and milk are good sources of protein. However, these foods also have large amounts of fat and cholesterol. Even in the leanest ground beef about half (50%) of the calories comes from fat. In whole or full cream milk almost half the calories come from fat. Two percent (2%) milk is not as low fat as you might think. Although it is 2% fat by weight, over one-third (36%) of its calories come from fat. Skim milk is high in protein but low in fat. Most legumes provide good amounts of protein but have very little fat. One cup of cooked kidney beans/red peas for example, contains less than 1 gram of fat. Whole grains are also good sources of protein but have very little fat.

By replacing a major part of the protein from animal sources with plant sources we can cut down on the consumption of excess fat without jeopardizing our protein needs. We can also cut costs as plant sources of protein are still cheaper than animal sources. After all, it is grains that humans could eat, that are fed to animals in large quantities to produce small amounts of meat and other animal products.
Vitamins are vital — we all know that! But how many of us know why, what exactly they do, or how to ensure that we get the right selection of them in the necessary amounts from the foods we eat? This chapter explains the basics about the 15 vitamins which our bodies need as “helpers” and “regulators” in the processing of our food. It also appears that they can save us from serious diseases such as heart attack and cancers. Interesting notes on how the vitamins got their names, how much we need, foods in which they are found and diseases caused by too little or too much of them are also covered.

Vitamins are nutrients that are necessary for normal growth and maintenance of life. They serve as essential links in the processes by which carbohydrates, fats and proteins are digested, absorbed and used in the body and make up new tissues. It is essential that we get the right amount of vitamins to be healthy, but too much is wasteful and even dangerous sometimes. Most of us get all the vitamins we need from the food we eat so we do not need to take expensive vitamin pills. Vitamins D and K are the only two vitamins that we get from non-food sources.

Vitamins are compounds which are all made of the same chemical elements: carbon, hydrogen and oxygen. The elements are arranged in different combinations to form different vitamins. About 15 vitamins have been identified as playing special roles in keeping us healthy.

How the Vitamins Got Their Names

It took a long time to identify the vitamins chemically. So researchers named each compound after a letter of the alphabet — A, B, C, D, E, etc. As the compounds were better understood some were given specific names and numbers and others retained their letter names. Scientists found that the B vitamins were in fact a whole family of similar vitamins. So numbers were added, for example vitamin B₁, B₂, B₃. Scientific names were also given to these vitamins. The most popular vitamins are: vitamin A or retinol,
vitamin B₁ or thiamine, vitamin B₂ or riboflavin, vitamin B₃ or niacin, folacin, folic acid or folate, vitamin B₆ or pyridoxine, vitamin C or ascorbic acid, vitamin E or tocopherol, and vitamin K or menadione/phyloquinone. There are gaps in the alphabetical system of names because some vitamins were found unnecessary for human beings and were therefore dropped from the list.

Properties of Vitamins

Vitamins are classified according to whether they dissolve in water or in fats. Those that dissolve in water are called water-soluble and include the B vitamins and vitamin C. Those that dissolve in fat are called fat-soluble and include vitamins A, D, E and K.

The water-soluble vitamins (B group and C) are quickly absorbed into the blood and the body cells. Except for vitamin B₁₂ which is recycled, excesses are passed out of the body in the urine. So we need some of those vitamins every day. Overdosing, especially from expensive vitamin pills, is a waste.

Because some vitamins dissolve in water, we need to handle the foods which contain them with care otherwise they may be wasted. When we chop vegetables such as cabbage and soak them in water to keep them crisp or when we over-cook them we lose the vitamin C. The heat and the water combined destroy the vitamin rapidly. When we soak meats, we lose some of the B vitamins.

Fat-soluble vitamins are absorbed into the cells very slowly and stay there along with fats. Excesses are stored in the liver. So the extra fat-soluble vitamins which we get today may be stored to meet later needs. It is often said that it is possible to store enough vitamin A to last from one mango season to the next. That depends, of course, on how many mangoes one eats. Vitamins D, E, and K are also stored. It can be dangerous to take too much vitamin A as this may overwork the liver and prevent it from functioning well. Overdoses of vitamin K are deadly. That is why vitamin K is always kept as a single vitamin and obtained only by prescription.
Small but Vital

We need very small amounts of vitamins, since it takes only a tiny amount of any one vitamin to start the necessary chemical reactions in the body. Some vitamins such as A, D and E were measured in International Units. These units represent a quantity which produces a given amount of activity that can be measured. Those measurements are now expressed in weights, so international units are no longer used. Other vitamin needs are also expressed by weight, in milligrams (mg) and micrograms (µg). To give you a picture of the tiny quantities needed, let's consider the amount of vitamin B₁ (thiamine) that is recommended for adults in the Caribbean. About 1 milligram is required per day. One milligram is one thousand (1/1000) times smaller than a gram and a gram is about 30 times (1/30) smaller than an ounce. So an ounce (30 grams) of this vitamin is enough for about 30,000 adults. It's easy to see why so much of these vitamins go to waste, as we often take too much of them.

Vitamins are like nails used to fit a shoe onto the horse's foot. "For the want of a horseshoe nail a war was lost" according to an old saying. We need not lose our health because of a lack of vitamins. There is an ample supply in our foods. It is for us to make wise food choices and handle our foods with care to conserve the vitamins. Tips on conserving vitamins are given on pages 168-171.

More is Not Necessarily Better

It cannot be stressed enough that getting the right amount of vitamins is essential for good health but excesses are wasteful and in some cases even dangerous. Many people believe in "vitamin insurance" for many reasons. Clever advertising of vitamin preparations and tonics invites people to try them. Some people think that vitamins provide energy, build the body and prevent them from getting sick or "run-down", so they faithfully take vitamin pills or a tonic every day, but fail to eat a nutritionally adequate diet. Some vitamins are required for the release of energy from foods and others for the utilization of energy in the body. So it is good to have an adequate food intake so vitamin supplements (if necessary), can be more effective.

Remember that vitamins neither provide energy nor build any part of the body. They help our body to process and use three key groups of nutrients —
carbohydrates, fats and proteins. These nutrients must be provided by eating enough of a variety of foods. Many people never need more vitamins than they can get from food. Those who need more may have specific illnesses, or special needs such as those during pregnancy, and rapid growth, when extra amounts of certain vitamins may be required.

We should not overdose ourselves with vitamins before finding out if we really need them. It is possible to get our vitamin status accurately assessed by scientific professionals who use specific techniques. Many tests are difficult, complicated and costly. To self-diagnose or to be mis-diagnosed could cause many problems. The finest, most complete vitamin ‘supplements’ are foods, in a balanced diet.

Why Some People Do Not Meet Their Vitamin Needs

Some people may not meet their vitamin needs for several reasons. Firstly, they may not be eating enough of a variety of foods. Dependence on a single staple food such as corn or polished rice can lead to a deficiency of vitamin B₃ (niacin) and vitamin B₁ (thiamine) respectively. Some pregnant women, elderly people and young children may not be properly fed and therefore do not meet their needs for energy nor for B vitamins.

Secondly, vitamins depend on each other for their synthesis (production), absorption, use by the body and excretion (passing out). So an apparent lack of one may reflect a lack or abnormality in the action of another. For example, for niacin or vitamin B₃ to be formed from the amino acid tryptophan, vitamin B₆ must be present. If vitamin B₆ is absent that process does not proceed normally and signs of nerve disorders specific to vitamin B₃ deficiency may show up. Also, folic acid and vitamin B₁₂ work together to regulate the formation of normal red blood cells in bone marrow. If one is lacking the other does not function well.

Thirdly, some drugs, even alcohol, interfere with the action of the vitamins. Taking mineral oil regularly as a purgative, robs the body of vitamin A as the mineral oil will pick up the vitamin A from digested food and take it out of the body with it. We should be particularly careful not to abuse antacids and other medications, or alcohol.
Vitamin B<sub>12</sub> is unique. It requires a special compound made inside the body for its absorption into the bloodstream. The ability to make this compound is something a person inherits. The genes may become defective so a person cannot absorb the vitamin from the diet. He or she will then need to get the vitamin by injection, to bypass the block in the intestine where it is absorbed. When the compound is lacking, a type of anaemia develops. In this type of anaemia, the red blood cells are large and immature; so, they cannot carry as much oxygen around as the body needs. Eventually, there is a creeping paralysis of the nerves and muscles. The same type of anaemia develops when there is not enough of the B vitamin folate.

Children or adults can go blind because they lack vitamin A. The basic problem in these cases is that those people do not take enough vitamin A. If the condition is caught early enough it can be corrected by taking the vitamin. Vitamin A deficiency is a major problem in many parts of the world, but luckily for us in the Caribbean a severe deficiency of that vitamin, or any other for that matter, is rare.

**Vitamin Deficiencies and Excesses**

The importance of vitamins was known long before scientists identified and named them. Hippocrates, an ancient Greek physician known as the 'father of medicine', advocated the eating of liver for the cure of night blindness — an early symptom of vitamin A deficiency. In 1897, it was discovered that a regular diet of polished rice caused the disease beriberi, but that the addition of the thiamine-rich bran and other polishings from the rice cured it. In the early 19th century, the disease scurvy was eliminated by adding lemon to the diet of British sailors. We now understand that it was vitamin C that was lacking in their diets. By the early part of the 20th century people in the southern United States of America who subsisted on eating corn or maize, came down with the disease called pellagra. Pellagra was soon wiped out when a more varied diet was eaten and cereals were fortified with B vitamins. Not only was vitamin B<sub>3</sub> missing from the corn, but also the essential amino acid, tryptophan, which the body needs to make vitamin B<sub>3</sub>.

More recently, it has been discovered that mild or moderate deficiencies of some vitamins may also put us at risk of heart attack, stroke and some
forms of cancer. It has been found that vitamins A, C and E protect us from heart disease, stroke and cancer.

Vitamin A is obtained from foods from animals, e.g., meat and milk. It can also be formed in the body from beta-carotene found in carrot, pumpkin, green leafy vegetables, mango and pawpaw/papaya. In the past, we thought that beta-carotene had only one function in the body, that is, to form vitamin A. Now we know that beta-carotene is more protective against heart attack and certain cancers than vitamin A itself. So, for example, people who smoke but consume enough beta-carotene have less cancer of the lung than smokers who eat less beta-carotene-rich food.

A lack of small amounts of the vitamins we need can cause serious diseases. Better understanding of the nature of these vitamins and their functions has added to scientific knowledge required for the establishment of minimum requirements and levels which will achieve and maintain optimal health.

How much of the vitamins we need daily, foods that provide these vitamins and the diseases or symptoms caused by too little or too much of them in our diet, are given in the following chart. How to conserve vitamins is given in Chapter 18.
Vitamins, their recommended daily intake, dietary sources, major body functions, and effects of deficiencies and excesses

<table>
<thead>
<tr>
<th>VITAMIN</th>
<th>RDA* - HEALTHY ADULT MALE &amp; FEMALE (mg)</th>
<th>DIETARY SOURCES</th>
<th>MAJOR BODY FUNCTIONS</th>
<th>TOO LITTLE</th>
<th>TOO MUCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>VITAMIN B₁ (THIAMINE)</td>
<td>0.9-1.2</td>
<td>Pork, liver, mutton, beef, whole grains, legumes, nuts</td>
<td>Helps body cells obtain energy from food. Keeps nerves healthy and promotes good appetite and digestion.</td>
<td>Beri beri (nerve changes, too much fluid in the tissues (oedema), heart failure)</td>
<td>None reported</td>
</tr>
<tr>
<td></td>
<td>0.7-0.9</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>VITAMIN B₂ (RIBOFLAVIN)</td>
<td>1.3</td>
<td>Widely distributed in foods — milk, fish, meat, liver, eggs, enriched cereals, dark green leafy vegetables</td>
<td>Helps body obtain energy from foods. Keeps eyes healthy and the skin around the nose and mouth smooth.</td>
<td>Reddened lips, cracks at the corner of the mouth (cheilosis), damage to the eye</td>
<td>None reported</td>
</tr>
<tr>
<td></td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>VITAMIN B₃ (NIACIN)</td>
<td>15-20</td>
<td>Liver, kidney, heart, chicken, fish, lean meats, grains, legumes (can be formed from tryptophan)</td>
<td>Helps body obtain energy from food; maintains healthy skin, tongue, digestive and nervous systems</td>
<td>Pellagra (skin and digestive system damage, nervous, mental disorders)</td>
<td>Flushing, burning and tingling around the neck, face and hands</td>
</tr>
<tr>
<td></td>
<td>12-15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Recommended Dietary Allowances for the Caribbean, Revised 1993. Caribbean Food and Nutrition Institute, Kingston, Jamaica, W.I.

*First values are for males.
<table>
<thead>
<tr>
<th>VITAMIN</th>
<th>RDA - HEALTHY ADULT MALE &amp; FEMALE* (mg)</th>
<th>DIETARY SOURCES</th>
<th>MAJOR BODY FUNCTIONS</th>
<th>TOO LITTLE</th>
<th>TOO MUCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>VITAMIN B₆</td>
<td>0.8</td>
<td>Meats, vegetables, whole-grain cereals</td>
<td>Helps body to use fats and protein, make red blood cells and vitamin B₆</td>
<td>Irritability, muscular twitching, inflammation of skin near eyes, kidney stones</td>
<td>None reported</td>
</tr>
<tr>
<td>(Pyridoxine)</td>
<td>0.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PANTOTHENIC ACID</td>
<td>4-7</td>
<td>Widely distributed in foods</td>
<td>Plays a central role in energy metabolism (break down and build up)</td>
<td>Fatigue, sleep disturbances, bad coordination, nausea (rare in humans)</td>
<td>None reported</td>
</tr>
<tr>
<td>(a B vitamin)</td>
<td>4-7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOLACIN</td>
<td>0.2</td>
<td>Legumes, green vegetables, whole-wheat products</td>
<td>Regulates formation of red blood cells in bone marrow</td>
<td>Anaemia, digestive disturbances, diarrhoea, red tongue</td>
<td>None reported</td>
</tr>
<tr>
<td>(a B vitamin)</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VITAMIN B₁₂</td>
<td>0.002</td>
<td>Muscle meats, eggs, dairy products, (not present in plant foods)</td>
<td>Aids use of folacin; functions in all cells but especially those of the GI tract*, nervous system and bone marrow</td>
<td>Few large red blood cells (Pernicious anaemia), disorders of the nerves</td>
<td>None reported</td>
</tr>
<tr>
<td>(Cyanocobalamin)</td>
<td>0.002</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOTIN</td>
<td>0.10-0.20</td>
<td>Legumes, vegetables, meats</td>
<td>Needed for amino acids to form protein and glycogen (animal-starch) to be formed</td>
<td>Fatigue, depression, nausea, inflammation of skin, muscular pains</td>
<td>None reported</td>
</tr>
<tr>
<td>(a B vitamin)</td>
<td>0.10-0.20</td>
<td></td>
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</tbody>
</table>

*First values are for males.

**GI = gastrointestinal (digestive tract/stomach and intestines)**
<table>
<thead>
<tr>
<th>VITAMIN (Ascorbic Acid)</th>
<th>RDA - HEALTHY ADULT MALE &amp; FEMALE (mg)</th>
<th>DIETARY SOURCES</th>
<th>MAJOR BODY FUNCTIONS</th>
<th>TOO LITTLE</th>
<th>TOO MUCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>VITAMIN C</td>
<td>60</td>
<td>Fresh fruits and vegetables, garden cherries, citrus fruits, tomatoes, green peppers, guava, broccoli, cabbage</td>
<td>Maintains health of cells in cartilage, bone and dentine in teeth; important in collagen (a protein) production</td>
<td>Scurvy (breaking down of skin, teeth, blood vessels, bleeding)</td>
<td>Relatively harmless possibility of kidney stones</td>
</tr>
</tbody>
</table>

### VITAMINS THAT DISSOLVE IN FAT (FAT SOLUBLE)

<table>
<thead>
<tr>
<th>VITAMIN A (Retinol)</th>
<th>0.7</th>
<th>Beta-carotene, widely distributed in green and yellow vegetables and yellow fruits. Retinol present in milk, butter, cheese, fortified margarine, liver, fish oils</th>
<th>Needed for bone growth, vision, reproduction and maintenance of tissues which form outer layer of body or line spaces within the body</th>
<th>Xerophthalmia (hardening of eye tissue), night blindness, permanent blindness</th>
<th>Headache, vomiting, peeling of skin, anorexia (loss of appetite), swelling of long bones</th>
</tr>
</thead>
<tbody>
<tr>
<td>VITAMIN D</td>
<td>0.025</td>
<td>Cod-liver oil, eggs, dairy products, fortified milk and margarine</td>
<td>Promotes growth and laying down of minerals in bones; increases absorption of calcium</td>
<td>Rickets (bone deformities) in children. Osteomalacia (soft bones) in adults</td>
<td>Vomiting, diarrhoea, loss of weight, kidney damage</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>VITAMIN E (Tocopherol)</td>
<td>10</td>
<td>Seeds, green leafy vegetables, margarines, shortenings</td>
<td>Helps prevent heart disease, stroke and cancer</td>
<td>Possibly anaemia, heart disease, cancer</td>
<td>Relatively harmless</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>VITAMIN K (Phylloquinone)</td>
<td>0.07-0.14</td>
<td>Green leafy vegetables. Small amount in cereals, fruits and meats</td>
<td>Important in blood clotting</td>
<td>Conditioned deficiencies associated with severe bleeding; internal haemorrhages</td>
<td>Relatively harmless man-made forms at high doses may cause jaundice</td>
</tr>
</tbody>
</table>
Minerals are those almost magical, little chemicals we hear so much about. Only a tiny amount of each is needed, but the work they do is of maximum importance. They help to keep bones and teeth strong, to balance body fluids and to regulate vital processes such as digestion and the use of oxygen for energy, and promotes growth. These and other benefits are explained, and the most important minerals are described, in this chapter.

So far, we have discussed nutrients which are primarily made up of carbon, hydrogen, oxygen and nitrogen. We also need certain metallic elements collectively known as minerals. Minerals, like vitamins, are needed in very small amounts. Whereas vitamins speed up chemical processes but do not become a part of the end product, minerals do.

- Minerals provide structure for bones and teeth.
- They help in various functions of the body, such as keeping the heartbeat regular, helping the muscles and nerves to work and keeping a balance of the fluids inside and outside the cells.
- They form important parts of enzymes which speed up reactions, and of hormones (chemical messengers) which are involved in many processes in the body.
- Nine minerals help in the break down of carbohydrate, fat and protein to provide energy. Five are also needed for converting excess glucose into its storage form of glycogen, and fatty acids into body fat, and for assembling amino acids to form proteins in the body.

The following charts show the minerals that are involved in the breakdown and buildup processes (metabolism) in the body.
Minerals are found in abundance in nature. They enter our body mostly through the food we eat and drink. Once a mineral is in the body, it stays there until it is passed out and cannot be changed into something else. Minerals will dissolve in water and are easily absorbed into the blood, carried about freely by it, and easily passed out in the urine. To date we know of 21 different minerals which take part in the structure and functions of our body. Seven of the major ones are described below and the others are briefly described in the chart at the end of this chapter.
IRON

When we look around we find many things made of iron such as chairs, tables, pots and pans. We need that same iron in our bodies, but it is lacking in the bodies of many Caribbean people. Iron is found in every cell of the human body, and in the cells of all living things. When we do not get enough iron through the food we eat, or when the iron is poorly absorbed in the body, our cells are starved of oxygen and a condition called anaemia develops. There is a section on anaemia in Chapter 11.

Iron in the Body

When food is digested, iron is absorbed into the intestinal cells, and into the blood which carries it throughout the body. Each tissue in the body takes up the amount of iron that it needs. Bone marrow and liver take large quantities. Most of the iron is found in the muscles and the red blood cells. In a pregnant woman, the placenta (afterbirth) is “greedy” for iron, devouring large quantities to provide iron to the developing baby. That is why pregnant women usually need iron supplements.

Iron takes oxygen into the muscle cells. The muscle cells use the oxygen to produce energy and form waste products such as water and carbon dioxide (CO₂) which are removed. In this way, muscles remain active.

As the muscles use up oxygen and give off waste, the red blood cells shuttle between muscles and lungs to maintain fresh supplies of oxygen. The red blood cells which perform this vital shuttling service, live for about four months. When they are worn out and no longer useful, they are removed from the blood by the liver cells. In the liver, the blood cells are broken down into their components, one of which is iron. The iron is then returned to the bone marrow where new blood cells are constantly being produced. So iron is recycled and only small amounts are lost.

How Much Iron Do We Need?

The amount of iron we need varies according to age, and the amount lost through faeces, urine, sweat and shed skin. Women lose extra iron
during their monthly periods (menstruation), pregnancy and breastfeeding. Infants, children and adolescents need enough iron to promote growth and to produce greater amounts of blood. Assuming that only about 10% of the iron eaten in a mixed diet will be absorbed, it is recommended that on a daily basis:

- infants, young children, adult males and women over 60 receive 6-10 milligrams
- males 10-18 years should get about 12 milligrams
- females 10-18 years, non-pregnant adults and those nursing need 15 milligrams
- pregnant women need about 30 milligrams. It is difficult to get that much iron from food. So, they need iron tablets in addition to iron-rich foods.

Iron in Foods

Foods which are excellent sources of iron include:

- liver, meat, heart, kidney, sardines
- dried peas and beans — pigeon or gungo peas, black-eye peas, red kidney beans/peas and broad beans
- dried seeds such as pumpkin and watermelon seeds
- dark green leafy vegetables — pak choi, cabbage bush/bush cabbage, spinach, callaloo and broccoli
- flour, bread and cornmeal which are enriched with an easily absorbed type of iron
- dark brown, crude sugar (formerly known as ‘wet’ sugar because of the high molasses content) and molasses

Note: The brown sugars commonly used today are not rich in iron and cannot then be said to be more nutritious than white, granulated sugar.
The iron content of some foods is given in the following chart.

### The Amount of Iron in Servings of Some Foods

<table>
<thead>
<tr>
<th>Food Servings</th>
<th>Iron (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60g/2 oz liver</td>
<td>3.4</td>
</tr>
<tr>
<td>1 cup/250 ml cooked, enriched cornmeal</td>
<td>2.9</td>
</tr>
<tr>
<td>60g/2 oz sardines</td>
<td>2.5</td>
</tr>
<tr>
<td>1/2 cup/125 ml cooked 'greens' (spinach, callaloo, baghi)</td>
<td>2.5</td>
</tr>
<tr>
<td>1 tablespoon/15 ml molasses</td>
<td>2.4</td>
</tr>
<tr>
<td>1/2 cup/125 ml stewed peas</td>
<td>2.3</td>
</tr>
<tr>
<td>2-3 slices (90g) breadfruit</td>
<td>1.7</td>
</tr>
<tr>
<td>1 cup/250 ml cooked rice</td>
<td>1.7</td>
</tr>
<tr>
<td>60g/2 oz meat</td>
<td>1.4</td>
</tr>
<tr>
<td>2 slices (50g) enriched bread</td>
<td>1.2</td>
</tr>
<tr>
<td>60g/2 oz chicken</td>
<td>0.9</td>
</tr>
<tr>
<td>30g/1 oz peanuts</td>
<td>0.7</td>
</tr>
<tr>
<td>2 (65g) green bananas/figs</td>
<td>0.6</td>
</tr>
<tr>
<td>120g/4 oz fresh fish</td>
<td>0.2</td>
</tr>
</tbody>
</table>

From the chart we can calculate how much of these foods we would need to eat to meet the suggested allowances for iron. Suppose you are in a category which needs 15 milligrams daily; you could fill your needs by having:

- 1 cup cooked rice
- 2-3 slices breadfruit
- 1 cup cooked cornmeal
- 1/2 cup stewed peas
- 1/2 cup cooked greens
- 60 grams meat
- 60 grams sardines
How Much Iron is Absorbed?

Iron from animal sources such as meat, is more easily absorbed than iron from vegetable sources. Vitamin C-rich foods such as fruits and fresh vegetables and animal protein, help the absorption of iron.

Large amounts of certain substances prevent the body from absorbing iron well. Some of these substances are tannic acid in ‘green’ tea, coffee and cocoa, phosvitin in egg yolk, phytates in whole grains such as oats, and calcium and phosphate salts in milk and antacids.

It is best not to drink too much strong coffee and tea with meals or to take too much antacid. Also, it may be better to have milk between rather than with meals. But an orange, grapefruit or garden cherry juice as part of a meal will help the body to absorb more iron from that meal.

SODIUM

Sodium is a major mineral found in the fluid outside the cells in our body and in blood. There it helps to maintain the balance of water and acidity and alkalinity (pH). Also, it is a part of pancreatic juice and bile, which help in the digestion of foods. It is found in sweat and tears. It plays a role in how the muscles and the nerves work and in the absorption of carbohydrates.

In general, if we do not take in enough, our kidneys will withhold all the sodium. On the other hand, if sodium is high, the kidneys will get rid of the excess in urine. So, a sodium balance is maintained. This system does not work properly for some people. When they take in too much sodium it stays in their bodies, along with a lot of water. This increases the volume of blood in their bodies, causing them to have high blood pressure. This often happens in people of African origin. We say those people are salt-sensitive, because most of the sodium comes from salt. Most people in the Caribbean should therefore be careful about how much salt they use in their diet.
Sodium in Foods

Sodium gets into the body from the food we eat and drink. Salt used in cooking, processing and seasoning foods is the chief source, but sodium is already present in most foods in varying amounts. Generally, more sodium is in animal sources of food than in plant sources of food. Fruits contain little or no sodium. Water used for drinking and for domestic purposes varies considerably in sodium content and may provide some of our sodium intake. The sodium content of some foods is shown in the chart below.

Sodium Levels in Some Commonly Eaten Foods

<table>
<thead>
<tr>
<th>High Sodium (1300-2300 mg)</th>
<th>Moderate Sodium (800-900 mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 teaspoon salt</td>
<td>60g ham</td>
</tr>
<tr>
<td>30g dried salted fish, (unsoaked)</td>
<td>60g corned beef</td>
</tr>
<tr>
<td>1 packet soup mix (cup-a-soup)</td>
<td>1 frankfurter</td>
</tr>
<tr>
<td>1 tablespoon soy sauce</td>
<td>30g salted fish (soaked overnight)</td>
</tr>
<tr>
<td></td>
<td>¼ cup canned baked beans</td>
</tr>
<tr>
<td>Fair Sodium (300-500 mg)</td>
<td>30g milk powder</td>
</tr>
<tr>
<td></td>
<td>1 egg</td>
</tr>
<tr>
<td></td>
<td>30g cheese</td>
</tr>
<tr>
<td></td>
<td>5 small soda crackers</td>
</tr>
<tr>
<td></td>
<td>2 cups (500 ml) milk</td>
</tr>
<tr>
<td></td>
<td>1 cup cornflakes</td>
</tr>
<tr>
<td></td>
<td>½ teaspoon baking powder</td>
</tr>
<tr>
<td></td>
<td>1 tablespoon ketchup</td>
</tr>
<tr>
<td></td>
<td>1 strip bacon</td>
</tr>
<tr>
<td></td>
<td>2 slices bread</td>
</tr>
<tr>
<td>Low Sodium (less than 100 mg)</td>
<td>30g oats</td>
</tr>
</tbody>
</table>

How Much Sodium Do We Need?

Babies get their supply of sodium from breast milk, and several times their requirements from cow's milk and formula. The requirements for children from 7 years of age and adults can be filled by 1-1½ ozs (30-45g) canned corned beef; those for the 4-6 year old with 1 cup cornflakes and
those for the 1-3 year olds with 2 cups milk. This simply shows how much sodium we consume over our daily requirements as shown in the chart below. 

**It is recommended that older children and adults have about 1600-2000 milligrams of sodium daily (equivalent of 1 teaspoon salt) from all sources.** This is more than they require but is not overly excessive to be injurious to their health, especially if they are not salt-sensitive as discussed in Chapter 14.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Daily Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Babies, birth to 11 months</td>
<td>120-200mg</td>
</tr>
<tr>
<td>Children 1-3 years</td>
<td>225mg</td>
</tr>
<tr>
<td>Children 4-6 years</td>
<td>300mg</td>
</tr>
<tr>
<td>Children 7-10 years</td>
<td>400mg</td>
</tr>
<tr>
<td>Healthy children over 10 years and adults</td>
<td>500mg (approximately ¼ teaspoon salt)</td>
</tr>
</tbody>
</table>

See the section on meal planning and preparation (Chapter 18) for how to reduce sodium in the diet and to add flavour and zest to meals without salt.

**POTASSIUM**

Potassium is another of the major minerals in the body. It helps to maintain the balance of fluids, acidity and alkalinity (pH), heartbeat and the health and vitality of the cells. A higher intake of potassium is associated with a lower incidence of high blood pressure and stroke.

Unlike sodium, potassium stays chiefly inside the cells. Together with sodium and chlorine, it adjusts or regulates the exchange of fluids within the various parts of the body. This allows for the constant flow of nutrients from outside to inside the cells and of waste products from inside the cells to outside. This mineral also helps the nerves to function properly.
Severe diarrhoea, heavy sweating and “water pills” or diuretics cause the body to lose lots of potassium. In all these cases, the potassium can be put back or replenished by eating potassium-rich foods. “Water pills” and potassium pills should only be taken under the direction of a doctor, as either too much or too little potassium can be dangerous. See Chapters 11 and 12.

Potassium is widely available in foods, especially fruits, vegetables and legumes which are not highly processed. Some of these foods are pumpkin, mangoes, oranges, orange juice, peas, beans, green leafy vegetables, bananas, potatoes, yams and goat’s milk. Coconut water is especially high in potassium.

CALCIUM

About 99% of the calcium we get from the foods we eat, goes into the making of bones and teeth. The rest circulates in the watery fluids of the body, where it performs many important functions such as helping the heart and muscles to work and the nerves to send messages. The absorption of calcium is influenced by vitamin D, so this vitamin is necessary for the most efficient use of the mineral. On the other hand, other natural food chemicals prevent the body from absorbing some of the calcium in the food we eat. For example, the oxalic acid of some 'greens', chocolate and cocoa, and the phytic acid of some grains, will attach themselves to the calcium and make it unavailable to the body. This does not mean that these foods must be avoided, but we cannot depend on them to provide the calcium we need. Depending on how much chocolate and cocoa is mixed with milk, the oxalic acid may combine with some of the calcium in the milk. It is therefore not advisable to add chocolate and cocoa products to every milk feed that a child gets.

Meeting Calcium Needs

People can adapt to varying amounts of calcium intake. It is important that children, teenagers, pregnant and nursing women receive adequate amounts.

Children need about 500-600 mg daily; adolescents 900 mg; adults 700 mg; and pregnant and nursing women 1000 mg.
Older persons too, must be encouraged to have enough calcium to ensure the continued strength of their bones.

**Calcium in Foods**

Calcium is found in dairy products such as milk and cheese, and in some 'greens', peas, beans, cereals and molasses. An important source for many people is fish with edible bones, such as canned sardine, herring, mackerel and crisp sprat/herring. The tips of poultry leg bones, lime-processed tortillas (type of pancake/fritter made from corn) and calcium-processed tofu (soybean curd) are rich, unrecognized sources of calcium. Water is a variable source of calcium. The amount of calcium in some foods is shown below.

**The Amount of Calcium in Some Commonly Used Foods**

<table>
<thead>
<tr>
<th>FOOD</th>
<th>CALCIUM mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>30g/1 oz skimmed milk powder*</td>
<td>370</td>
</tr>
<tr>
<td>1 cup/250 ml/½ pint full cream/whole milk</td>
<td>290</td>
</tr>
<tr>
<td>100g/3½ oz callaloo/spinach; bush cabbage/cabbage bush</td>
<td>255</td>
</tr>
<tr>
<td>60g/2 oz sardines</td>
<td>212</td>
</tr>
<tr>
<td>30g/1 oz cheese</td>
<td>210</td>
</tr>
<tr>
<td>¼ cup/60 mL evaporated milk**</td>
<td>145</td>
</tr>
<tr>
<td>1 tablespoon/15 ml molasses</td>
<td>102</td>
</tr>
<tr>
<td>½ cup/125 ml cooked pigeon peas/broad beans/red peas/kidney beans</td>
<td>80</td>
</tr>
<tr>
<td>30g/1 oz milk chocolate</td>
<td>}</td>
</tr>
<tr>
<td>½ cup/125 ml plain ice cream</td>
<td>}</td>
</tr>
</tbody>
</table>

*Makes approximately 1 cup/½ pint fluid skimmed milk

**Equivalent to ½ cup full cream/whole milk**
IODINE

Iodine is necessary for the proper functioning of the thyroid gland, which regulates the rate at which the body uses energy. It is therefore essential for growth. When the body does not get enough iodine, the thyroid gland may become enlarged. This condition, known as simple goitre, shows up as a swelling in the front of the neck. Goitre does not occur in adults when they have more than 75 micrograms of iodine per day. Adult men need about 140 micrograms and women 100 micrograms daily.

Sea water is high in iodine and foods grown in the ocean or in soils near sea coasts, contain large amounts of this mineral. So sea moss (Irish moss) is high in iodine. Salt-water fish, salmon, tuna and shellfish are also high in iodine. Another good source of the mineral is salt to which iodine is added at the rate of 100 micrograms of potassium iodide or iodate (forms of iodine) per gram. So a teaspoon (5 grams) of iodized salt provides 3-5 times the normal requirement.

Most of the table salt available in the Caribbean is iodized. This may be one reason that we do not see a deficiency of iodine in our countries.
FLUORINE

Fluorine is required in very, very small amounts, about one microgram per day. Traces of the mineral are present in the bones, teeth, thyroid gland and skin. It helps to protect the teeth against decay as it hardens the enamel and reduces the solubility of tooth minerals. It is believed that it also discourages the growth of acid-forming bacteria. Its effect is seen mostly in the development of children’s teeth.

The chief source of fluorine is drinking water to which the mineral is added. Fluorine is not always added to drinking water. It is added to salt manufactured in Jamaica. Other important sources are: sea fish and tea — especially China tea.

ZINC

Zinc is present in all living tissues. It is an essential component of at least eight enzymes and is important in the digestion of protein and in the body’s use of carbohydrate. (An enzyme is a complex protein produced in living cells to start many of the chemical changes necessary for life).

The need for zinc is greatest during infancy, early childhood and adolescence, when growth is rapid. Zinc promotes growth, the development of some sex characteristics and wound healing. The normal concentration of zinc in the blood (120 micrograms/100 mL) is greatly reduced when the liver is diseased or there is energy-protein malnutrition.

Important food sources of zinc are: seafood (especially oysters), meat, eggs, legumes and whole grains. It is available mostly from animal products.
The important minerals in the body, their recommended daily intake, dietary sources, major functions and the effects of deficiencies and excesses

<table>
<thead>
<tr>
<th>Mineral</th>
<th>RDA(^1) for Healthy Adult Male(^2) &amp; Female (mg)</th>
<th>Dietary Sources</th>
<th>Body Functions</th>
<th>Too Little</th>
<th>Too Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphorus</td>
<td>800</td>
<td>Widely distributed in foods but especially in milk, cheese, meat, poultry and grains</td>
<td>Release of energy; Bone and tooth formation; acidity and alkalinity (pH) balance</td>
<td>Weakness, loss of mineral from bone, loss of calcium</td>
<td>Erosion of jaw</td>
</tr>
<tr>
<td></td>
<td>800</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulphur</td>
<td>Not known for certain</td>
<td>Sulphur amino acids (methionine and cystine) in proteins</td>
<td>Helps to form some tissues, cartilage and tendons</td>
<td>Poor tissue formation and growth</td>
<td>Leads to poor growth</td>
</tr>
<tr>
<td>Chlorine (chloride)</td>
<td>500</td>
<td>Common salt</td>
<td>Formation of digestive juice; acidity and alkalinity (pH) balance</td>
<td>Muscle cramps; Mental apathy (lack of interest); Reduced appetite</td>
<td>Vomitting</td>
</tr>
<tr>
<td>Magnesium</td>
<td>350</td>
<td>Whole grains, green leafy vegetables</td>
<td>Activates enzymes; involved in making protein and in calcium metabolism(^*)</td>
<td>Growth failure, Behavioural disturbances, Weakness, spasms</td>
<td>Diarrhoea</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\)Recommended Dietary Allowances (RDA) for the Caribbean, Revised 1993, Caribbean Food and Nutrition Institute, Kingston, Jamaica, 1993.

\(^2\)First values are for males.

\(^*\)Metabolism = breakdown and build-up processes in the body.
<table>
<thead>
<tr>
<th>Mineral</th>
<th>RDA(^1) for Healthy Adult Male(^2) &amp; Female (mg)</th>
<th>Dietary Sources</th>
<th>Body Functions</th>
<th>Too Little</th>
<th>Too Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>2&lt;br&gt;1.5</td>
<td>Meats, drinking water</td>
<td>Forms part of enzymes associated with iron metabolism&lt;br&gt;Involved in making of skin colouration (melanin)</td>
<td>Anaemia, bone and nerve changes (rare in humans)</td>
<td>Skeleton deterioration</td>
</tr>
<tr>
<td>Silicon</td>
<td>Not known for certain</td>
<td>Many different foods</td>
<td>Function unknown (essential for animals)</td>
<td>Not reported in humans</td>
<td>Industrial exposures: Silicon - silicosis&lt;br&gt;Vanadium - lung irritation&lt;br&gt;Tin - vomiting&lt;br&gt;Nickel - acute lung infection</td>
</tr>
<tr>
<td>Vanadium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nickel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selenium</td>
<td>0.07&lt;br&gt;0.05</td>
<td>Seafood, meat, grains</td>
<td>Functions in close association with vitamin E</td>
<td>Anaemia (rare)</td>
<td>Disorders of stomach and intestines, lung irritation</td>
</tr>
</tbody>
</table>

\(^1\)Recommended Dietary Allowances (RDA) for the Caribbean, Revised 1993, Caribbean Food and Nutrition Institute, Kingston, Jamaica, 1993.

\(^2\)First values are for males.
<table>
<thead>
<tr>
<th>Mineral</th>
<th>RDA(^1) for Healthy Adult Male(^2) &amp; Female (mg)</th>
<th>Dietary Sources</th>
<th>Body Functions</th>
<th>Too Little</th>
<th>Too Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese</td>
<td>Not known for certain Safe values: 5 2</td>
<td>Particularly in whole grains, nuts, legumes, fruits and tea</td>
<td>Forms part of enzymes involved in making fats from fatty acids</td>
<td>In animals: poor growth, disturbances of nervous system, reproductive abnormalities</td>
<td>Poisoning in manganese mines; generalized disease of nervous system</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>Not known for certain (range 0.05 - 0.4)</td>
<td>Legumes, cereals, organ meats</td>
<td>Forms part of some enzymes</td>
<td>Not reported in humans</td>
<td>Prevents enzymes from working</td>
</tr>
<tr>
<td>Chromium</td>
<td>Range: 0.05 - 2</td>
<td>Vegetable oils, especially corn oil, whole grain cereals</td>
<td>Involved in glucose and energy metabolism</td>
<td>Reduced ability to metabolize glucose</td>
<td>Exposures at work: skin and kidney damage</td>
</tr>
<tr>
<td>Cobalt</td>
<td>Not known for certain</td>
<td>Liver, heart, kidney meat, milk</td>
<td>Forms part of vitamin B(_{12})</td>
<td>Not reported in humans</td>
<td>Skin ailments and diseases of red blood cells</td>
</tr>
</tbody>
</table>

\(^1\)Recommended Dietary Allowances (RDA) for the Caribbean, Revised 1993, Caribbean Food and Nutrition Institute, Kingston, Jamaica, 1993.

\(^2\)First values are for males.
Water — many of us take it for granted, but this precious liquid is as vital to the human body as it is to the human household — even more so, in fact! To the body, water is a messenger and a moisturizer, a softener and a support, a cushion and a cleanser, plus acting as a "go between" and bringing other substances together for important interactions inside us. More than half the body is made up of water. Let's see why we need water, where to get it and how much we should take to keep well.

About two-thirds of the human body is water. Two-thirds of this water is inside the millions of cells in the body. For example, muscles which appear to be so solid are three-fourths water. Fat, on the other hand, has very little water trapped in its cells. The remaining one-third of the water in the body is outside the cells in blood plasma, lymph and other body fluids. So, water is a very important nutrient. Our bodies cannot function without it.

We lose water all the time as we sweat, breathe out or get rid of urine and faeces. This water must be replaced or the body will become dehydrated (dried out). Children can become dehydrated very quickly, especially if they have diarrhoea (running belly). An adult can live for several months without food, but for only a few days without water. Dehydrated children can die in one or two days.

Why We Need Water

- Water serves as a transport system for the nutrients we get from food, for gases and for passing out waste products through urine, faeces and sweat.

- It makes some reactions in the body possible either by becoming a part of the reaction, or by allowing other substances to dissolve in it, so that they can react with each other.
- Water is also necessary for the flushing out of waste and harmful products from the body.

- Water keeps all the tissues moist to allow the diffusion (soaking through) of gases.

- It also helps the body temperature to keep stable.

- It lubricates foods as we chew and swallow them.

- Water lubricates the joints.

- Water helps to fill out the cells of the body and prevent them from collapsing.

- Water cushions the body and protects it against blows, pressure, and other types of outside stress.

**Getting Enough Water**

Water is lost from the body daily to eliminate certain waste products. This loss needs to be replaced. In a normal person about 2550 ml or 2½ litres or quarts of water is lost each day, as shown in the diagram below. We lose about 1500 ml in urine, 100 ml in faeces, 600 ml in sweat and 350 ml in the air we breathe out. About 1000 ml of this loss is replaced by water in the food we eat. Note the amount of water in some foods in the chart on page 77. The body produces about 350 ml through various reactions. This leaves about 1200 ml (over a quart or litre) of water that we have to drink daily.
To ensure that we get enough water we should drink 6-8 glasses of fluids, mostly water, every day in addition to the water we get from fruits, vegetables and other foods. Some people drink enough liquid in fruit drinks, sodas or alcoholic beverages. These replace the needed water but give extra calories through the sugar and alcohol in them. There is no harm in drinking plain, clean water. If you are not doing this now, get into the habit for a healthy life.

Usually, our intake of water is guided by the feeling of thirst. This feeling is associated with dryness of the throat and mouth and is believed to be regulated by the amount of sodium in the blood. Sodium is contained in salt. This is why salty foods sometimes increase our feeling of thirst.

Thirst itself does not remedy a water deficiency, but drinking does. You have to notice that you are thirsty, pay attention and take time to get a drink of water. The athlete, the casual runner, a gardener in hot weather, an elderly person whose attention wanders, can all experience serious dehydration. They need to be alert to thirst signals and to drink when they feel them.

Water never accumulates in the body of a healthy person. Nor does drinking water, especially iced water, make a person fat or raise their blood pressure. It is never a bad idea to drink extra water. That's a healthy practice. The body maintains a balance between its water intake and output.

Don’t Be Misled

If a pregnant woman drinks a large amount of milk, fruit juice, ice water or other non-alcoholic beverages, this will not cause her baby to become fair-complexioned, as some people believe — neither can she drown her unborn baby by drinking too much liquid.
## Water in Foods

Almost all foods have water. Dried foods have much less than fresh foods. Here is how much water there is in some foods.

<table>
<thead>
<tr>
<th>Lots of Water (50-90%)</th>
<th>Moderate Amounts of Water (20-49%)</th>
<th>Very Little Water (less than 15%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>fruits - fresh, canned, frozen</td>
<td>dried fish</td>
<td>dried peas, beans, nuts</td>
</tr>
<tr>
<td>vegetables - fresh, canned, frozen</td>
<td>bread</td>
<td>uncooked cornmeal, rice, flour</td>
</tr>
<tr>
<td>young corn, peas, beans, jelly coconut</td>
<td>dried fruits</td>
<td>dried corn</td>
</tr>
<tr>
<td>starchy fruits, roots, tubers (ground provisions)</td>
<td>pickled fish</td>
<td>crackers</td>
</tr>
<tr>
<td>milk, meat, fresh and canned fish, chicken eggs</td>
<td>cheese</td>
<td>butter/margarine</td>
</tr>
</tbody>
</table>
Alcohol is man's oldest socially accepted but potentially harmful substance. Few of us think of celebrating without it. But do we have any idea of what it can do to us if we take too much? And for some — pregnant women, alcoholics, drivers and people operating machinery — even a small amount is too much. Here are the sobering facts about alcohol and the human body, with a guided tour of the different types of strong and moderate drinks popular in our society.

There are several types of alcohol but the one found in the beverages we drink is called ethyl alcohol or ethanol. This alcohol has been used in nearly every culture since the earliest civilizations. Alcoholic beverages are brewed from a variety of materials that will ferment (change chemically in a special way). Some of these are corn, wheat and other grains, fruits, berries, honey and molasses. The resulting alcoholic beverages are the strong liquors: brandy, gin, rum, whiskey and vodka; and those moderate or low in alcohol such as wine, beer and stout. Various other products such as liqueurs, shandy and creams result from combining strong or moderate alcoholic beverages with juices, milk, cream, sugar, carbonated sodas and flavourings.

Alcohol is man's oldest drug. When drunk in moderation it may stimulate the appetite and make a person feel relaxed. When too much is taken, a person becomes drunk or intoxicated. Some people have a special problem with alcohol, called alcoholism, and need to avoid it totally.

Alcohol and Nutrition

Alcohol is purely a source of energy (calories). It provides seven calories per gram and is therefore almost as concentrated as fat in energy. Strong liquors or distilled spirits do not contain minerals, vitamins or protein. Beers have a small amount of B vitamins and wine has a very small amount of iron. The amounts of nutrients in these beverages are so small that if a person depends on beer for example, to meet his or her vitamin B₁ requirements he or she would need several bottles per day.
The number of calories in drinks will vary according to the amount of alcohol in the drink, the brand of drink, and additions such as sodas, juices, etc. The approximate calorie values of drinks commonly purchased in our region are shown below.

Since alcohol’s main contribution is energy it is wise to abstain from it and get your energy instead from foods such as peas, beans and cereals which also provide protein, minerals and vitamins. If you do like to drink however, try to have no more than 1 to 2 ounces of alcohol per day. This means about 1-2 standard drinks per day. The higher the alcohol content, the fewer the drinks to make up the suggested amount of alcohol.

### Energy Value of Common Alcoholic Beverages

<table>
<thead>
<tr>
<th>Alcoholic Beverage</th>
<th>Standard Size of Drinks Sold</th>
<th>Energy (Calories) in Stated Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shandy</td>
<td>284 ml (10 oz bottle)</td>
<td>135-140</td>
</tr>
<tr>
<td>Beer</td>
<td>341 ml (12 oz bottle)</td>
<td>140-170</td>
</tr>
<tr>
<td>Stout/strong ale</td>
<td>284 ml (10 oz bottle)</td>
<td>130-140</td>
</tr>
<tr>
<td>Table wine - Dry</td>
<td>120 ml (4 oz drink)</td>
<td>75</td>
</tr>
<tr>
<td>Table wine - Sweet</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Sherry - dry, sweet</td>
<td>50 ml (1½ oz drink)</td>
<td>55-90</td>
</tr>
<tr>
<td>Rum/gin/vodka</td>
<td>50 ml (1½ oz drink)</td>
<td>100-125</td>
</tr>
<tr>
<td>Rum cream</td>
<td>100 ml (3½ oz drink)</td>
<td>115</td>
</tr>
<tr>
<td>Liqueurs</td>
<td>50 ml (1½ oz drink)</td>
<td>175</td>
</tr>
<tr>
<td>Cocktails: gin &amp; tonic</td>
<td>215 ml (1 drink)</td>
<td>170-175</td>
</tr>
<tr>
<td>vodka &amp; orange juice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whiskey sour</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If one-fifth or more of a person’s total calories come from alcohol it is harmful to their health. For a pregnant woman, any amount can be harmful to the unborn baby. Pregnant women should avoid any kind of alcoholic drink.
What Happens When You Drink?

If you drink, you are affected by alcohol. If you drink a little now and then the risks are very small. The more you drink and the more frequently you drink, the higher the risks.

Alcohol is more easily absorbed by the body when it is taken on an empty stomach. The alcohol enters the blood stream quickly and is then transported to the liver. There it is oxidized. Alcohol is oxidized slowly at a rate of about 7 grams per hour. When the liver cannot manage the volume of alcohol consumed, the remainder continues to circulate in the blood and the person becomes intoxicated (drunk). Women and children are more easily intoxicated because their bodies are smaller and contain less water than men.

Alcohol may decrease the digestion of protein, and large amounts of alcohol decrease the intake of vitamins and disturb their absorption in the intestine. Alcohol may also disturb the absorption and use of minerals. Excessive use of alcohol causes nausea, vomiting and diarrhoea.

When a person is drunk, the brain is affected very quickly. The body processes slow down, instead of being stimulated as is often believed. The person who takes too much alcohol may feel drowsy, perspire a lot, urinate often, have decreased coordination and may even become unconscious, depending on the amount of alcohol taken. This means that the alcohol affects his or her judgement, self-control and coordination.
How Much Alcohol is in a Drink?

The amount of alcohol in drinks varies widely. Bottles and cans of liquor show the percentage alcohol by volume (written % ABV). This means that in a given amount of the drink there is a certain concentration of alcohol. For example, in a 284 millilitre bottle/10-ounce of commercially prepared shandy there are approximately 4 millilitres of alcohol (1.4% ABV). This is the lowest alcohol content you will find in an alcoholic beverage, as you would expect, because this shandy is a mixture of two-thirds carbonated soda and one-third beer. Beer has 5% alcohol by volume. So, in a 341 ml or 12-ounce bottle there are 17 millilitres or about half an ounce of alcohol. Stout and strong ale have more alcohol than beer (7-8% ABV) and some table wines have the same or up to three times more alcohol than beer.

Gin has almost 7 times more alcohol as beer, while rum, brandy, whiskey and vodka have 8 times more. Some brands of white, overproof rum surpass all, having a whopping 63% alcohol by volume. So, in a 50 millilitre (1½ ounce) drink there is 32 millilitres or just about an ounce of alcohol.

The term “proof” in distilled spirits refers to ethanol or the alcohol concentration. The standards for proof vary from country to country. In general, proof means twice the amount of ethanol/alcohol present. So a 100 proof liquor has approximately 50% alcohol by volume.

Rum creams normally comprise rum, milk cream and sugar, but some brands contain milk powder. They have approximately 15% alcohol by volume. So, in 100 millilitres there are 15 millilitres of alcohol or just about the same amount as there is in a bottle of beer.

How Long it Takes for the Effects of Alcohol to Wear Off

It takes about an hour to get rid of the alcohol in one standard drink, for example a bottle of beer. The level of alcohol increases for every drink. Accordingly, it will take as many hours for the blood alcohol level to get to zero as the number of drinks taken. Some heavy drinkers suffer from hangovers which consist of a tired, weak, drowsy feeling and dehydration. Resting as much as possible and having lots of fluids are the best ways to deal with hangovers.
Long-Term Effects of Consuming Excessive Amounts of Alcohol

With continued use of too much alcohol several things can happen. Heavy drinkers can be overweight and still suffer from malnutrition because alcohol provides energy (empty calories) only. Other problems include: deficiencies of the B vitamins — thiamine, folic acid, B6 and niacin — and of the minerals zinc and magnesium; chronic diseases — high blood pressure, cancer of the mouth, throat and gullet, heart disease, liver disease (cirrhosis) and added problems for people with diabetes; stomach disorders (gastritis, bleeding and ulcers); depression, emotional disorders, brain damage and problems with the nervous system (especially nerve pains in the legs and arms), and sexual difficulties.

During pregnancy alcohol abuse can affect the delicate system of the unborn baby. Such babies may be born with defects such as small heads, irregularities in the face, abnormal joints and limbs, heart defects, poor coordination and low birth weight. So, it is advisable that pregnant women avoid drinking alcoholic beverages. The mother who is breast-feeding should also avoid alcohol, as she can pass on the alcohol to the baby. Other persons should avoid excesses for better health mentally, physically, socially and economically.

Alcoholism is “a chronic, progressive, disease”. There is a worldwide movement, Alcoholics Anonymous (AA), dedicated to helping people with this specific problem. In years gone by, alcoholics encountered massive problems in trying to overcome their drinking problems because people, doctors included, did not appreciate that alcoholism was an addiction, and not a lack of will power. (There are examples of reformed alcoholics who have gone back to the bottle because they took a cough mixture, not knowing it contained alcohol).

Alcoholics need medical attention to help them overcome their problem. Alcoholics Anonymous, a voluntary organization, acts as a support group to help those afflicted and their families get over the problem. Many children become alcoholics in the clinical sense, when their parents let them sip adult drinks as a joke. The Caribbean is now developing anti-drug abuse programmes which include help for alcoholics and their families.
PART TWO

CONSEQUENCES OF UNHEALTHY EATING
When we talk about nutrition, “too little” can refer to many different situations — starvation, malnutrition related to a lack of certain kinds of nutrients, or the body's inability to use important nutrients, although we eat the foods that contain them. Some people starve even though they don’t have to. Some children suffer though help and advice are available, because their parents don’t use the health services provided by governments. This chapter provides a detailed look at aspects of having “too little”, and gives practical tips on avoiding these dangerous situations.

Just think of some of the pictures you see on TV, in the newspapers and magazines, of people in war-torn, famine or drought-stricken countries, and in refugee camps. In those situations there is just not enough food to eat. People waste away, become weak and sickly, and many die. They lack the basic energy and nutrients for survival.

In our region the effects of not getting enough of the right types of food are seen mainly in young children and elderly folks. The young do not grow and develop well; they often get bouts of infection; they may waste away. Some look plump, with shiny-looking skin, yet they may even die. Such are the ravages of not getting enough of the right types and amounts of food for a long time. But it is not only the lack of food which brings on this condition. It is a whole set of social and economic circumstances.

Some people may not get enough food. Others may get enough food overall, but the combinations may be such that some nutrients are in short supply, or, there may be too much of others. That is to say, there are deficits and imbalances.

It usually takes a long time before we can really tell that a person is not getting enough food and nutrients. “I am starved” is a term we often hear or use when we are hungry. But that short-term lack of food is different from when a person gets little or no food for days, weeks, months or a whole
season. For example, a child may go to school without his or her breakfast. That child's last meal was 8 o'clock the night before. The child is hungry, but he or she may not necessarily be malnourished.

Malnutrition is the term we use to describe getting too little, but as you will see in the next chapter, malnutrition also includes those who eat too much over a long period. In this chapter we will deal with the most prevalent conditions resulting from too little food and nutrients, which affect people in this region.

Energy-protein malnutrition is at the top of the list. Next in importance comes iron-deficiency anaemia — a widespread problem. The decaying of our teeth is also nutrition-related and is a big problem. Vitamin and other mineral deficiencies are rare, but we must be mindful of them also. The eating disorder, anorexia nervosa is self-imposed starvation related to emotional problems. Fortunately, this is not common in the Caribbean.

Why do these conditions occur? How do we recognize them? What can we do to prevent and control them?

Before discussing these, we should also mention that there is an increasing tendency to have too little of the complex carbohydrates. These include peas, beans, grains, ground provisions and fruits and vegetables, discussed in the chapters on carbohydrates, diabetes, heart attack, high blood pressure and cancer. These foods are useful in preventing excessive weight gain, keeping blood fat levels low, managing diabetes and protecting against the chronic diseases mentioned above. Complex carbohydrate foods have lots of fibre and are low in fat. Foods that contain complex carbohydrates are also very rich in some vitamins and minerals, the lack of which, is associated with heart disease, stroke and some cancers.

ENERGY-PROTEIN MALNUTRITION

Energy-protein malnutrition (EPM) in young children is a persistent problem in the Caribbean, but we are seeing fewer cases now in most countries than we did 20-30 years ago. Some countries have "pockets" of malnutrition. Those "pockets" need special attention to reduce the levels.
The first symptom of EPM is failure of children to grow and develop normally. There are clear differences between the two children of the same age shown in this picture. The child on the right may appear healthy but he is shorter and underweight compared to the one on the left. His muscles are not so well developed and he has very little spare fat. This is the story of those who are mildly malnourished. The chances of his getting frequent bouts of infection are great. These may lead to severe forms of malnutrition.

Children may be mildly, moderately or severely malnourished. In the mild cases they are just not growing well. With the moderately affected ones, growth falters to a greater degree. Young children who are severely malnourished suffer set-backs in their mental development, behaviour and physical growth and development. They often have to be hospitalized, and sometimes even with the best care they die at this tender age. It is always a sad affair, as these deaths could have been prevented.

Contrary to popular belief, calories (energy) are usually in shorter supply than protein in the malnourished. That is why the condition is called energy-protein malnutrition. The child fails to grow and rapid weight loss occurs. Weight is lost as the energy the child needs to survive is more than what he or she gets from food. Protein from muscles is used to provide energy, and wasting occurs. The term marasmus, often called "mirasmy", is used to describe the severely wasted child.
Some severely malnourished children may also look “puffy” and plump as if they are fat. The plumpness is due to excess water in their bodies. Sometimes the skin flakes, cracks and may even burst. This condition is called kwashiorkor. This name was given to the condition by the late Dr. Cicely Williams, a well-known Jamaican, while she was working in Africa.

The following drawings show the difference between marasmus and kwashiorkor — two severe types of energy-protein malnutrition.

**KWASHIORKOR**

Children with kwashiorkor:
- show body swelling (oedema) especially on the legs and feet, and sometimes on the face
- have soft, flabby muscles
- have cracked, peeled skin
- have thin, reddish hair
- are unhappy and often peevish and may not want to eat

**MARASMUS**

Children with marasmus:
- have no fat (very skinny)
- are very underweight
- have an “old person’s face”
- are always hungry

Source: WHO
Adults too, especially some young, hard-working ones and the elderly, may also suffer from energy-protein malnutrition. How the adults look is a way of telling that they are malnourished. The best way is to see how much they weigh for their height. When they weigh 20% or more below what they should, they are considered malnourished. The table on page 102 can help adults to see what they should weigh, depending on their height.

What Causes Malnutrition in Children?

Many children who are severely undernourished come from homes or environments where food and other important things are lacking. These include:

- good child rearing habits, including adequate feeding;

- resources: gainful employment of, and support for parents, clean healthy surroundings such as clean water supply and proper human waste disposal systems;

- the resources plus a willingness to have the child's health checked regularly by a qualified nurse or doctor and to access other forms of child care;

- Too often there is the belief that "ghosts are sucking the child", and so the advice of spiritual lay leaders is sought instead of that of health professionals.

Sometimes enough food is available to feed the child but he or she does not get enough, because of the ignorance of parents or guardians about the right amount or quality of food to be fed to children. For example, a mother decides to buy expensive tinned formula to feed her newborn baby. She is not able to buy enough of this expensive milk. She stretches the milk by adding more water than is recommended and thus deprives the child of adequate nourishment. Little does she know that she does not need that expensive milk for her baby. Nature has provided her with an adequate supply of food for her child in the form of breast milk.

The way children are treated by their parents and others also affects their physical, mental and emotional development and their nutrition.
Malnutrition in children may also arise in a family where food and other things are available, but the mother just does not look after the child well. The mother could be very young, mentally unsound or on drugs or alcohol. She may be pregnant with a second child while the first one is still very young. So, child neglect is also an important cause of malnutrition.

**Prevention of EPM in Children**

To prevent EPM we must look carefully at the contributing factors and remove them. There is no simple solution, as many factors are involved.

1. *Pregnant women should eat enough of the right kinds of food to ensure that their babies will be born heavy enough for a healthy start.*

2. *When the babies are born, they should be breast-fed and weaned appropriately.*

3. *Parents should ensure that their children:*
   - are properly fed;
   - live in clean, healthy conditions;
   - are loved, communicated with and provided with suitable playthings;
   - get adequate health care and in general, are raised in a healthy and stimulating environment.

Some of these factors are discussed on the next few pages.

**Make Use of the Health Care Facilities**

There is a well-established system for monitoring the nutritional status of pregnant women and young children at government health clinics. Unfortunately, most women visit the clinic late in the pregnancy, if at all. A pregnant woman must eat well and gain adequate weight for her child to be born healthy and well nourished. Even a fat mother must gain weight during pregnancy. Some mothers do gain weight but their blood is too "poor". That is, they are anaemic, so the child will be born unhealthy and undernourished. The best way to watch for this problem is to visit the clinic or the doctor
regularly from very early in the pregnancy. The mother also must take care of the child growing within. Diet for the pregnant woman is discussed in Chapter 20. Many parents do not take the children to the clinic after they have had their immunizations (injections and drops for preventing diseases). The clinic’s monitoring or “watching” system can detect health problems in children and remedy them quickly. But it can only work if parents cooperate.

Some countries have now developed a take-home growth chart. Using this chart, the mother can check the child’s growth for herself. The child will also have to be weighed regularly. Remember, Ministries of Health provide programmes at the home, community and ministerial levels to help parents prevent and treat EPM in their young children. A system for school children is also being started in the Caribbean.

Watch Children's Growth and Development Carefully

An important aspect of child care is monitoring or watching their growth. Check the growth and development of your children so you can get help quickly if a problem shows up. It is the parents’ business to know how their children are doing, just as it is important for doctors or nurses to check, keep records and advise parents. Sickness and feeding patterns affect the weight of the child. A child should gain weight, so watch out for that. If the child is not gaining weight or if he or she is losing weight, something is wrong. The child may not be getting enough to eat or may be sick.

There is no special weight that a child should have at a given age because children are born with different weights and develop at different rates. The important thing is a child should gain weight. So, watch out for that — CHECK YOUR CHILD'S GROWTH!

Feed the Sick Child

Feed or coax the sick child to eat to gain strength to fight the illness. Soft, easy to swallow, tasty and attractive meals, juices, milk shakes, puddings and soups are good. The age-old practice of withholding food from the sick, is a harmful custom. After the illness, feed the child more food than usual, to make up for what he or she could not eat while the illness persisted.
Be a Responsible Parent

Children need careful attention, love, stimulation and other support from their parents or care-givers. Being a responsible parent makes a big difference in the health of a child. This is just as important for fathers as for mothers. Child rearing is not an instinctive behaviour which many people think all women know. It is a learned behaviour that future or present parents must learn. A lot of parenting advice is now available for those who care.

ANAEMIA

Anaemia is a condition caused by a lack of red blood cells, or a lack of haemoglobin in the red blood cells. Haemoglobin is the protein in the blood which carries oxygen to all the tissues. This lack of haemoglobin may be due to the lack of iron in the body, loss of blood or badly formed red blood cells. All forms of anaemia cause oxygen deprivation in the tissues. In all cases, transportation of oxygen by the blood is at a lower level than normal, causing the person to tire easily. Anaemia reduces the person’s ability to work, it also reduces resistance to disease and may lead to complications in child-birth. In the school-age child, it is likely to jeopardize the learning process. In the Caribbean, iron-deficiency anaemia occurs mostly in pregnant women and pre-school children. In some countries many school-age children are also anaemic.

Signs

Unusual tiredness, extreme lack of energy, pale skin, difficulty in breathing, unusual heart beat, giddiness, and headaches are the chief signs of anaemia. The most reliable way of telling whether a person is anaemic is by testing the blood. The most common tests measure the number and size of the red blood cells, and the amount of haemoglobin in them. Haemoglobin levels of 11 grams per decilitre of blood (11g/dl) and above are considered normal, according to the World Health Organization.
Nutritional Anaemia

Cases of nutritional anaemia in our region are due mostly to a lack of iron in the diet, and poor absorption of the available iron. Deficiencies of folate (a B vitamin) and vitamin B₁₂ are also causes of anaemia but to a lesser extent.

Iron-deficiency anaemia occurs mostly during periods of growth such as infancy, childhood, adolescence and pregnancy. During these periods there is an increased demand for iron due to an increased blood volume to feed the new tissues. If these demands are not met, anaemia results. However, it may occur at any age if the normal need for iron is not met.

A lack of iron reduces the amount of haemoglobin in the red blood cells. The lack of vitamin B₁₂ results in a condition in which the bone marrow is unable to manufacture normal red blood cells. The same type of anaemia develops when there is not enough folate.

Prevention and Treatment of Anaemia

The prevention and treatment of anaemia involve:

- breastfeeding babies for the first 6 months and gradually weaning them onto nutritious mixtures of food;
- eating a nutritious diet with special attention to foods rich in iron along with vitamin C-rich foods; no iron pills are necessary if the right foods are eaten;
- avoiding substances which interfere with the absorption of iron; see page 64;
- taking supplements, in special cases. Most pregnant women are advised to take an iron/folate supplement to ensure an adequate margin of safety for themselves and their unborn children;
- getting regular check-ups so that the haemoglobin levels can be monitored;
• paying special attention to environmental sanitation and wearing shoes in areas where worms and parasites, which cause internal bleeding, may get into the body through the feet.

TOOTH DECAY

Many people think that tooth decay (dental caries) and gum diseases are a natural part of growing up and growing older, but this is not so. If a good diet is combined with good teeth and mouth care, we can build and keep strong teeth that will last a lifetime.

The same foods that are good for general health are good for our teeth. Since our meal pattern usually contains many foods with natural sugars, it is a good idea not to add a lot of sugar, especially for young children whose teeth are forming. If a child needs extra energy foods, try to include a little more of the cereal staples, and some extra fat in his or her meals.

Foods which have crisp textures and which children usually enjoy eating because of their noisy crunch — raw chocho/christophene, carrots, sweet peppers and fruits — make good snacks and are good for their teeth. Scraps of food that contain a lot of sugar and starch will ferment if allowed to stay in the mouth for a long time. This will help to cause teeth to decay or rot.

How Cavities are Formed

The bacteria in the mouth form a sticky substance which gathers on the teeth. This is called plaque, and it is this substance which joins with the sugars and starch in food to form an acid. The acid produced eats away the teeth until holes, called cavities, are formed. It has been shown that the regularity with which sugar and other carbohydrates are eaten, how much they cling to the teeth and how long they are left in contact with the teeth, contribute more to tooth decay than how much of them is consumed. Decay is also influenced by the level of the mineral fluoride, the flow and composition of saliva and the amount of liquid which is consumed.
Tooth Care

Let's eat well so that our teeth will be strong and healthy. Also, let's brush our teeth to clean away the plaque and keep acid from forming. When children have some teeth and can handle a toothbrush, they should be shown how to clean their teeth after each meal. All of us should do this, or rinse our mouth well with water if we cannot brush our teeth after a meal.

Visiting the dentist regularly, from early in life, will help to save our teeth by detecting cavities which can be filled promptly.

EATING DISORDERS

Some youngsters and even some adults are so preoccupied with being slim that they refuse to eat, lose a lot of weight and become sick. This condition is now known as Anorexia Nervosa. Allied to this is a condition called Bulimia which is eating large amounts of food and then vomiting or taking purgatives to rid the body of the food. Both are types of voluntary starvation.

These conditions generally occur in teenagers, but anorexia nervosa may begin as early as age seven and can extend into later years. The problem occurs in all socio-economic, racial and intellectual groups. Social and psychological factors are at the root of the problem.

It is felt that teenagers tend to develop this condition just after puberty (sexual maturity) or when undergoing other major stresses such as being sent away from home, separation from parents or the death of a loved one. Some youngsters in striving to become “fashionably thin” end up being anorexic.

Symptoms

The victim might not show every symptom, but many physical, behavioural and emotional characteristics are associated with the condition.
The most obvious are:

- Extreme weight change. Victims may lose a quarter or more of their body weight within a few months, as severe restriction of food makes the body waste away. Body fat and muscle are lost. There are clear signs of undernutrition.

- Unusual eating habits. In some cases the person eats ravenously and then induces vomiting, so that the food eaten is not digested or absorbed. Others may adopt odd practices, such as eating only foods of a particular colour or type, chewing food and spitting it out, stretching out their eating time, by taking tiny bits of food at a time or being compulsive in how they arrange their meals. Such persons may even refuse to eat with others, or may always make the excuse of not being hungry.

**Treatment**

Generally, the focus will be on improving body functions and nutrition, and modifying (changing) behaviour. The condition is difficult to treat and it may be months or years before the person is normal again. Medical supervision and good nursing care are necessary. Psychiatric care may also be necessary. Changing the behaviour of the individual, the family and peer group is very important.

**Prevention**

Things which parents, teachers, counsellors and other interested persons can do to prevent eating disorders are:

- Provide guidance about good nutrition and exercise.

- Encourage victims to feel good about, and accept themselves.

- Avoid driving victims, youngsters in particular, to try to excel beyond their capacities.
• Be alert to crises in the life of the young person; be ready to provide support and encouragement.

• Exercise care when encouraging a person to lose weight. Consider the individual’s health and well-being and not just his or her physical appearance.

• Find out why the teenager wants to begin dieting, and seek counselling from a professional, such as a nutritionist, dietitian, doctor, clinical psychologist or psychiatrist.

Teenagers and adults can take responsibility for their own behaviour by:

• Practising healthy eating habits.

• Seeking advice when in doubt and talking over problems with their doctor, nurse, pastor/religious leader, parents or a family friend.

They should be careful about not “over-doing it” in trying to be slim and trim, as this may ruin their health.

DEFICIENCIES OF MINERALS (OTHER THAN IRON)

Calcium deficiency is mostly linked with vitamin D deficiency and is discussed under that vitamin (see Chapter 7). Calcium deficiency also leads to a reduction of total bone mass, giving rise to a condition called osteoporosis. The bones become thin, weak and brittle. There seems to be a racial link in the occurrence of this condition — white people, especially women, are mostly affected.

Calcium may also become deficient when digested food is not absorbed well, due to diseases, or when there are disorders in metabolism (the process by which the body uses food). This may lead to low levels of calcium in the blood, resulting in tetany. Tetany is a condition in which the nerves become too excited and muscle contraction gets out of control.
Iodine

Iodine is necessary for the proper functioning of the thyroid gland. That gland regulates the rate at which the body uses energy. When the body does not get enough iodine the thyroid gland may become enlarged. This condition is called goitre and shows up as a swelling in the front of the neck. Goitre can be prevented by using iodized salt, that is, salt to which iodine has been added, and by eating seafood. Iodized salt is available in most countries of the Caribbean. Also, when iodine is inadequate, the rate at which the body uses energy slows down leading to overweight.

Potassium

Potassium deficiency is not primarily due to its lack in the diet, but to many circumstances such as those in severe malnutrition, chronic alcoholism, severe tissue injury following surgery, burns and during prolonged fevers, the use of medicines to treat hypertension and when there is too much fluid in the body. The deficiency symptoms include nausea, vomiting, muscle weakness, low blood pressure (hypotension) and abnormal heart beat.

More recently, it has been found that potassium exerts a beneficial effect on people with high blood pressure. Diets high in potassium which is found in fruits and vegetables, lower blood pressure and protect against stroke and damage to the blood vessels when blood pressure is high.

VITAMIN DEFICIENCIES

B Vitamins

Except for folacin, vitamin B deficiencies are rare in our region. People who have certain illnesses such as kidney disease; who abuse alcohol or other drugs; some pregnant women, the poor, elderly folk, teenagers and small children who are not fed properly, may not get enough B vitamins. Strict vegetarians may show signs of vitamin B12 deficiency. Supplements are usually given and these guard against or correct the deficiencies. It has been shown that after natural disasters such as hurricanes when the consumption
of vegetables, fruits and foods may be limited, some pregnant women may not get enough folate and their babies’ nervous system may not develop well.

Goat’s milk is low in folacin, so babies fed goat’s milk might show a deficiency. Folacin deficiency shows up mostly in the tongue. The tongue looks smooth instead of grainy, due to the atrophy or wasting away of the tissues. The smooth glossy look of the tongue no doubt has earned for the condition the name “glossitis”. A deficiency of folate also leads to the malformation of the red blood cells type of anaemia discussed earlier in this chapter.

Luckily, deficiencies of a single B vitamin seldom show up in isolation. We do not eat nutrients singly. We eat foods which contain mixtures of nutrients. So, if a major food is missing from the diet, the nutrients from that food will be lacking to a varying extent. There are only two recorded cases in world history where B vitamin deficiencies occurred on a large scale in humans. The resultant diseases were beriberi and pellagra as discussed in the chapter on the ABCs of Vitamins.

Vitamin C

The importance of vitamin C to health has been known for almost 300 years. Its role was discovered when crew members of ships that undertook long voyages contracted a disease called scurvy. This disease caused sores, bleeding gums, infections, internal bleeding and other complications, and finally death. It was found that vitamin C contained in fresh fruits and vegetables prevented scurvy. Recently, it has been shown that vitamin C, along with vitamins A and E protect against heart attack and some forms of cancer.

Vitamin A

Deficiencies of the fat-soluble vitamins occur when the diet is consistently low in them, when they are lost from the digestive tract with undigested fat, and when diseases cause them to be absorbed poorly by the body. Persons who use mineral oil as a laxative, lose fat-soluble vitamins as the body cannot absorb mineral oil.
In many parts of the world, deficiencies of vitamin A are still found in the form of blindness in children and adults, though cases are rare in our region. If discovered early, blindness due to a deficiency of the vitamin can be remedied by giving the vitamin. The less obvious signs of vitamin A deficiency in children are stunted growth, poor appetite and lowered resistance to infections.

Vitamin D

Vitamin D deficiency is still a problem worldwide, but is rare in our region. When there is not enough of the vitamin, bones fail to calcify (harden) normally and become so weak that they bend when they have to support the body's weight. So children have bow legs, knock-knees and a curved breastbone. This condition is called rickets. In adults it shows up in the form of soft, brittle bones that break easily. Some people may even become deaf as the tiny bones in the ear are also affected when vitamin D is lacking. Women who have repeated pregnancies and periods of breastfeeding may become bent and stooped, as their system becomes depleted of calcium.
"Too much of anything is good for nothing" is an old saying which is very true. When we eat too much food, especially those which contain the "fuel" nutrients, we become fat. Being fat is very unhealthy. Taking unnecessary amounts of minerals and vitamins as pills, can also ruin our health. In addition, too much protein overworks the liver and kidneys, which have the task of breaking it down and getting rid of it. The list of ills from having too much alcohol is long, as noted earlier. The dangers of excesses are explained below and ways to avoid them are suggested.

We know that if we do not eat adequately we will suffer from deficiency diseases. The deficiency could be of the total amount of food eaten (e.g., Energy-protein malnutrition) or a deficiency of one or more specific nutrients (e.g., Anaemia from lack of iron). Similarly, if we eat too much either in total quantity of food or in some specific nutrients, the excess becomes harmful to health.

An excess of calories, derived from dietary fat, carbohydrate or protein, gets converted into body fat. It is the most common example of too much, leading to obesity from which a large percentage of people in the Caribbean suffer.

The Perils of Being "Pleasingly Plump"

It is said that West Indian men, like their women "plump". We equate fatness with being well-off and being healthy. One Minister at the opening of a meeting proudly declared "our people are healthy, look at the numbers of buxom ladies walking in our streets". Little did he realize that scientists are discovering that being fat is unhealthy and obesity is a form of malnutrition.

*Buxom means pleasingly plump (fat).*
People who are 20% overweight have twice the chance of getting diabetes than those who are of normal weight. This rate keeps doubling for every additional 20% weight gain. Similarly, people who are 5-15% overweight have twice the rate of deaths from heart attack. For those who are 25% or more overweight, the number of fatal heart attacks is five times higher than normal.

Being overweight is definitely associated with high blood pressure and stroke. Fat people are more likely to get some forms of cancer. Obesity also brings on gout, arthritis, gall bladder disease, and the list goes on. Scientists are convinced that being fat is unhealthy. It causes many diseases and shortens our lives.

How Do We Know if We are Too Fat?

There are several ways to tell if a person is too fat. The simplest are noticing when the clothes no longer fit right, or when body weight is more than 120% of ideal weight for height and body build (that is, a fifth more than the normal weight). More accurate methods used by the experts include measuring skinfold thickness, waist/hip ratio, Body Mass Index (BMI) and underwater weighing.

Excessive amounts of body fat should not be confused with the heavy, muscular body of some athletes and body builders. Body weight, is largely the most common method of assessing body fat. Most of the weight of the body builders may be due to muscle mass and bones. In most people who are not into heavy exercise, if body weight goes up, it is most likely to be too much fat which contributes to the weight.

Body Weight and Height: Weight alone does not tell us everything about our body. Some of us are short and others are tall. Weight in relation to height is more meaningful. However, this is further complicated by the fact that for the same height some persons have a large frame, others have a medium frame and yet others have a small frame. Our weight differs with our frame. Frames can be measured but it is a cumbersome process.
The best estimate of body fat is shown by a formula in which we divide body weight in kilograms by the square of height in metres or, weight (kg) divided by height squared (m$^2$). This is called the Body Mass Index (or BMI).

For those 20 years and over, the weight is considered normal if the BMI value lies between 18.5 and 24.9;

If BMI is between 25.0 and 29.9, the person is pre-obese;

A BMI value of 30.0 - 34.9 indicates obese class I;

A BMI value of 35.0 - 39.9 indicates obese class II;

A BMI value equal to or above 40 indicates obese class III and it is a dangerous situation.

Our height after age 20 remains constant and we know that a BMI between 18.50-24.99 is normal. So, if we know our height, we can calculate the upper and lower limits of our weight. For example, a six-foot (1.8 metres*) tall man should weigh between $(1.8^2 \times 18.50)$ or 60 kg and $(1.8^2 \times 24.99)$ or 81 kg. This is equivalent to 132 and 178 pounds, respectively**.

If you are good at arithmetic, you can calculate the limits of your weight by multiplying the square of your height in metres by 20 and 25. However, many people do not like calculations. If you are one of them, do not worry. It has been calculated for you. Find out your height and look in the table below for the range of what you should weigh for your height. As long as you stay within the two limits (upper and lower, preferably in the middle) indicated in the table, you are doing well. The limits given in the table are the same for both men and women of the same height.

*To convert feet and inches into metres, bring the feet and inches to inches, multiply by 2.5 and divide by 100.

**To convert kilograms into pounds multiply by 2.2.
How Much Should I Weigh?

The Range of Desirable Weights for Heights in Adults

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Distribution of Body Fat: Fat is distributed differently in the bodies of different persons. Fat is a necessary part of our body. We divide that fat into two categories: essential fat and storage fat. Essential fat is stored in various organs of the body. In females it includes sex-specific fat (e.g., in the breasts) and is almost 4 times higher than in males. So, in a 60-kilogram female, essential fat is about 7 kg compared to about 2 kg in a man of the same weight.

Storage fat is almost the same in both male and female and in a 60-kg person it is about 8 kg. It is there as a nutritional reserve. It is the storage
fat which goes up or down according to what we eat (energy input) or use up in activities (energy output).

Patterns of storage also differ in the two sexes. While men tend to store in the upper part of the body mainly around the waistline (so-called beer belly), the women accumulate fat at the hips. But women also get fat around the waist. Scientists have discovered that irrespective of gender, those who have excess fat storage around the abdomen are at a much greater risk of diabetes, high blood pressure, stroke and heart attack than those who are big at the hips. Consequently, a method has been developed to measure the two areas and compare them.

The waist/hip ratio involves dividing the waist measurement* by the hip measurement** in either traditional or metric units. A result greater than 0.85 for women and 1.0 for men represent a health risk. For example a waist measurement of 100 cm and a hip measurement of 100 cm gives a ratio of 1 which would indicate abdominal obesity in women. If the measurements were 90 cm (36 inches) waist and 100 cm (40 inches) hip the ratio would be 0.90, also indicating abdominal obesity.

How and Why Does a Person Become Fat?

Many factors are responsible for obesity. It has been known for decades that obesity runs in some families. Studies of twins suggest that genetics (inherited traits) is an important factor in whether people become obese or not. However, families also share meals and other habits and it is at times difficult to separate the genetic from the familial/environmental factors. Obesity is a complex problem caused by a combination of genetic, nutritional, metabolic, physical, psychological and social factors. One thing is sure — to avoid obesity, energy balance must be maintained. Simply put, if the energy intake exceeds the energy output, obesity will invariably result. This is illustrated on page 13 in Chapter 2.

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*Smallest point below your ribs but above your navel.

**At the largest part of your buttocks.
There are people who eat, eat and eat and never become obese and others who eat a little extra and begin to bloat. At this point in our knowledge the only thing we can say is that every individual must find his or her own eating and exercise balance. There is no single solution for all. This requires effort on the part of the individual. The alternative is disastrous. So, preventing obesity is the only way to prevent the consequences.

Eating too much and not being physically active enough to burn extra calories are the commonest causes of obesity. It is so easy to get extra calories, as you will see from the section on “fat facts” on the next page. Too much of the foods which are high in calories, makes us fat. Alcoholic beverages also add their share of calories. Note that we have not included the ground provisions. It is a mistaken belief that ground provisions cause obesity. You would have to eat such large quantities of them in any one day that your stomach could hardly cope. But perfectly healthy, starchy foods become fatty foods when we fry them (e.g., fried plantain or potato) or add a blob of fat to them during cooking or when eating (e.g., boiled corn).

On the other hand, vegetables and fruits are low in calories but most of us only eat small amounts, especially of vegetables. Some of us do not even regard them as food. Little do we know that they are very effective in helping us to control our weight, among other health benefits such as providing vitamins and minerals.

Our eating patterns and behaviour are other aspects of the weight problem. Skipping meals and eating too much at one sitting, especially at nights, help the extra calories to be stored as fat. Sometimes we are in situations that prompt eating, such as shopping when we are hungry, always having food in sight, entertaining a lot, attending many parties and outings, or feeling compelled to stop at the ice cream counter or other fast food place every opportunity we get. The ‘sweet tooth’ syndrome is another of our problems. We feel we must bake or we must buy that bit of pastry, pudding, cake, some cookies and soft drinks, or our beverages must be sweet like syrup.

Some of these practices are handed down from generation to generation, so family members get fat. But it doesn’t have to be that way. Even if our parents and grandparents are, or were fat, we don’t have to be fat. We can stop ourselves from becoming too fat.
There is also the mistaken belief that acid foods melt fat and clear starch from the body. People are sometimes taken in by the belief that grapefruit or a mixture of honey and vinegar will “melt” body fat and help them to get slim fast or not to gain weight. Others believe that tomatoes will clear out excess starch from the system so it will not contribute to overweight. We need only look at the process by which the body acquires, stores and uses the end products of digested food to conclude that these are false beliefs. It is healthy to eat grapefruits and tomatoes, which are good sources of vitamin C and fibre. However, honey provides easily digested sugar; so instead of “cutting fat”, it may help to build fat, if the energy it provides is more than a person needs.

**A Few “Fat Facts”**

Obesity tends to creep upon adults. Two hundred extra calories each day will result in or 9 kg or 20 pounds per year increase in weight. Those 200 calories we can get from 2 slices buttered bread, or 1 small slice of cake, or a small milk shake, or 30-50g (1 - 1½ ounces) of meat, or 1 glass of milk and 3 biscuits. Similarly, 3,500 extra calories per week will lead to 23 kg (50 pounds) gain in body weight in a year.

Can you imagine what it would feel like if you had to carry around a 23 kg (50 pound) bag of cement all day every day? Well, that is exactly how our body systems feel when they have to cope with all that extra fat. Note the emphasis on extra because it is important that our bodies have essential fat and storage fat which together account for 15% of the adult female’s weight. It is having more than this amount of body fat that makes a person obese.

**Prevention is Key**

We are aware of the benefits of not being fat. We know the hazards and we know how to tell if we are too fat. We also know why we get fat, or at least we should know. So, we must try to prevent ourselves from getting fat, and if we are fat, we need to reduce our weight.
Get Wise to the “Why” of Weight Problems

If you are like most people with a weight problem, you find cutting down on what you eat very difficult. One of the most helpful things you can do is to try to figure out WHY you eat the things you do. For one whole week, keep a food diary. Get a pencil and a small pad of paper or an old notebook with ruled lines.

Write these five headings across the page:

WHEN    WHERE    WHAT    WHY    CALORIES

Continue eating in your usual way, but every night, write down carefully every single thing you ate throughout the day. Do not forget the things you drank, the snacks or nibbles you took between meals, and any foods eaten away from home.

A food diary like this can help you understand how much you really eat in a day. It may surprise you, because we often eat without thinking. Do you eat most when you are alone at home? When you are at school, at work, or out with friends? It will also help you understand WHY you eat ice cream for example. Is it because you are hungry? Bored? Worried? Unhappy about something? Or just because you have to eat? Be honest now! Don’t fool yourself that you do not know how you felt when you ate that chocolate bar or piece of cake or took that extra drink!


Remember:

• Having less meat and other fatty foods, less refined cereals and sugars and having more fruits, vegetables, peas, beans and ground provisions is healthy eating.

• Watch your food portions. Large amounts of energy-rich foods mean more calories.

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• Eat slowly and do not rush your eating. When you eat fast, you can easily overeat.

• To lose a pound (½ kg) you must use up an extra 3,500 calories or eat that much less calories. That would mean eating 500 calories less daily over a period of one week. Here are some examples of amounts of foods that contribute about 500 calories:

A large milk shake; a quarter pound of meat; a quarter pound of flour or rice; a pound of ground provisions and a half pound of bread.

Replace Old, “Bad” Habits With New, “Good” Ones

• Be selective in your shopping — not too much of high calorie foods such as meats, or calorie-only foods like sugars, sweets, soft drinks, and alcoholic beverages.

• Avoid situations that prompt eating:
  - shop when not hungry
  - eat low calorie foods such as fruits before you go to parties and other functions so you do not get too hungry and eat ravenously. Chances are you will be served high calorie foods anyway.
  - do not skip meals so that you do not become too hungry.

• Identify problems in eating and correct them; for example, food servings may be too large. Have smaller servings. You may be eating too fast and should try to eat slowly — chew well and converse to interrupt eating. You will eat more than you really need, if you eat too fast.

• Don’t forget your fruits, vegetables and ground provisions.

• Finally, find out your own level of energy intake which lets you maintain your normal weight, and stick to it.
Exercise Regularly and Properly

Some women and adolescents get adequate exercise through their daily work, for example working or farming the land. The majority do not, however, especially those who are city dwellers.

Exercise burns calories. How much you burn depends on your weight. A heavy person will expend more energy for the same amount of exercise, than a light weight person.

Burning energy also depends on the type of activity, how often you exercise, how vigorous or intense you exercise and how long you exercise each time. All these should be varied. See more on these in Section 4, Annex D.

Due caution must be taken before adults start an exercise programme for fitness or weight control. See a doctor and get a check-up before beginning.

If You Have to Reduce Weight Because You Are Too Fat

• Try to do so slowly and sensibly — that is, not too much too soon. Being too thin is as harmful as being too fat. It is important that you know your desirable weight range and do not go below the lower limit. Also, try to keep weight off, once you have lost it. Gaining and losing, gaining and losing or yo-yo gain and loss are harmful to your health.

• Healthy eating is discussed in Chapter 17. The same principles apply in losing weight. In addition, to lose weight you must have less than the usual supply of energy (calories), but you need all the necessary nutrients for good health. Twelve hundred (1200) calories are suggested as the lowest limit of energy intake without medical supervision.

• Beware of diet programmes that focus on quick weight loss or are based on diet drinks or pre-packaged foods. They are usually not successful in the long run.
• Your weight loss programme should help you to make the transition to healthy eating and exercise. You should try to burn at least 300 calories in each exercise session if you are to lose weight.

EXCESS VITAMINS

Some people tend to take massive doses of vitamins in the mistaken belief that “if a little is good, more is better”. Others feel that extra vitamins will give them energy and vigour, which is not true. It is very important to remember that overdoses of vitamins can be harmful.

Nausea (upset stomach), cramps in the abdomen and diarrhoea are some effects of overdoses of vitamin C. Overdoses may also interfere with medical treatment. For example, the large amounts which are passed out in the urine may interfere with the tests used to detect diabetes. People taking medicines to prevent their blood from clotting may not get the desired effect if they take massive doses of vitamin C. People who are prone to gout may also find that massive doses of vitamin C may trigger the development of kidney stones. Gout is a disease which causes inflammation of the joints, especially of the big toe. Too much vitamin C given to children in the form of chewable tablets can damage their teeth. The damage is done by the acid in the product.

Fear of not getting enough vitamin A may lead to our taking massive doses through vitamin pills or cod liver oil. Beware of too much vitamin A! This can be toxic or harmful. People who take too much vitamin A in supplements stand a chance of having their hair fall out, getting pains in their joints, sore bones and muscles, nausea, diarrhoea, rashes and enlarged liver and spleen. Huge doses in pregnancy can cause the mother to have a child with major birth defects including learning disabilities. So too much of the vitamin is just as dangerous as too little.
EXCESS MINERALS

Food contains dozens of minerals in varying amounts. Some of these are known to be essential nutrients, others are just there in the foods we eat, serving no known purpose but doing no harm. When taken in excess, some minerals may be harmful.

Sodium is an essential nutrient, but the amount consumed by most people, mainly in the form of salt (1 teaspoon of salt contains 2000 mg of sodium) is much more than the amount needed for normal body functions.

A connection between an excess of sodium and high blood pressure has been investigated for many years. At present scientists believe that excess sodium causes blood pressure to rise in salt-sensitive people. There is no easy way to detect who is salt-sensitive. Since no harm has been found in restricting sodium it is recommended that everybody should limit their salt intake to 6 grams (one teaspoonful) per day from all sources.

Potassium has beneficial effects on high blood pressure and helps prevent stroke. An intake of 3.5g per day is associated with lower blood pressure and fewer deaths from stroke. This amount can be obtained from five or more servings of fruits and vegetables. No additional supplement of potassium is normally needed.

On the other hand, too much potassium in the blood, called hyperkalemia, is a frequent complication in kidney failure; in severe dehydration, as in cases of severe diarrhoea; when too much is had by taking pills and when the adrenal gland is not functioning properly. The adrenal gland produces hormones or chemical messengers which regulate the balance of sodium and potassium in the blood.
When there is too much potassium in the body, the muscles become weak; respiration (breathing) is poor and there are nervous disorders which affect the scalp, face, tongue and extremities. In addition, heart failure may follow. The condition can be corrected by using a low potassium, low protein, high carbohydrate diet.

**Calcium** serves many vital functions in life. When there is too much calcium in the blood the condition is called *hypercalcemia*. Too much calcium will be deposited in the soft tissues of the body causing them to harden and preventing them from functioning properly. Blood pressure also increases and there may be bleeding in the digestive tract. These conditions may occur in adults who overdose themselves with calcium tablets.

Infants who get overdoses of vitamin D may also get hypercalcemia. They have frequent upsets in their digestive system and they do not grow as well as they should. The condition is corrected by removing the excess vitamin D.

**Fluoride** is recommended for the prevention of dental caries (tooth decay). An over-supply (2-8 micrograms daily) over time causes mottling of the teeth and makes the bones of the spine, pelvis and limbs too dense or compact.
A LOOK AT DIABETES

“Sugar”, the popular name for diabetes, affects a lot of Caribbean people. It is a disease which causes untold suffering, many complications, and which can result in serious disabilities and death. Scientists have been trying for centuries to find out exactly what causes it, but without success. However, we do have some clues, including the recent discovery that being too fat, and not getting enough exercise, put us at great risk for developing diabetes. The good news is that a healthy lifestyle can help us to avoid getting diabetes, and that with early discovery and treatment of the condition, complications are less likely and a normal life is possible. This chapter describes the different forms of the disease and provides good advice for avoiding and controlling the condition.

“I have sugar”, is a common saying in the Caribbean. “Having sugar” means there is a constant excess of the sugar glucose from digested food in the blood. Diabetes mellitus is the scientific name for the condition. That fancy name comes from the Greek language and means “frequent urination of honeyed or sweet urine”. The disease is not only very common worldwide, but has been known to humanity for centuries.

Diabetes is very common in the Caribbean. It is estimated that one out of ten persons over the age of 40 in the Caribbean is diabetic. One in eight deaths in some of our countries is due to this disease. In addition, it leads to many long-term complications involving the eyes, kidneys, nerves and heart, which also result in disabilities and deaths. Exact Caribbean figures are not available, but those from the USA, (where the treatment for diabetes is probably better than ours), show that people with diabetes are 2 to 4 times more likely to have heart disease and 2 to 6 times more likely to have a stroke, than people who do not have diabetes. One-tenth of the people with this disease develop kidney failure, which requires very expensive treatment (dialysis) or a kidney transplant, for survival. Diabetes is the number one cause of blindness, and a major cause of amputation of the leg.
What Is Diabetes?

Diabetes is a condition in which there is much more of the sugar glucose in the blood than is normal. This happens because the body is not able to use glucose, which is a major source of energy.

There are different types of diabetes. All types of diabetes have something to do with insulin, a chemical messenger that the body uses to control the use of glucose in the blood. A gland called the pancreas produces this chemical messenger in the body. Diabetes occurs when there is no insulin or when the body is not able to use the insulin that it has to take glucose into the cells to produce energy.

What Are the Types of Diabetes?

There are two main types of diabetes.

Type 1 Diabetes: In this condition the body does not produce any insulin at all. The only way to help these people is to provide insulin regularly through injections, throughout their lives. This type of diabetes is therefore also called “insulin-dependent diabetes mellitus” or “IDDM”.

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DIABETES

1. Excessive Urination and/or
2. Chemicals in Urine (Ketones)

Excess sugar in blood (more than 120 mg/dl)

Excess Thirst
About 1 in 10 cases of diabetes are of this type. Symptoms begin showing up early in life, mostly in young adults. At one time the disease was called "juvenile diabetes".

**Type 2 Diabetes:** The majority (8 out of 10) of the cases of diabetes are of this type. In this condition insulin is produced by the body, sometimes in even more than normal amounts, but the cells of the body do not allow the insulin to take glucose inside the cells to produce energy. The body is not dependent on insulin from outside. This type of diabetes therefore, is named "non-insulin dependent diabetes mellitus" or "NIDDM". The way to treat these cases is to make the body's own insulin function. The symptoms of this type of diabetes appear in adult life. Therefore, in the past it was called "adult-onset diabetes".

**Other Types of Diabetes**

A small percentage of women develop high blood sugar levels during pregnancy. The blood sugar level usually comes back to normal after the baby is born. A few of these women develop outright diabetes later in life. We call this gestational diabetes.

Another type of diabetes is related to malnutrition in childhood. A small percentage of malnourished children develop diabetes later in life. They sometimes require insulin injections, but there are periods when they are normal and do not need these injections.

**How Can You Tell Whether You Have Diabetes?**

A person with diabetes may:

- urinate often — this happens because more urine is produced as water is drawn from the cells to help excrete (get rid of) some of the sugar;
- lose weight, in spite of normal or increased appetite — the body tries to get nourishment by using up its muscle and fat. This usually happens in Type 1 diabetes;
• become weak and tire easily, as the various parts of the body do not get enough energy and nourishment;

• become very thirsty and drink a lot. The loss of excess water through the urine makes one very thirsty;

• complain of prickling, tingling or creeping sensations on the skin and may itch a lot;

• complain of blurred vision. Some people say their eyes are "cloudy" or "dark".

Anyone who has any of those symptoms should be checked regularly for diabetes, especially if the disease runs in the family and if the person is overweight. If diabetes is found early and controlled, the person can live a long, happy, healthy life.

What Causes Diabetes and How to Prevent It

Diabetes has been known to medical science since 1500 B.C., and vast amounts of research have been done, but we still do not understand exactly what causes it. The disease still baffles scientists and many others.

Type 1 Diabetes

Both inherited and environmental forces destroy the cells of the pancreas which produce insulin. Not all cases of Type 1 diabetes are hereditary however. Some viruses and chemicals destroy the pancreas, so that it does not produce insulin. In other cases, the body appears to produce cells that destroy the pancreas through what is called an auto-immune reaction. Diet has not yet been confirmed as a cause of Type 1 diabetes, but it appears that not breastfeeding and feeding cow's milk early in life in those babies that are sensitive, brings about the disease.
Type 2 Diabetes

This type of diabetes is definitely inherited. We cannot do anything about our hereditary traits, but this does not mean that every person with Type 2 diabetes in their family must get the disease. Most scientists are trying to find out what brings on diabetes in genetically prone people.

Diet has been the major focus of these investigations. No specific nutrient has been found to be the culprit. Even excessive consumption of sugar has not been found to be the cause of diabetes as many people think. In fact, diabetic patients are allowed to take small amounts of sugar.

Obesity is the only diet-related factor which has a strong link to diabetes. Researchers have found that as body weight increases, blood sugar level tends to increase. They have also found that fat deposits (especially around the abdomen) increase the chances of a person getting diabetes. All the extra fat, carbohydrate or protein we get from the food we eat is converted into fat in the body and increases our weight. It is the total food or calorie intake which is responsible for obesity and therefore linked to diabetes.

The majority of adult diabetics are obese and they may have excess insulin in their blood. So why is the glucose in their bodies not used? It appears that in order for glucose to enter a cell, it has to combine with insulin and be carried inside the cell by a “transporter” called a receptor which is located in the cell wall. Obesity decreases the number of receptors, while weight loss increases the number of receptors.

Reducing fat in the diet and exercising or engaging in other forms of physical activity, influence the insulin/receptor relationship. Regular exercise over a long time increases the number of receptors. A short period of intensive exercise, makes the receptor and insulin combine better.

Since obesity is a prime factor for diabetes, a person can prevent diabetes by preventing himself or herself from becoming too fat. We now know that both overeating and lack of exercise decrease the receptors and
their affinity for insulin. **The only way to help prevent diabetes is to eat a healthy diet, do daily physical exercise and prevent obesity.** We do not know who has hereditary tendencies for diabetes. Consequently, all of us need to eat properly and do daily physical exercise, if we wish to avoid getting diabetes. Maybe you are not prone to diabetes — but remember, obesity is also related to high blood pressure, heart attack, stroke and some forms of cancer. So, being too fat is unhealthy on several counts.

If you have diabetes and would like to know more about meal planning, we suggest that you consult the 1994 edition of the CFNI publication “Meal Planning For Diabetes”.

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Most of us call it “pressure”. Doctors and nurses say “hypertension” or “high blood pressure”. It is very common; you cannot see it, and the effects are not easy to connect with the cause. As a result, many people take it lightly, often ignoring their doctors’ instructions and not bothering to take their “pressure” medicine. But this is a dangerous disease, which disables and kills thousands of people. The good news is, we can prevent it, or at least reduce the risk of getting it, and we can control it. To find out how, and to understand this disease and the way it works — read on.

One in six adult West Indians will say that they have “blood pressure” or simply “pressure”. What they actually mean is that they have high blood pressure, because all of us have blood pressure. When a person’s pressure rises beyond certain accepted levels and remains consistently high, it becomes an illness called hypertension or high blood pressure. If you are over 40 years of age, the chances are you have high blood pressure, and if you have not made an effort to get it checked, you probably do not know you have it.

Half of those who actually have high blood pressure do not know that they do, and sometimes do not find out until it is too late. So, only half of them can get the proper treatment. Those who are put on medication often do not keep it up and half of them show poor results. Little do they know that taking their medicine is a matter of life and death. Those who take their pills regularly are not completely alright. Some of the pills have serious side-effects when used for a long time. The risk of both heart attack and stroke increases progressively as blood pressure gets higher.

High blood pressure is also a leading cause of heart failure, kidney disease and diseases of the nerves of the eyes. Obviously, hypertension is a dangerous disease; so dangerous that we need to give serious consideration to its prevention. Since the disease affects large numbers of adults, everybody needs to know about it.
Prevention through diet, exercise, reducing weight and cutting down on alcohol is vital.

What is Blood Pressure?

Every cell in the body needs nutrients and oxygen to keep us alive and functioning. The blood carries them to the cells as it circulates throughout the body. Here is what happens. The heart pumps the blood through the arteries (blood vessels leading away from the heart) throughout the body and finally to the cells. To do this the heart muscles contract and push the blood out with a certain force. Every time the heart beats, it pushes a large amount of blood into the arteries, with a certain pressure or force.

The arteries which are normally soft and elastic, expand to accommodate the gush of blood and the pressure it exerts. The pressure on the walls of the blood vessels as blood rushes out of the heart is called systolic blood pressure. The heart beats 60-80 times a minute and every time it beats it exerts this pressure on the walls of the arteries.

The heart relaxes between beats and the soft, elastic blood vessels contract to their original size. The pressure of the remaining blood on the vessel walls at this time is low. This lower pressure is called diastolic pressure.
Let us use a hose and a water pipe to demonstrate these processes. Imagine that you are using a soft, collapsible hose to water your garden. Hold the hose gently in any one place and turn on the pipe. Water rushes into the hose. You feel the force or pressure of the water against your hand as the hose expands and water rushes through. If you turn off the pipe, the hose will collapse to its original size and the pressure on your hand will be less. This is exactly what happens when the heart pumps blood into the arteries and then relaxes. So, as long as we are alive and the heart is pumping blood there will be a certain pressure on the walls of the arteries. This is normal and there is nothing to worry about. What is worrisome is the consistent rise in blood pressure above certain levels.

How Blood Pressure is Measured

A special instrument called a sphygmomanometer (sphyg-mo-man-ometer) is used to measure the pressure in the artery. The instrument has a gauge on which the pressure is read. A special cuff is put around the arm and tightened by pumping air into it. This tightness cuts off the circulation of blood in the artery. As the air is gradually let out of the cuff, the pumping action of the heart shows on the gauge of the special instrument. A number is written down for that pumping force or systolic pressure. When the heart is relaxing between beats, another number which represents diastolic pressure registers on the instrument. Both numbers represent that person's pressure. The two pressures on the walls of the artery - systolic and diastolic - are written as two numbers separated by a slash, such as $120/80$ and is read as "one-twenty over eighty". When the resting pressure remains high after several measurements, that person has high blood pressure.
**You Can Measure Your Own Blood Pressure**

These days there are several easy-to-use electronic devices which you can use to measure your blood pressure. Many of them are as accurate as the ones in the doctor’s office, and are easy to use. The readings appear on the dial like the one on your digital clock, so there is no need to have that fancy gadget called a stethoscope which the doctor puts in his ear. Most of these new devices are battery-operated.

The accuracy of the instruments and how well you can use them make a difference in the blood pressure readings. It is very important to monitor blood pressure outside the doctor’s office. Some people become so obsessed with measuring their blood pressure, that they take their pressure “every few minutes”, and panic when the reading is not as they would wish. Others do not observe the rules of taking pressure and either panic or become complacent with the results of the measurement.

The rules for measuring blood pressure, both at home and at the doctor’s office, are the same.

**Before the test:**

- Read the instructions on the instrument and follow them, including the care of the instrument (e.g., changing or caring for the battery).

- Avoid smoking, drinking coffee or eating just before the test.

- Try not to entertain thoughts that will make you feel anxious or excited.

- Empty your bladder.

- Do not exercise before the test.

- Sit quietly for five minutes before the test.
During the test:

- Put the cuff accurately in place on the upper arm, midway between the shoulder and the elbow.
- Keep the area to which the cuff is attached at just about the same level as your heart.
- Support the arm on a solid surface.
- Do not move your arm or talk during the test.

If you decide to monitor your blood pressure or that of a family member, take it seriously. Equip yourself with an instrument and learn how to use it. Do not panic or become complacent. When in doubt check with your doctor or a nurse. They will be glad to help you.

What is Normal Blood Pressure?

Blood pressure depends on how fast the heart is beating, how much blood it pushes at each beat and the condition of the arteries. If the arteries are soft and elastic they will expand to accommodate the pressure of the blood gushing from the heart. So, normal blood pressure varies according to the physical condition of a person. As a basic guideline, blood pressure above 140/90 is generally considered high in adults.

How far below this number can blood pressure be called normal? Many specialists believe that except under certain special circumstances blood pressure cannot be too low. A perfectly normal person could have a blood pressure reading of about 85/60. Others with that reading may feel weak, dizzy, or have other problems. Let your doctor advise you on what blood pressure is normal for you.
The upper limits of normal blood pressure for young people are as follows:

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Blood Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 6</td>
<td>110/75</td>
</tr>
<tr>
<td>6-10</td>
<td>120/80</td>
</tr>
<tr>
<td>11-14</td>
<td>125/85</td>
</tr>
<tr>
<td>15-18</td>
<td>135/90</td>
</tr>
</tbody>
</table>

Why Some People Get High Blood Pressure

In most cases the exact cause of high blood pressure is unknown. There are many factors which may make some people more likely to get high blood pressure than others. These include their age, diet, lifestyle and the way they take care of themselves in general, and even whether they are male or female. Let us look at these factors one by one:

**Age:** We cannot avoid aging. Blood pressure rises with age and stabilizes in adulthood. If we maintain a healthy weight in adulthood our blood pressure may not rise to any great extent. If we maintain a healthy lifestyle, we have a good chance of avoiding a pronounced rise in our blood pressure as we age. A healthy lifestyle includes healthy eating and regular exercise, drinking alcohol in moderation, if at all, not smoking and being of the right weight - not too fat and not too thin.

**Heredity:** Many people are born with a tendency towards high blood pressure and cannot do anything to change that trait. If one parent has high blood pressure, the chance of a son or daughter developing it is doubled, compared with those who do not have a family history of high blood pressure.

This does not mean that a person will definitely get the disease. Some may have true hereditary tendencies for the disease. Others may simply
adopt and follow the lifestyle of their parents which lead to the disease. A healthy lifestyle may prevent a person from getting the disease or at least delay it, in spite of the hereditary tendency.

**Gender and Race:** In the United States of America more blacks have high blood pressure than whites. Blacks also have three times higher death rates from hypertension than whites. They develop the disease at a younger age, and it is more severe in them.

Early in their adult life, black women have lower blood pressure than black men. By age 50 however, the women's blood pressure levels catch up with those of the men. The same gender differences are found in young, white adults, but the women catch up with the men in their sixties and seventies.

You cannot stop yourself from growing old. You cannot change your gender and racial origin and you must live with what you inherit. There are factors which you can modify, and use to prevent high blood pressure. You can prevent yourself from getting fat or obese, you can eat a healthy diet, be physically active and avoid taking excessive amounts of alcohol and smoking cigarettes.

**Obesity:** As a person gets fat and weighs more, he or she is likely to get high blood pressure. In the famous Framingham Study in the USA, for instance, patients who were 20% or more over their ideal weight were found to be eight times more likely to become hypertensive. Upper body fat, or excess fat around the abdomen (also called beer belly) and chest is more often associated with high blood pressure than lower body fat or excess fat around the hips and thighs.

But take heart! It has been found that hypertension in obese people is less dangerous than hypertension in people who are not overweight. When people lose weight they can reduce their blood pressure. In one study, 79 of the 81 hypertensive patients who lost an average of 20 pounds (9 kilos) lowered their blood pressure by an average of 30 points on the systolic reading and 20 on the diastolic reading.
DIETARY FACTORS:

Salt: One of the major components of common salt is the mineral sodium. These days potassium salt is available on the market. Two-fifths or 40% of regular salt is sodium. So, in 10 grams or 2 teaspoons of salt there are 4 grams of sodium. When salt-sensitive persons take too much sodium their blood pressure will rise. About half of the persons with high blood pressure are salt-sensitive. When they reduce their salt intake, their blood pressure will fall. In Chapter 8 we mentioned that sodium helps to regulate water in the blood and thereby affects blood pressure. It is recommended that salt-sensitive persons reduce salt in their diet to a maximum of 6 grams or a teaspoon per day from ALL sources. Since there is no way to know beforehand who is salt-sensitive and who is not, everyone should reduce salt. Those who are hypertensive, or have the tendency to be hypertensive could also benefit from restrictions in their sodium intake.

Fats: The type and mix of fats in the diet affects blood pressure. Polyunsaturated fats (mostly from plant sources and fish) tend to lower blood pressure. Fish oils appear to have the greatest effect on lowering blood pressure.

Other Dietary Factors: A high fibre diet and high intakes of the mineral potassium lower blood pressure. Fruits and vegetables are excellent sources of potassium. When people with normal blood pressure are put on diets severely deficient in potassium, their blood pressure increases. Coffee and tea drinkers will be pleased to know that there is no evidence that the stimulant caffeine found in those beverages predisposes them to high blood pressure.

Vegetarianism: Vegetarian diets are associated with lowered blood pressure in a big way. Although the exact reason is not clear, the blood pressure lowering may be due to the combined effect of low fat, low sodium, high fibre and high potassium in those diets.

Sedentary Lifestyle: Those who habitually indulge in physical activity have lower blood pressures than those who are not physically active. A person’s risk of developing hypertension is associated with his or her physical activity or fitness level. Less active and less fit persons have a 30-50% greater risk of developing hypertension than active, fit persons. A recent study shows that people who had a high risk for developing high blood
pressure reduced this risk by 50% through exercising. In addition, those who were already hypertensive reduced their blood pressure by approximately 10 points through mild to moderate exercise training. The individual with hypertension needs an exercise regime that is specially designed for him or her.

**Alcohol:** Individuals who consume moderate to large amounts of alcohol usually develop high blood pressure. It is harmful to have more than 2 ounces of alcohol per day (equivalent to two average-size drinks of wine, beer, rum). Studies on heavy drinkers show that 80% of those who have high blood pressure when they enter an alcohol rehabilitation programme, experience a normal blood pressure within 30-60 days after they stop drinking. In addition, hypertensive women who drink moderately, have a higher incidence of stroke than those who do not drink.

It appears that there are alcohol-sensitive people who suffer from high blood pressure even with small daily intakes of alcohol. Their blood pressure returns to normal if they stop drinking and if they eliminate other risk factors as well.

**Smoking:** Although smoking only raises blood pressure temporarily, it has adverse effects on those who have high blood pressure.

**Reducing the Risk of Getting High Blood Pressure**

You can reduce your risk of getting high blood pressure by doing the following:

- Reduce if you are overweight.
- Eat a healthy diet.
- Cut down on excess calories; eat smaller portions of food.
- Eat less fatty meat and animal fat.
- Use low-fat or skimmed milk and products made from it such as yoghurt and cheese.
• Eat more fish, and foods with complex carbohydrates such as peas, beans, ground provisions, fruits, vegetables and whole grain cereals.

• Reduce salt from all sources to about 6 grams or 1 teaspoon per day. See how to do this in Chapter 18, page 173.

• Do not drink alcohol. If you must, drink no more than 1-2 drinks* a day.

• Exercise at least 3 times a week for at least 30 minutes a day, even if you are not overweight.

• Practise sensible, regular exercise as a part of daily life.

• Stop smoking, if you now smoke.

Remember! You can have hypertension even if you are not tense or anxious.

*One drink is equivalent to 12 ounces of beer, 5 ounces of wine, or 1½ ounces of strong liquor such as rum, whisky or gin.
HEART ATTACK: A GROWING BUT PREVENTABLE PROBLEM

A heart attack is a tragedy that does NOT have to happen. Although some people are born with a greater risk for this condition, each of us can reduce the chance of getting an attack. This chapter tells how we can do this; have a healthy diet, control our weight, exercise regularly, don't smoke and don't abuse alcohol. It also explains what causes a heart attack, lists the warning signs, and encourages early treatment. But most of all, it shows that "prevention is better than cure!"

These days more and more people are dying suddenly of "heart attack". A quarter of the people who have a heart attack have only one symptom — sudden death. Another one-third die between the time they get the attack and the time they reach the hospital and start getting treatment. So, for more than half of those who have a heart attack, it is too late to do anything about it. In the medical profession various names such as coronary artery disease, coronary heart disease, ischaemic heart disease or simply heart disease are given to conditions which result in the attack. These names will become clearer as you read on.

What is Heart Attack?

To understand heart attack, we must first look at the heart itself. The heart is a muscular organ situated in the lower part of the chest a little to the left of the center under the rib cage. It pumps blood to all parts of the body through a system of tubes or blood vessels called arteries. Having served its purpose of supplying oxygen and nutrients to the various parts of the body, the blood returns to the heart through another set of blood vessels called veins.
The heart is made of a strong muscle called myocardium. To function properly, the heart muscle itself needs a supply of blood carrying nutrients and oxygen. That blood supply is provided by the coronary arteries.

Normally, the walls of an artery are thin, soft and elastic. Over time, blobs of fatty and other materials stick to the inner walls of the arteries, making them thick, hard and inelastic. Just think of an old piece of clogged-up, galvanized iron pipe in your water supply system. That is a perfect example of a hardened artery.
This hardening of the arteries is called atherosclerosis. As the walls of the arteries thicken, the channel through which the blood flows becomes narrower and narrower. The narrowing cuts down the amount of blood flowing through the arteries.

If the thickening takes place in the coronary arteries then the heart muscle does not get enough blood. It suffers from a lack of oxygen and nutrients, and a heart attack is the result. Since the main problem is in the coronary arteries, the disease is called coronary artery disease or coronary heart disease. Since the heart is deprived of the oxygen it needs, the name ischemic (meaning lack of oxygen) heart disease is also used.

Depending on the degree of the blockage in the artery to the heart and how much the heart muscle is deprived of oxygen, the functions of the heart suffer. If the blockage is partial or is only in a minor artery, the person feels pain in the chest and along the left arm. This pain is called angina. If the blockage is complete because of a blood clot stuck in the narrowed part of the artery, and in a major artery, the part of the heart supplied by that artery does not get its blood supply and dies. The heart stops beating and the person dies suddenly. This is also a heart attack. Doctors call it myocardial infarction.
What Causes Hardening, Narrowing and Blockage of the Arteries?

The hardening of the arteries, or atherosclerosis is a gradual process. Fats, particularly cholesterol, are deposited in the walls of the arteries over a long period. In the beginning, these deposits are called “fatty streaks”. As more cholesterol is deposited in the arterial wall, the fatty streaks grow. By the time a child becomes a teenager, these fatty streaks begin to be covered by hard, stiff, fibrous tissue and muscle. At this stage they are called “fibrous plaques”.

If the process continues, the plaques keep growing and by about middle age, calcium starts to be deposited in them, making them very hard. The arteries begin to narrow, and blood has a hard time flowing through them. Hardening of the arteries is detected in adulthood, but it begins in childhood.

When the arteries become narrow, several things can happen:

1. The part of the body supplied by the artery may only get small amounts of blood, and therefore suffer from lack of oxygen and nutrients.

2. Blood flows slowly through the narrowed artery. A blood clot may form and block the already reduced space in the artery.

3. In the worst case, the plaque may crack open, releasing fragments which suddenly block the artery, cutting off the supply of oxygen and nutrients to that part of the body. Those tissues soon die.

The first culprit to begin the artery-hardening process is too much fat in the blood, particularly cholesterol. Fortunately, the process can be prevented, arrested and even reversed through changing the diet.

Not everybody’s arteries get hard as they grow older. So why do some people’s arteries harden? The answer lies in their diet, mostly the amount and the kind of fat and cholesterol. Remember how fats and cholesterol
move around the body? We discussed this in Chapter 5, but here are some key reminders.

1. We get fats and cholesterol from the foods we eat.

2. The body also makes them.

3. Fats and cholesterol travel in the blood in association with specific proteins giving rise to compounds called lipoproteins.

4. Four types of lipoproteins circulate in the blood and carry fat and cholesterol to and from various parts of the body.

5. Each of these lipoproteins has different proteins and each behaves differently.

6. Cholesterol is transported to certain target cells by two of these lipoproteins — LDL and HDL.

7. The LDLs take cholesterol from the liver to the body cells, while the HDLs help to remove cholesterol from the cells and return it to the liver where it can be excreted (got rid of) in bile.

Too much LDL-cholesterol causes cholesterol to accumulate on the walls of the blood vessels leading to fatty streaks, plaques, and blocked arteries.

**Who is Likely to Get a Heart Attack?**

It is very difficult to say who is likely to get a heart attack. Persons of a certain age, race and family history have greater chances of getting heart attacks than others. Let us look at these characteristics one by one.

**Age:** Heart attacks are common in people over 50 and less common in those below 40. In some countries men are 3 to 5 times more likely to die of heart attack under the age of 50 than women, but women seem to catch up with the men after age 50.

**Gender:** Males have a higher rate of heart attack than females.
Race: East Indians have a greater chance of getting an attack than people of African descent, whites or those of mixed races.

Family History: If any of your parents, grandparents, brothers or sisters have had a heart attack, your chance of having one is twice as high as it would be if you come from a family without such problems.

Nothing can be done to change these factors. There are other strong factors, however, which when reversed can considerably reduce our chances of getting a heart attack. The factors to watch out for are an unhealthy diet, being too fat, lack of physical exercise, smoking and alcohol abuse.

Now, let us examine these factors.

Dietary Factors

Fats and Cholesterol: Both the amount and type of fat in the diet affect a person's cholesterol levels. The total amount and the types of fat and other lipids in the diet influence the risk of coronary heart disease. Foremost among these are saturated fat and cholesterol. The higher the intake of saturated fat (mostly from animal sources such as meat, milk, lard, butter), the higher the chances of getting a heart attack. Lowering the intake of saturated fat is likely to reduce the risk of getting coronary heart disease.

Fish fat, which is mainly unsaturated fat, appears to have a beneficial effect. Its effect on cholesterol is not known for certain, but it does lower total blood fat and prevents the formation of blood clots. Limited evidence suggests that one or two servings of fish per week could lower the risk of coronary heart disease.

Fats derived from plant sources are generally beneficial. Some vegetable fats, particularly those that are rich in poly-unsaturated fatty acids (e.g., corn oil or soybean oil), reduce LDL-cholesterol and so prevent heart attack. However, they also reduce HDL levels. Other fats from plants sources such as olive oil (mainly mono-unsaturated) reduce LDL-cholesterol without reducing HDL-cholesterol.
More recently, it has been found that trans-fatty acid, found in margarine, which has been promoted as a substitute for butter, also increases the chance of getting a heart attack.

**Carbohydrate, Fibre and Vitamins:** Diets high in plant foods - that is, fruits, vegetables, grains, legumes and ground provisions, are associated with less coronary heart disease. The exact reason is not clear. It may be that a higher intake of these foods is usually associated with a lower intake of saturated fats. On the other hand, these foods are also rich in certain vitamins and minerals which protect against coronary heart disease. At the same time a higher intake of soluble fibre found in these foods also lowers LDL-cholesterol and therefore the risk of heart attack.

**Obesity:** Fat is a rich source of energy. Eating too much fat, whether it is saturated or unsaturated, contributes to the body's total energy supply, and whatever is not used is stored in the body as fat. Carbohydrates and proteins also, if taken in excess, are stored as fat, making the person too fat or obese. Obesity in itself is a risk factor for coronary heart disease.

**Non-dietary Factors**

**Physical Activity:** Scientific reports show that active or fit people tend to develop less coronary heart disease than those who are inactive. If they do develop heart disease, it occurs at a later age and tends to be less severe. Higher levels of physical fitness are associated with lower death rates from coronary disease, and in some cases with long life and the avoidance of other diseases as well.

Physical exercise also helps to prevent other attacks in patients who survive heart attacks. **Physical exercise works on the heart in many ways, such as increasing the oxygen supply to the heart muscle, increasing the “good” HDL-cholesterol levels in the blood, reducing blood fat levels and making the heart function better.**

**Cigarette Smoking:** Smoking increases the chances of having a heart attack. The overall risk in smokers is double that in non-smokers. Smoking is also dose-related. Those who start smoking before age 20 and those who smoke 20 or more cigarettes a day have 8 times higher chances of getting
heart attacks than non-smokers and twice those who smoke fewer than 10 cigarettes a day.

_Alcohol:_ Small amounts of alcohol are advocated as a factor which may reduce the chances of getting a heart attack, but “all that glitters is not gold”.

One or two drinks may have a beneficial effect on the incidence of heart attack but very few people take alcohol like medicine; that is, a small dose and no more. Even moderate doses of alcohol raise blood pressure. People with high blood pressure have 5 times more heart attacks than those with normal blood pressure.

Alcohol provides calories only and may contribute to obesity (including “beer belly”) which is largely responsible for diabetes and hypertension. Diabetics have 2 to 4 times more chances of having heart attacks than non-diabetics. The French people with their enjoyment of red wine may have a low rate of heart attack, but they do have a very high rate of cirrhosis of the liver (caused from too much alcohol), which is also fatal. Alcohol is implicated in promoting cancers of the breast and other organs. Several other problems including traffic accidents are related to alcohol consumption as outlined in Chapter 10. So, the small amounts of alcohol being advocated for the prevention of heart disease carry their own dangers.

_Stress:_ The role of stress in heart disease is still not clear. Earlier studies indicated that people who are competitive with excessive drive and sense of urgency (so-called type A personalities) have a higher risk of coronary heart disease than those who manage stress well. Later studies have not confirmed this.

**Warning Signs and Symptoms of Heart Attack**

Since 60% of the persons who get a heart attack die before treatment can be started, prevention or removal of the risk factors is the only way to reduce the number of cases. Many of the risk factors such as: high blood pressure, diabetes, obesity, cigarette smoking, high levels of cholesterol and fat in the blood, a diet with a lot of greasy or fatty foods (mostly from animals) and low intakes of fruits, vegetables and ground provisions, and lack of regular exercise can be controlled. Stress, another risk factor, can also be
controlled, by using relaxation techniques such as meditation (exercising the mind on a particular subject). Instruction in such techniques is now widely available.

Getting rid of these risk factors can reverse the heart disease process. Not allowing the heart to develop this disease in the first place is the key.

<table>
<thead>
<tr>
<th>It also pays to know the warning signs of a heart attack, which usually revolve around a pain in the chest:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The pain may be a dull, squeezing or pressing feeling, usually in the center of the chest, or it may be unbearably intense.</td>
</tr>
<tr>
<td>• It may spread out to the left arm, the neck or jaw.</td>
</tr>
<tr>
<td>• The pain may come after exercise, a heavy meal, or excitement.</td>
</tr>
<tr>
<td>• It may be accompanied by weakness, nausea, sweating, shortness of breath and often a feeling that a disaster is coming.</td>
</tr>
</tbody>
</table>

Do not ignore these signs. Have a heart, consult your doctor right away and follow his or her advice. Even the clogged arteries can be unclogged through suitable measures.
CANCER: THE NUMBER ONE KILLER IN SOME COUNTRIES

Cancer is still a mystery in many ways, even after years of intensive research. This dreaded disease is killing more and more people in our region. However, we are finding some clues about preventing many types of cancer. Researchers believe that eating the right foods may be one of the most important ways to do this. What you read in this chapter, therefore, could very well save your life.

Cancer is one of the most dreaded diseases. In spite of numerous research efforts over the last fifty years, scientists do not fully understand what causes cancer. Modern medicine has made tremendous progress in its treatment. When it is caught or found out early, the chances of survival are good but when late the result is early death. Victims are not always old people. Many of them are in the prime of life. In addition to their physical and mental suffering and death, the individuals, their families and society suffer socially and economically.

In the Caribbean, more and more people are dying of cancer. It has become the number one killer in six out of twelve countries and number two in another four. In many of our countries the death rates from cancer are higher than those of Canada and the USA.

Cancer can affect any part of the body. Sometimes, it doesn’t stay in that particular part but invades surrounding areas and even travels through the blood to distant parts.

What Causes Cancer?

Cancer is a group of conditions resulting from an out-of-control growth of cells in any tissue of the body. Normally, ten million cells divide
in the human body every minute. The old cells die and the new cells replace them. Usually, the cells divide the right way, at the right time and in the right numbers. Occasionally something goes amiss. A particular control that governs this orderly division of cells fails. The carefully ordered pattern of cell growth is now lost. So, the cells begin to grow haphazardly — just growing, dividing, growing, dividing, on and on . . . Masses of cells, with no purpose, called tumours form. Cancer is this abnormal cell growth and cell mass.

How Does Cancer Progress?

The cancer process is very complex. Scientists believe that a cancerous growth has at least two distinct stages: initiation or starting and promotion or advancing. Different agents or substances regulate each stage at different times. On starting, the cancer-producing agents, which are called carcinogens, and the target tissue have a brief, irreversible interaction. This reaction interferes with the genetic material of some cells, causing them to lose control over their orderly growth process. The body has mechanisms for spotting and destroying out-of-control cells, through its immune or foreign substance-destroying system. But, occasionally, a cluster of such cells slips by without being detected. This alteration does not produce cancer unless another class of agents called promoters move in and begin their act.

A promoter can cause the changed or transformed cells to multiply rapidly and form an abnormal mass of cells or a tumour. The promoter must act continuously for a long time for the cancer to develop. The time may range from 5-15 years. The effects can be reversed if the promoting agent is removed or an anti-promoting agent is brought in.

It appears, therefore, that most cancers have external causes and are preventable. If the initiating factors could be identified, the incidence or rate at which cancer occurs could be reduced. Very few initiating agents have been identified, for example, inhaled tobacco smoke and asbestos which are associated with lung cancer. If the initiating factor is the defective gene we can do nothing about it. On the other hand, factors are almost always our living conditions or circumstances (environment) and can be changed.
What Do We Know About the Diet/Cancer Relationship?

Several dietary factors may be tumour promoters or anti-promoters. Reports from developed countries such as the USA estimate that cancer rates are attributed to the following:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet</td>
<td>30-40% cancers in men and up to 60% in women</td>
</tr>
<tr>
<td>Tobacco</td>
<td>30%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>3%</td>
</tr>
<tr>
<td>Food Additives</td>
<td>1%</td>
</tr>
<tr>
<td>Contaminants and industrial pollution</td>
<td>1%</td>
</tr>
</tbody>
</table>

So, contrary to popular belief, food additives such as colouring and flavouring, preservatives, contaminants and pollution are not the major cancer-producing agents.

A review of the evidence shows that a high fat intake increases the risk of getting certain cancers, especially those of the prostate, breast and colon. It is not clear what type of fat is responsible. A few studies show that higher intakes of saturated or hard fat are associated with these cancers. Studies in animals show that poly-unsaturated vegetable oils promote certain cancers, but fish oils inhibit the same cancers. The type of polyunsaturated fat in fish oils is different from that in vegetable oils.

A high meat diet is associated with increased risk of breast and colon cancer but it is suspected that this is due to its high fat content. Such a diet also tends to be low in plant sources of food.

Diets high in plant sources of food such as fruits, vegetables, peas, beans, nuts and whole grain cereals are associated with lower levels of cancers of the lung, colon, oesophagus (gullet) and stomach. Such diets are low in fat and rich in complex carbohydrates (starches and fibre), and some vitamins and minerals. These factors probably also protect against certain cancers. For example, high fibre foods are associated with lower risk of colon
cancer. Similarly, carotenoid-rich foods (dark green leafy vegetables and deep yellow to orange fruits and vegetables) are associated with a lower risk of lung and breast cancer. Some investigators have found that vitamin C, vitamin E and some B-group vitamins may block both the initiation and promotion of cancer.

Heavy intakes of alcoholic beverages on a regular basis increase the risk of cancers of the mouth and throat, especially in combination with cigarette smoking. There is also some evidence that drinking alcoholic beverages is associated with cancer of the liver, pancreas and breast and moderate beer drinking with cancer of the rectum.

Is Nutrition-related Cancer a Problem in the Caribbean?

It is fair to say that it is so. As mentioned earlier, cancer has become the number one cause of death in several Caribbean countries. It is one of the five principal causes of death in most of the countries.

In Jamaica, information on the incidence of the different types of cancer is available through the work of the Cancer Registry. These records show that cancer rates are high and that cancers of the prostate, breast and colon have been rising, while cancers of the stomach and oesophagus or gullet have been getting less.

In other Caribbean countries, death records show a similar pattern. Deaths from cancer of the breast, prostate and colon are among the highest. In some countries, rates of stomach cancer are also very high. From the types of cancers occurring, it is fair to say that nutrition-related cancers are major problems in the Caribbean.

Are Caribbean Food Patterns Changing in a Way that Tends to Increase Cancer Rates?

Available evidence suggests that this is true. Over the last twenty years the total amount of calories (energy) available per person, per day in all Caribbean countries has increased. These increases are mostly due to the
eating of more meat, milk, fats and oils. On the other hand, people are eating less and less grains, ground provisions, beans, fruits, and vegetables.

In a recent study, one of the authors (Sinha) has shown that Caribbean countries where the people consume more fat overall, have many more deaths from cancer of the breast, prostate, colon and rectum, compared with deaths in those countries where less fat is consumed. He has also shown that countries in which people eat larger amounts of grains, starchy fruits, roots and tubers (ground provisions), have lower death rates from cancer of the colon and rectum than those where less of these foods is eaten.

What Can We Do?

Although there are strong links between cancer and diet, the connection has not been shown directly. Absolute proof is difficult to obtain in any branch of science. Should we wait until we have absolute proof, or should we act once we have reached the point where dietary causes are very likely? It is now generally accepted that we have reached the point where we must act and change our diet according to the latest recommendations.

The American Cancer Society recommends the following six steps to reduce the risk of cancer:

1. AVOID OBESITY. (May reduce the risk of uterine, breast, gall bladder and colon cancers)

2. CUT DOWN ON TOTAL FAT INTAKE. (May reduce the risk of breast, prostate and colon cancers).

3. INCLUDE A VARIETY OF FRUITS AND VEGETABLES IN THE DAILY DIET. (May reduce the risk of colon, rectum, stomach, gullet, throat and lung cancers).

4. EAT MORE HIGH FIBRE FOODS SUCH AS WHOLE GRAIN CEREALS, FRUITS AND VEGETABLES. (May reduce the risk of colon cancer).

5. GO EASY ON ALCOHOL, IF YOU MUST DRINK. (May reduce the risk of liver, breast and lung cancers).
6. **EAT LESS SMOKED, SALTED AND NITRITE-CURED FOODS.** (May reduce the risk of gullet and stomach cancers).

It is time that we re-examine our diets to reduce fat and increase the complex carbohydrates — grains, ground provisions, legumes, fruits and vegetables. There is no reason why the American Cancer Society's dietary recommendations may not hold true for the Caribbean. You may also notice that these recommendations are also the same for preventing other chronic diseases such as diabetes, high blood pressure, stroke and heart disease. The next part of this book gives hints on healthy eating.
PART THREE

HINTS ON HEALTHY EATING
Good nutrition is not something we can take for granted. It involves knowledge and skills which we have to learn and practise. While many of the “old time” ways we grew up with are sound, others are not suitable for modern lifestyles and conditions. And, as many of us know, the advice in most of the books we see comes from “foreign” and is not right for our region. Confused? Don’t be! Here is a simple, easy-to-follow system to help you. It shows how to mix different types of foods, how much of them you should eat, and alerts us to the special dietary needs which different people have. Best of all, this system was designed just for us in the Caribbean!

Combining foods to create a diet that supplies all the needed nutrients and the right amount of energy is a skill which we have to develop and practise. When we eat, we should bear in mind some key points: the amount, the variety or range of foods, and the way we mix them, which will give us the right amount of energy and nutrients. A convenient way of ensuring that we get a variety of nutritious foods, according to our needs, is to use the six food groups as our guide.

The Caribbean Food Groups

In the Caribbean we can divide our available foods into six groups, according to the chief types of nutrients they have. The groups are on the following page.

There is another mixed group of foods which includes sugars, sweets, honey, alcoholic and other beverages, condiments such as ketchup and other sauces which contribute mostly calories (energy) and the mineral sodium, the chief source of which is salt. We could call these “taste makers”. After all, we eat for taste as well as for nutrients.
• Staples
• Legumes and Nuts
• Vegetables (particularly the yellow and dark green leafy ones)
• Fruits
• Food from Animals, and
• Fats and Oils

Putting foods into different groups is a way of highlighting which foods have similar nutrients. So we can exchange one food for another within the same group. It is possible to get various combinations of food from different food groups. The selection of foods from the different food groups is known as the "multimix principle".

We also group our foods according to what we produce, what is available, what we like and are accustomed to eating and what we should eat. So, we put our ground provisions alongside the imported cereals, such as wheat flour and its products into the same group called staples. We highlight our legumes for those health advantages they have over meats, and we encourage the eating of more vegetables and fruits and less fats. That is how we came up with our food grouping system.

On the next few pages is a summary of the foods included in the Caribbean food groups, and the major nutrients in each group. From this summary, we see that staples, legumes and nuts, fruits and vegetables, which are rich in complex carbohydrates, are also very rich sources of nutrients except fat and sodium. From the last two groups — food from animals and fats and oils, we will not get enough carbohydrate, which is the preferred source of energy for good health; and we will not get fibre, a health aid found only in foods from plants, but we get lots of fat. From the foods from animals we also get lots of protein, vitamins and minerals.
The Six Caribbean Food Groups

STAPLES

LEGUMES & NUTS

DARK GREEN LEAFY & YELLOW VEGETABLES

FRUITS

FOOD FROM ANIMALS

FATS & OILS

OTHER FOODS
<table>
<thead>
<tr>
<th>Food Group</th>
<th>Foods</th>
<th>What we get from them</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Staples/Cereals</strong></td>
<td>Cereals: bread (from whole grain or enriched flour), wheat flour, corn (maize), corn-meal, dried cereals, macaroni, spaghetti, rice, cereal porridges.</td>
<td>Carbohydrate (starch) and sugar in some dry cereals; protein; B complex vitamins; fibre and high levels of sodium from instant and dry cereals. High levels of energy from carbohydrate and protein;</td>
</tr>
<tr>
<td>Starchy fruits, roots, tubers/ground provisions</td>
<td>Banana, plantain, breadfruit, yam, potato, dasheen coco/eddoe, cassava.</td>
<td>Carbohydrate (starch), fibre, water, small amounts of vitamins, protein and minerals. These are low in sodium and have moderate levels of energy.</td>
</tr>
<tr>
<td><strong>Legumes, seeds, nuts</strong></td>
<td>Red peas (kidney beans), gungo/pigeon peas, black-eye peas, cow peas, other dried peas and beans, peanuts, cashew nuts, sesame seeds, pumpkin seeds.</td>
<td>Carbohydrate, protein, fibre, the minerals calcium and iron, B complex vitamins and fat and vitamin E in soya beans, peanuts, cashew nuts and seeds. Unprocessed legumes are low in sodium. They are high in energy.</td>
</tr>
<tr>
<td><strong>Dark green leafy and yellow vegetables</strong></td>
<td>Callaloo/spinach, dasheen leaves, cabbage bush, pak choi/pat choi/pap chow, string beans, pumpkin, carrot.</td>
<td>Water, fibre, carotene, vitamin C, B complex vitamins, the minerals iron and calcium, low levels of energy (calories).</td>
</tr>
<tr>
<td><strong>Other vegetables:</strong></td>
<td>Squash, cho-cho, (christophene), cucumber, tomato, garden egg/aubergine</td>
<td>Water, fibre, low levels of energy (calories), small amounts of vitamins and minerals.</td>
</tr>
<tr>
<td>Food Group</td>
<td>Foods</td>
<td>What we get from them</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------------------------------------------------</td>
<td>-----------------------------------------------------------</td>
</tr>
<tr>
<td>Fruits</td>
<td>Mango, guava, citrus (orange, grapefruit, limes, tangerine), pineapple, West Indian cherry, pawpaw/papaya, golden apple/Jeew/ June plum, sugar apple/sweet sop.</td>
<td>Water, fibre, carbohydrates (sugar), vitamins (especially vitamin C and carotene), minerals — mainly potassium. Moderate to low levels of energy.</td>
</tr>
<tr>
<td>Food from animals</td>
<td>Meat, poultry, fish — fresh, canned, pickled, dried; milk, cheese, yoghurt, egg, liver, heart, kidney, tripe (offal), trotters, feet, tail, head.</td>
<td>Protein, fat, vitamins A, B, D, E, minerals, cholesterol, carbohydrate from milk. They are naturally high in sodium.</td>
</tr>
<tr>
<td>Fats and oils</td>
<td>Cooking and salad oils, butter, margarine, shortening, coconut cream/milk, meat fat, nuts, avocado pear, Jamaican ackee.</td>
<td>Fat, rich source of energy/calories, vitamin A (butter, fortified margarine, cheese from full cream milk) and vitamin E. They are low in sodium, but butter and margarine are high in sodium.</td>
</tr>
<tr>
<td>Other foods</td>
<td>Sugars, sweets, sugar cane, honey, beverages, beverage bases, packaged soups, sauces, pickles and other condiments.</td>
<td>Provide high levels of sugar and sodium.</td>
</tr>
</tbody>
</table>

What About Processed Foods?

Some consumers are concerned about processed foods. In general, processed foods are safe. They last longer than fresh foods, but often contain too much added salt and/or sugar. They retain most minerals and vitamins because of improved processing techniques. Foods such as peas, corn and meat lose vitamin B₃ by heat processing. Milk stored in clear containers is
likely to lose vitamin B<sub>2</sub> which is sensitive to light, and some vitamin C is destroyed in canned fruits and vegetables.

Here is how frozen, canned and dried foods measure up to fresh, raw foods.

<table>
<thead>
<tr>
<th>State</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh, raw</td>
<td>High nutrient content; crisp texture; bright colour, natural flavour; low energy cost for storage</td>
<td>Nutrient content declines with storage; out-of-season cost high; firm texture difficult for some people to chew; may be harvested before maturity; need preparation before cooking</td>
</tr>
<tr>
<td>Frozen</td>
<td>Available year-round; nutrient content stable for months; usually unsalted; natural colour and flavour preserved; quick to cook and serve</td>
<td>High risk of repeated thawing and freezer burn; appliance and energy cost for storage high; some texture loss</td>
</tr>
<tr>
<td>Canned</td>
<td>Available year-round; nutrient content stable for several years; easy, economical storage</td>
<td>Some colour changes; loss of natural texture; salt or sugar often added</td>
</tr>
<tr>
<td>Dried</td>
<td>Available year-round; nutrient content high in some, e.g., nuts, peas, beans; natural flavour; low energy cost for drying (if sunshine is used) and storage; easy, economical storage</td>
<td>Nutrient content variable in vegetables, fruits; some vegetables change colour; loss of natural texture in fruits and vegetables; some need preparation before cooking and eating</td>
</tr>
</tbody>
</table>
How Much Should We Eat From These Food Groups?

The types of food for each person may be the same, but the amounts will be different based on individual needs. Those needs vary with age, whether one is male or female, rate of growth and development, levels of physical activity, body size and general state of health. Men will need more food than women. Members of the family who do very hard strenuous work will need more than others. Growing children and adolescents will need more than some adults.

The matter of age brings up a number of concerns. Some of these are discussed in the section on Feeding Through the Life Cycle, but here we remind you that eating habits and needs change as we get older. A person’s nutrition begins a long time before birth. So, the pregnant woman must be well fed. So must the growing child and the teenager. By the late teens, adult size is reached and this is the stage where food needs differ most. They depend on the amount of physical activity, body size and special demands such as those in pregnancy. At middle age there is often the need to cut back on the amount of food one eats. This continues into old age as the amount of energy being used or expended gradually falls.

There is a lot of emphasis on meeting energy or caloric needs, because it is energy from food that keeps the human machine running, and this energy must be adjusted to changes in the individual’s size and patterns of physical activity.

Using energy as the standard around which all else revolves, the World Health Organization (WHO) has suggested guidelines for the proportion of energy which people should aim at getting from various food groups. Using those guidelines, we have worked out the proportion of foods from the various groups that a person needs daily after two years old and upwards, as shown in the following chart.
Of course, children 2-6 years will not need as much food as shown in the chart, but the ratio of the foods from each group will be the same, so we cut back from each group for those children. This is illustrated in Chapter 21.

The smaller amounts shown in the chart are mainly for children over 7 years old, teenage and adult females, and young males and elderly persons who need about 2000 calories per day. Teenage and adult males require about 3000 calories per day and would therefore need more portions. Sample menus for sharing these amounts of foods in meals are given in the sections on Meal Planning and Feeding Through the Life-cycle. Note also that food portion equivalents are discussed later in this chapter.
The amounts are based on the energy value of the raw or uncooked foods within each group. Also, the foods are already peeled or trimmed to get rid of waste such as skin, seeds and membranes and meat, chicken and fish are deboned. In other words, these weights are for the edible portions of the foods. Ground provisions, fruits, vegetables and young peas and beans are high in water and fibre, so their energy values are low. On the other hand, dried foods such as cornmeal, rice, flour, dried peas, beans, milk powder and saltfish or red herring have a lot more calories than the same weight of fresh or wet food.

What does the chart tell us? It tells us that older children and adults should have:

- lots of fruits and vegetables
- a good amount of the staples — ground provisions and cereals
- moderate amounts of legumes and nuts
- small amounts of foods from animals
- very small amounts of fats, oils and sugar

The plan for the child up to two years varies from that of older children and adults, as discussed in Chapters 20 and 21.

The major differences are that for younger children there is a smaller ratio of energy from fruits, vegetables and more from legumes, fats and food from animals. The lower ratio of fruits and vegetables means less fibre and hence more complete absorption of the food the young child eats. Legumes and food from animals provide more of a wide range of nutrients. More fat helps to ensure that meals have concentrated energy in the small portions the child eats. Together the ratio of foods from the different groups provides a child with high nutrient, high energy feeds to fuel the rapid growth taking place.
Food Portion Equivalents

Fruits

Here are the amounts of some fruits in units or household measures which will give 50-60 calories (average 55). As we move down the list, the portions are larger.

<table>
<thead>
<tr>
<th>Fruit Description</th>
<th>Portion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweet sop/sugar apple, mango, jackfruit, sapodilla/naseberry</td>
<td>1 small ⅛-½ cup pulp/segments</td>
</tr>
<tr>
<td>Custard apple, star apple/caimit, June plum, guava</td>
<td>½-⅔ cup pulp/segments or 1 medium</td>
</tr>
<tr>
<td>Guinep/chenette, lychee/Chinese guinep, garden cherry, plum</td>
<td>6-12</td>
</tr>
<tr>
<td>Orange, ortanique, tangerine, cashew apple/banana, pineapple, watermelon, cantaloupe</td>
<td>1 medium-sized citrus fruit; 3-4 cashew apples/bananas: 1 large (100g) slice pineapple ½ cup fresh pulp or juice or ¾-1 cup chunks</td>
</tr>
<tr>
<td>Grapefruit, pawpaw/papaya, peach, ripe banana</td>
<td>¼-1 cup sections, chunks ½ medium-sized grapefruit or solo pawpaw or ripe banana</td>
</tr>
</tbody>
</table>

In general, the amount of fruit which makes a portion, that is, provide just about the same amount of calories, range from a medium-sized whole fruit to half to one pound/¼-½ kilo of a large fruit such as a watermelon or pineapple.

Vegetables

Vegetables have even fewer calories. The amounts shown below give 30-40 calories (average 35). Remember that all of these portions can be eaten. Waste has already been removed.

<table>
<thead>
<tr>
<th>Vegetable Description</th>
<th>Portion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed vegetables, frozen peas and carrots, cassava leaves</td>
<td>¼-⅛ cup cooked 50g/2 oz raw</td>
</tr>
<tr>
<td>Cabbage bush/bush cabbage, beets</td>
<td>½ cup cooked 80g/3 oz raw</td>
</tr>
</tbody>
</table>
Calalloo, carrots, pumpkin, broccoli, string beans, chocho/christophene, turnip tops, dasheen leaves

Staples

Three-quarter ounce or approximately 22-30 grams of uncooked cereal such as rice is equivalent in energy to 2-3 ounces (60-90 grams) of peeled ground provisions and 3 ounces (90 grams) of green, immature corn.

Here are the amounts of the staple cereals and ground provisions that give approximately 65-85 calories (average 75).

Flour, cornmeal, Rice, macaroni, spaghetti, dried corn
Bread
Crackers
Green corn
Yam, green banana, dasheen, coco/eddoe, sweet potato, plantain, cassava
Irish potato, breadfruit

Legumes/Nuts/Seeds

These amounts provide approximately 75 calories.

Dried peas, beans
Cashew nuts, peanuts/peanut butter, pumpkin seeds, sesame seeds, sunflower seeds
Green peas/beans

¼ cup 1 slice (26g) depending on the size of the loaf
½ cup cooked 3-5 crackers (15-18g)
½ cup cooked ½ medium-sized ear
½ cup cooked ½ cup kernel
½ cup cooked 60g/2 oz
½ cup cooked 90g/3 oz raw
¼-½ cup cooked 15-20g/½-¾ oz
30g/1 oz uncooked (1-1½ tablespoons)
½ cup cooked
Food from Animals

The greatest variation in calorie values is in the food from animals group. This depends on the amount of fat in those foods.

* A 30g (1 oz) serving of medium fat meat or poultry is about equal in calories to 60g (2 oz) of fresh fish; each provides about 60-90 calories.

* 20-30g (¼- 1 oz) cheese or a 125 ml (4 oz) glass of whole milk, each provides about 80 calories.

* A 50 gram or medium egg has about 80 calories.

* 2 level tablespoons (¾ oz) skimmed milk powder provides about 80 calories.

Fats and Oils

Fats and oils are concentrated sources of energy. Four to five grams (1 teaspoon) of cooking oil, butter, margarine or shortening provide 45 calories. Three of the yellow, fleshy sections (arilli) of Jamaican ackee which weigh about 25 grams (less than an ounce), 30 grams of avocado pear and 15 grams (1 tablespoon) of dried coconut, all provide similar amounts of calories.

Other Foods (Taste-makers)

Five grams (1 level teaspoon) of sugar, jam or jelly, contain 15-20 calories. Brown sugar has fewer calories than white, refined sugar. Syrups, honey and sugarcane juice, which are higher in water content, have proportionately less energy. One and a half teaspoons syrup or honey and one ounce (30 ml) of sugarcane juice, provide approximately 20 calories each. So do two teaspoons (8 grams) of popular chocolate-based beverage bases. Other values are shown in the chart on nutritive value of commonly eaten foods, in Part 4, Annex B of this book.
Other Considerations

Whether a food is cooked or raw, weighed or measured in cups, spoons, etc, are other considerations in our discussion of amounts of foods and their calorie values. A half cup of raw, uncooked rice will have three times the energy value as the same amount of cooked rice. On cooking, rice triples in bulk, while pasta such as macaroni and spaghetti and dried peas and beans double, because they all absorb water.

How finely ground the food is or whether it is in large particles or pieces must be taken into account when we measure raw foods in cups or spoons. A pound of flour or finely ground cornmeal measures 3½ cups. So an ounce would be ¼ cup. A pound of rice measures 2 cups. An ounce would be one-eighth of a cup. Since rice triples in bulk when cooked, an ounce raw would be a little less than half cup cooked, but it is convenient to use half cup.

Portion sizes mean different things to different people. So, we have tried to give the approximate calorie contributions of specified amounts of some foods, as a guide. Traditionally, there are no measures for the amounts of food prepared and eaten in households. Instead, it is what “fills the eye” and what can be afforded that counts. But isn’t this the root of the obesity problem?

Experience shows that at home or in other situations people usually eat two to four times as much, or more, even of the portions that we have just talked about and it is easy to see why. A dumpling or a roti, may be made with more than an ounce of flour and a pound of rice serves 4-6 persons each of whom will have much more than one ounce. The larger the servings the more the calories. So be aware of the amounts you usually eat if you wish to keep track of how many calories your are getting.

Remember:

A portion is a measured amount which equates with a specific caloric value.

A serving is the usual amount individuals get at home or get when they eat out.
"What can I give them to eat?" is the age old cry of the anxious parent, householder or care-giver. Today, we also worry, "How can we afford the food we need?" But here is some good news! We all need to eat less food from animal sources. Cut down on those expensive cuts of meat. Also good old ground provisions, and our own Caribbean fruits and vegetables, are better for us than some imported or processed foods which are more expensive. The bad news is that sometimes we are our own worst enemies because of our wasteful or dangerous habits. So, this chapter offers a guide to practical aspects of keeping your family well and safely fed, with tips for saving money at every stage.

Most of us eat large amounts of meat and other food from animals, but there is an increasing trend towards reducing meat and being almost vegetarian. Today, scientific knowledge supports this. Also, there are different eating patterns throughout the Caribbean because of the many ethnic groups that comprise our society.

Remember that even among those eating the same types of food, the amounts should be different based on requirements. The requirements vary with age, whether the person is male or female, the rate of growth, levels of physical activity, body size and general state of health, as already shown.

Here is how a family can be sure that its members are fed wisely:

- Decide what to serve for a week or a few days, depending on facilities available for storing and preparing foods, how many meals are eaten away from home and how much money the family plans (budgets) to spend on food. Think about where you will get the food. Is there some in the garden or was there a gift? Do not buy more if there is enough.
• Work out the amounts and types of food that you need to feed the members of the household. That is, provide more for males than for most females; more for the young, rapidly developing and active, and pregnant and nursing females. It is a waste to buy and prepare food your family does not like, or to prepare more than they can eat, or than you can store properly. You will only end up throwing it out.

You will need to buy more of the foods which must be peeled or which have other types of waste and buy less dry ones, like cereals, dry salted fish, milk powder, than fresh products which contain lots of water, such as, fresh fish and fluid, full cream or skim milk.

• Serve meals, including a good breakfast, regularly each day and provide nutritious snacks for pre-school and school children.

• Provide meals that taste good and will satisfy the family members.

• Serve as wide a variety of foods as possible. Include generous portions of fruits, vegetables and ground provisions and smaller amounts of meats, other food from animals and fats and oils.

• Cut down on sweets and other sugar-laden and salty foods.

• Plan each day's meals according to the multimix principle. That is, mix and match foods from the six food groups: Staples, Legumes and Nuts, Dark Green Leafy and Yellow Vegetables, Fruits, Food from Animals and Fats and Oils. Use foods from each, or from as many of the food groups as you can afford.

• Choose foods that blend well in colour, texture, smell and taste.

• Serve the appropriate types and amounts of food to members of the family who have nutrition-related chronic disease such as high blood pressure. Do the same for those who may have a physical disability and cannot chew well, as in the case of some elderly persons. Remember that diabetics need starch and that they are allowed small amounts of sugar, and those with "pressure" need to avoid too much salt.
• Shop wisely. Examine foods before you buy, check weights and get value for your money.

• Grow and/or make some foods for yourself.

• Reap foods carefully to save the nourishing substances (nutrients).

• Store foods properly to save nutrients.

• Prepare foods correctly to save nutrients, especially the vitamins, which can be lost very easily.

• Make best use of what you have. Use leftovers quickly and creatively.

• Use fuel carefully in preparing food. Fuels such as gas, electricity and charcoal are expensive and increase your food costs.

Here is How to Do Some of the Above

Let us begin with those who do not eat meat (vegetarians). They should:

• Combine foods from the legume/nuts/seeds group with cereals from the staple group at all times; e.g., peas or beans with rice, roti and dahl (wheat flour pancake with split peas), stewed peas and rice, split peas soup with dumplings, corn tortilla (a type of pancake or wafer made from cornmeal) with beans and cornmeal and peas cook-up.

• Combine peas and beans with nuts and seeds, e.g. use either red beans, pigeon/gungo peas, lentils or black-eye peas with either cashews, peanuts, sunflower, pumpkin or sesame seeds. Use these in main dish preparations such as loaves, balls, fritters, salads and stews.

• Combine eggs or milk (if you eat them) with legumes, cereals and nuts; e.g., macaroni and cheese, cornmeal or oats porridge with milk or soya milk, egg-pea fritters or eggs and nuts in a salad,
peanut butter sandwich and eggnog or various other forms of egg and milk in meals, especially for children. The strict vegetarian or vegan may wish to have calcium-fortified soya milk, instead of regular soya milk and special vegetarian products like tofu (soybean curd).

- Include a generous portion of dark green leafy or yellow vegetable in at least one meal each day.

- Have fruits or fruit juices, especially citrus, guavas, mangoes and garden cherries to help the body make the best use of the iron from the plant foods and get adequate minerals and vitamins.

- Include enough energy-giving foods (staples, fruits, legumes, fats) to maintain proper weight.

- Choose many different kinds of grains, legumes, fruits and vegetables to get good nutritional balance.

Don't be surprised that food from animals such as milk, egg and cheese are mentioned as foods for vegetarians. Many people who are vegetarians omit meats, but they eat eggs, milk and milk products, though they get most of their foods from plants. In some Oriental cultures (e.g. India) the distinction is based on meat and non-meat. Only the strict vegetarians, or vegans, avoid all animal products.

Avoid Pitfalls in Planning Vegetarian Meals

- Know the “right” combinations of foods to supply nutrients. Some Seventh-day Adventists or other experienced vegetarians are familiar with proper vegetarian dietary patterns and use milk, cheese and eggs frequently. Nutritionally, this is a more complete diet than vegans get. Vegans do not get adequate amounts of all the nutrients, e.g., vitamin B₁₂.

- Do not limit the types and amounts of foods you should eat by following a diet based only on “natural” foods or refuse to take
vitamins or iron supplements. When in doubt, consult a Nutritionist or Dietitian. (See special precautions for the infant in Chapter 20).

Remember, an adequate vegetarian diet:

- Helps to keep the blood cholesterol levels normal.

- Provides high levels of fibre which promote normal bowel movements and prevent certain diseases.

- Provides a good combination of the types of fats which help to prevent heart attacks.

- Helps to retain minerals, especially calcium, in the bones, to keep them healthy, particularly in older people.

- Helps keep blood pressure normal.

- Helps to prevent the formation of gallstones and even lowers the death rate from cancer, heart disease, stroke and high blood pressure.

**Tips for Meat Eaters**

Meat eaters should take a leaf out of the vegetarian's book. When you have had some of the combinations mentioned above, you will not need to include meat in some meals, and even when you do, you can make the amounts small. Remember that a 60-gram/2-ounce portion of meat has the same energy (calorie) value as 120 grams/4 ounces fish or 240 ml/8 ounces regular milk or 30 grams/1 ounce cheese and a small egg is equivalent to half of the above amounts — for example, one ounce of meat.

Based on the guidelines for dividing foods by food groups for the older child and adult on page 150, here are examples of the amounts and types of food that both vegetarians and meat eaters could have, to provide 2000 and 3000 calories respectively, for one day.
<table>
<thead>
<tr>
<th></th>
<th>2000 Calories</th>
<th>3000 Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meat Eaters</strong></td>
<td><strong>Vegetarians</strong></td>
<td><strong>Meat Eaters</strong></td>
</tr>
<tr>
<td><strong>BREAKFAST</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>140g/4-5 oz Pawpaw with Lime Juice</td>
<td>Same</td>
<td>½ cup/125 ml Pineapple Juice 140g/4-5 oz Pawpaw with Lime Juice</td>
</tr>
<tr>
<td>Oats porridge made with:</td>
<td>Same</td>
<td>Oats porridge made with:</td>
</tr>
<tr>
<td>30g/1 oz oats</td>
<td>Add ½ cup milk to either porridge or hot beverage</td>
<td>30g/1 oz oats ¾ cup/190 ml milk</td>
</tr>
<tr>
<td>¼ cup/125 ml milk</td>
<td></td>
<td>¾ cup/190 ml milk</td>
</tr>
<tr>
<td>2 Tbsp/30g sugar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 slices/40g Bread + ½ tsp/3g margarine or butter</td>
<td>Same</td>
<td>3 slices/60g Bread with: 2 tbsp/30g peanut butter</td>
</tr>
<tr>
<td>Coffee or Tea or Cocoa with 2 tsp/10g sugar</td>
<td>Same</td>
<td>Coffee, Tea, Cocoa with: 2 tsp/10g sugar + ¼ cup/60 ml milk</td>
</tr>
<tr>
<td></td>
<td>2000 Calories</td>
<td></td>
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<tr>
<td>----------------------</td>
<td>---------------</td>
<td>------------</td>
</tr>
<tr>
<td></td>
<td>Meat Eaters</td>
<td>Vegetarians</td>
</tr>
<tr>
<td><strong>LUNCH (noon)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stewed Peas made</td>
<td>Same but adjust:</td>
<td>Stewed Peas made</td>
</tr>
<tr>
<td>with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60g/2 oz dried</td>
<td>Omit meat</td>
<td>60g/2 oz dried peas or beans</td>
</tr>
<tr>
<td>peas or beans</td>
<td></td>
<td>60g/2 oz meat</td>
</tr>
<tr>
<td>30g/1 oz meat</td>
<td>Increase fat to 2 tsp/8g</td>
<td>120g/4 oz carrots/chocho/christophene</td>
</tr>
<tr>
<td>120g/4 oz carrots/chocho/christophene</td>
<td>1 tsp/4g fat</td>
<td></td>
</tr>
<tr>
<td>1 cup boiled Rice</td>
<td>Same</td>
<td>1½ cups boiled Rice</td>
</tr>
<tr>
<td>4 slices (100g)</td>
<td>Same</td>
<td>6 slices (150g) Fried Plantain</td>
</tr>
<tr>
<td>Fried Plantain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cucumber &amp; Tomato</td>
<td>Same</td>
<td>Cucumber &amp; Tomato</td>
</tr>
<tr>
<td>Salad with Vinegar</td>
<td></td>
<td>Salad with Oil &amp; Vinegar Dressing</td>
</tr>
<tr>
<td>Dressing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 cup/250 ml Orange</td>
<td>Same</td>
<td>1 cup/250 ml Orange Juice</td>
</tr>
<tr>
<td>Juice</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TIPS ON COPING WITH RISING FOOD PRICES

Many of us are at a loss about how to cope with rising costs in providing the amounts and types of food we need to keep us healthy. Proper planning remains the key. The first step is taking stock of what, and how much to prepare and eat.
Always bear in mind that too much high energy food — such as fatty foods, meats, and other food from animal sources, sugar and alcoholic beverages — are harmful as well as wasteful. Your health and your pocket will be better off if you eat small amounts of these foods.

Cutting back on food supplies is a primary means of stretching the food dollar. Here are some useful tips on how to get that dollar to stretch even further.

• **Compare prices and seek cheaper, nutritious substitutes.** For example, use pumpkin instead of carrots because pumpkin is likely to be cheaper and has the same food value. On the other hand, chicken feet though cheaper than chicken per pound or kilo is not a good substitute for chicken, so simply settle for less chicken. After all, we need only a small amount of food from animals.

• **Take advantage of ‘specials’.** It helps to know the original price and to spot flaws which will cause an item to spoil before you can use it.

• **Do it yourself.**
  
  * **Produce some of your food such as vegetables, fruits, peas and beans.** Reap and handle them carefully to save the nourishment they contain. For example, reap your ‘greens’ in the early morning or late afternoon to prevent wilting. Also, do not buy wilted vegetables as they have lost some of their food value.

  * **Prepare meals at home instead of eating out.** Encourage your children to take lunches to school or to eat the school lunch.

  * **Preserve extra produce such as fruits and vegetables by blanching, drying, freezing or pickling in vinegar.**

  * **Parch/roast and grind your own coffee beans for brewing your coffee.**
* Make home-style chocolate from roasted cocoa beans. (Remove extra fat by allowing the beverage you make to sit in the refrigerator for a few hours. Then take off the slab of fat which forms on the top.)

* Make your own yoghurt by saving a little of the old batch and using it as a starter for the new. To begin making your own — buy a small container of unflavoured yoghurt and save some for the starter of your home-made batch. See recipe in Part 4, Annex A.

* Blend/mash fruits in season or make juices and freeze them in small plastic bags to use as snacks for children. Combinations of fruits such as guava, pawpaw, mango, melon, avocado and citrus juices are healthy and economical.

- **Conserve fuel energy when you prepare food** by cooking as quickly as you can — stir-fry; make one-pot meals; put several things in the oven each time you use it; pressure-cook or use your microwave oven effectively; lower flames and cover pots to keep in the steam which helps the food to cook quickly.

- **Make the best use of what you have.** Use potato, yam or other ground provisions instead of bread crumbs as a stuffing. Use leftover foods from the previous dinner for breakfast or lunch the next day; use callaloo/spinach stalks instead of celery in stir-fries. Use the carrot trash, left after making juice, in puddings, soups, salads, breads and "cook-ups".

- **Do not waste.** Peel ground provisions thinly; store food properly; prepare just what you need and can store well and serve just enough to reduce plate waste; use leftovers and fruit juices quickly.

**Shop Wisely**

- **Know a product before you buy it.** What does it cost? What nutrient benefit will you get? Some good buys are seasonal. Examples of foods which give a lot of nutrients at reasonable cost are shown on the next two pages.
• Be alert to factors that cause prices to differ, e.g:

* Brand name
* How much a product is advertised
* The shopping venue — uptown, downtown, mall
* Whether the unit size is small or large, wholesale or retail

• Develop good buying habits. Take advantage of specials, seasonal sales, etc., but base your purchase on the need for a particular item:

* Buy quantities which fit your family’s needs
* Examine the product well
* Pick up the item yourself instead of using a delivery service
* Shop around and compare prices

• Use your own and your family’s skills — see previous notes in this chapter on coping with rising food prices.

• Keep records of your purchases — receipts, cash register slips, etc. — so that you can check prices yourself. Before the arrival of supermarkets, families kept a ‘grocery book’ in which they wrote their weekly purchases. That was a good record.

• Plan your spending and evaluate what you are doing: what you planned to spend versus what you did spend. Was there a difference? Why? Circumstances are always changing; you probably had to substitute or buy something you did not bargain for.

Some Good Buys

Cereals

wheat flour, rice, cornmeal, bread, crackers

Ground provisions*

green bananas (figs), sweet potato, cassava, dasheen, coco, tannia, yam, breadfruit, Irish potato

*Prices will vary but they are usually cheaper when in season.
Legumes
  dried peas, peanuts

Vegetables*
  callaloo, spinach, dasheen leaves, pak choi, pumpkin, okra, carrots, cabbage, tomato

Fruits*
  pawpaw/papaya, ripe banana, orange mango, soursop, grapefruit, pineapple

Food from Animals
  skimmed milk powder, fish, liver, heart, kidney, chicken

Fats and Oils
  cooking oil (except corn oil), margarine, butter

Sugar
  brown sugar

* Prices will vary but they are usually cheaper when in season.

How to Shop:

- Use a shopping list — don't depend on memory alone.
- Shop with courtesy and care — not squashing produce or tearing packages.
- Examine packages and produce carefully.
- Watch out for rusty, dented, bulging cans or those with labels removed; the food in them may be spoilt and dangerous.
- Check dates on milk and juice cartons, packages of yeast, etc. They may spoil on or after that date.
- Compare prices per unit (oz, ½ kilo, etc.).
- Learn prices per kilo, litre, etc., to check on overcharging.
- Read labels.
• Check weight, read scales.

• Don't be misled by grades such as "A" grade, "B" grade, etc. The B grade on a product may mean that the size, shape and colour of the product may not be the same as in the A grade product. The B grade item is usually cheaper and offers the same nutrition as the A grade one. It is therefore a good buy.

• Buy only quantities you can store and use before they spoil.

• Keep your eyes on the cash register to make sure you are not overcharged for items, especially when they are listed as 'specials'.

SAVING THE VITAMINS IN FOODS

To get most of the water-soluble vitamins from our food supply we must reap, store, prepare and serve fresh and processed foods with care. Processed foods include dried, canned, bottled, boxed and frozen foods. Thiamine, riboflavin and vitamin C are most easily destroyed in foods. Here's how to save those vitamins.

Fresh Foods

Vitamin C is most readily destroyed. Oxygen from the air destroys the vitamin rapidly. To prevent loss:

* Let fruits and vegetables mature and ripen before reaping.

* Reap the ripe or mature food in the afternoon or morning when the temperature is cool.

* Chill the produce immediately by placing it in the refrigerator or in a cool place; and

* Keep it cool until ready to use.
* Keep fruits and vegetables whole (uncut); or

* Tightly cover or wrap cut ones or juices to exclude air.

* Cook vegetables quickly. Steam them over water instead of in it; or

* Cook vegetables in so little boiling water that there is little or no water left by the time they are cooked;

* Stir-fry: To stir-fry, cut the vegetables in small pieces (after washing) and toss them in a little hot oil until tender crisp. Serve the cooked vegetable immediately as more vitamins are lost when they are left to sit.

* Use any water left after cooking vegetables in soups, gravies and preserves, or drink it. Remember people in the old days always drank some of the 'pot soup' or cooking liquid and called it the 'benefit'. They knew a good thing.

* Wash the fruit or vegetable before cutting it.

* Except when stir-frying, leave vegetables in as large pieces as possible. Cook them quickly. Washing before cutting prevents the water-soluble vitamins from seeping out in the water. Leaving them whole or in large pieces makes it more difficult for oxygen from the air to combine with vitamin C.

* Most of all, let us eat some of these vegetables without cooking them — we get so much more nourishment than when we cook them!

* Try not to bruise fruits, especially cherries, as they lose a lot of vitamin C when they are bruised.

* Prepare vegetables and fruits for salads just before serving. To keep the salad vegetables crisp, wash and store them whole or in pieces in plastic bags in the refrigerator. Any loss of nutrients will be slower at a cold temperature than at room temperature. Do not cut vegetables and place in iced water to keep them...
crisp. Soaking them in water means a quick and massive loss of the water-soluble nutrients.

To Save B Vitamins

* Wipe instead of washing meats. By soaking and washing meats, some B vitamins will be lost in the water. It is better to clean the meat by wiping with vinegar. Washing packaged rice also destroys some B vitamins, especially when the rice has been enriched.

* Browning meat at high temperatures also helps to destroy some B vitamins. To get a brown colour in meat without using hot fat: burn or caramelize a little sugar in the pot before putting in the meat to cook. Or, have a little burnt sugar/browning or molasses on hand as a part of your seasoning collection.

* Do not use baking soda (bicarbonate of soda) to tenderize dried peas or to brighten the colour of vegetables. The soda destroys the B vitamins especially thiamine (B₁).

* Soak dried peas and cook them in the same water in which they are soaked.

Processed Foods

* Use liquids from canned fruits and vegetables in fruit punch, soups, stews or drink them.

* Keep milk away from light. Milk is the best source of riboflavin or vitamin B₂ This vitamin is sensitive to light. So, if milk is packaged in clear bottles some riboflavin will be lost. Cardboard boxes help milk to retain its riboflavin. The small farmer who milks his cow or goat in a pail, carries it covered in that container and distributes it in dark glass bottles, or opaque plastic bottles conserves the riboflavin in the milk. We are not so sure
what happens to the vitamin B$_2$ in milk packaged in clear plastic bags.

*Freeze foods in large pieces and add a source of acid, such as lime, lemon or orange juice if the foods are not naturally acidic. Vitamin C loss is especially great in mashed, finely cut and ground foods which are frozen.*

* Keep no-frost freezer temperatures at the lowest setting. The temperature fluctuates in no-frost freezers. Fruits and vegetables frozen in them can lose all their vitamin C in a short time. It is best to keep the temperature in the freezer at its lowest to conserve nutrients. Note, however, that more electricity will be used.

* Blanch foods before freezing or drying. Blanching is placing the food in boiling water for a minute or two and then cooling it rapidly in iced water. Blanching deactivates the enzyme which destroys vitamin C. A chemical, sulphur dioxide, is used commercially for the same purpose.

If a food deteriorates in appearance, taste and texture, it is most likely that nutrients have also been lost. Let's reap, store, prepare and use our foods with care, to retain their vitamins.

**ADDING FIBRE TO YOUR DIET**

* Growing, buying and using foods that are naturally high in fibre such as fruits, vegetables, ground provisions, peas and beans are the best ways of getting more fibre in your diet.

* Eat the whole fruit, instead of juicing it, and peel only if it is absolutely necessary. Many of our fruits such as mango, guava, apple, plum and naseberry/sapodilla have thin skins that can be eaten.
* Eat more vegetables raw instead of cooking them.

* Use whole grains and ground provisions rather than refined flours, breads and cereals.

* Do not overcook vegetables, and where possible leave the skin on and eat it. A potato cooked with the skin on is more nutritious than a peeled one.

* Add grated/shredded carrots, coconut and chocho/christophene to salads, stews, cook-ups and quick breads; add oats to fish balls/fritters, meat loaf and macaroni and cheese.

You can add fibre to your diet without having bran cereal or cooking with wheat germ. Use generous amounts of fresh fruits, vegetables, peas, beans and ground provisions.

**REDUCING SUGAR IN THE DIET**

* Use less sugar in beverages and other recipes. A reduction of as much as a quarter (25%) of the sugar makes hardly any difference in the taste of the product, especially when more spices are used.

* Leave the sugar or other sweeteners out of fruit juices and other beverages. For example, there is no need to add condensed milk to soft drinks/carbonated sodas which are already laden with sugar.

* Eat less candy, cakes, puddings, pastries, sweet biscuits/cookies and ice cream.

* Have fresh fruits and unsweetened juices or canned fruits packed in their own juice or a light syrup rather than those canned in a heavy syrup.

* Choose unsweetened dry cereals and add fruits such as ripe banana instead of sugar.
* Make popsicles or other frozen snacks at home using fruit juices, and limit the amount of sugar, or don’t use any.

Food companies need to look at the amounts of sugar they are now using in their products, and to cut back. Consumers need to encourage this by accepting only products with reduced sugar.

HOW TO REDUCE SODIUM (SALT)

* Breastfeed babies

* Learn to enjoy unsalted foods

* Cook with only small amounts of added salt

* Cut down on processed foods such as:

  - salty, smoked, cured, pickled foods e.g., ham, bacon, corned beef, sausages, salt fish, red herring, pickled mackerel, pig’s tail, salt pork, salt beef, bottled pickles and sauces

  - cheese — especially processed cheese

  - snack items such as banana chips, potato chips and plantain chips, salted nuts, salted popcorn and crackers

  - canned and instant soup and bouillon cubes

  - products with baking soda (sodium bicarbonate), and baking powder

  - monosodium glutamate (msg, accent, vetsin), and sodium preservatives

* Use herbs and spices instead of salt

* Eat plenty of fresh fruits, vegetables, peas, beans, ground provisions, cereals and unsalted nuts.
How to Add Flavour and Zest to Meals Without Salt

People who manage to do without adding salt in cooking say they now realize just how delicious the natural flavour of food is. Try to think of it as a challenge. You will find the tang of a freshly squeezed lime or lemon, and many spices and herbs, very helpful in making foods taste good. These include the aroma of cinnamon, allspice (pimento), pepper, orange peel and ginger. We are lucky to have limes and other citrus fruits, and spices, readily available in the Caribbean. Here are some ideas for using lime or other citrus juice to add flavour:

* Squeeze lime in soups.
* Add to mince and meats along with pepper and tomato.
* Brush chicken with citrus juice and oil, then dust with ground allspice (pimento) or cinnamon for broiling or frying.
* Rub fish with lime before cooking and serve with lime sections.
* Add a squeeze of citrus juice to yam, pumpkin, green beans and other cooked vegetables to help them keep their colour and flavour.
KEEPING FOOD SAFE AND WHOLESOME

Beware! Food can make you sick if it is not good. You need to avoid buying spoiled or contaminated food, and to keep the food you grow, prepare and store clean and free from dangerous bacteria and chemicals. Also important is good personal hygiene, good kitchen hygiene and preventing the spread of germs by those handling food. Here are the facts, and some simple, effective rules which will help you to keep your food safe.

Everyone has a responsibility to make sure that food is handled, stored and prepared in ways which will make it safe to eat. Unsafe foods can make us sick, and in some cases we may even die.

Illness caused from food is mainly due to harmful germs called bacteria. Bacteria grow and multiply fast where conditions are moist and warm and where there is a source of food. No wonder they thrive in our warm, moist Caribbean climate and in foods such as chicken, liver and other meats, milk, fish, creamy dishes and other “rich” foods.

Once food becomes contaminated, there is a short lag period. Then the bacteria begin multiplying rapidly, doubling in quantity every 15-30 minutes.

Most harmful bacteria in food are not destroyed when food is refrigerated or frozen. Refrigeration only slows down their growth. The bacteria will become active again as soon as the food is put at room temperature or after thawing.
Types of Food-Related Illnesses

There are two types of food-related illnesses:

1. Illness which results from eating or drinking food contaminated with harmful germs or chemicals used to control pests.

2. Illness which results from eating or drinking food in which bacteria or moulds have grown for some time and have developed a toxin or poison.

How to Make Our Foods Safe to Eat

Here are some tips for producing, buying, preparing and storing food safely:

- Use clean water to water your vegetable garden and to wash dishes and prepare foods.

- Wash fruits and vegetables to be eaten raw, preferably under running water.

- Avoid buying or using any food that has a musty odour or is off-colour. Harmful substances may be building up in it.

- Discard foods that show signs of cottony white or green spots (moulds). Mould on cheese can be scraped away and the cheese used.

- Be alert to health conditions which may make you or any other food handler unfit to handle food. Some of these are diarrhoea, skin rashes with or without fever, sores, abscesses, infected cuts, especially on hands and arms, also on other parts of the body which may be scratched, thus transferring the germs to the hands and so to the food, coughing or sneezing with or without fever, persistent fever, including typhoid fever and other infectious diseases.
**Practise good personal hygiene:**

* wash your hands with soap and water after using the toilet, after any clean-up operation, after blowing your nose or after handling dirty materials;

* take a daily bath, wear clean clothes and keep your hair clean and tidy;

* do not comb your hair, pick your nose, smoke or sing when preparing or serving food.

**Keep your kitchen and cooking utensils clean and tidy.**

**Keep pets out of food preparation and eating areas.**

**Store poisons in labelled containers away from foods.**

**Do not store kerosene, paint thinners or other chemicals in unlabelled beverage bottles.**

**Get your food from a reliable, clean source.**

**Select good quality food.** Food should be clean, sound, with a good smell and colour, free from insect, rat or mouse bites, moulds and bruises; not shrivelled or limp and not from cans which are dented, swollen, rusty or unlabelled. Egg shells should be whole, not cracked.

**Prepare clean food.** Scrub and wash with soap and water the boards, surfaces and utensils with which raw meat and fish come into contact. Cut bread or other food which will not be cooked, on different boards from those used for raw meats. Wash hands and food.

**Cook foods well.** Cook meat, fish and chicken until well-done. Stewing and boiling are good ways of ensuring that food is well done.
• Take no chances. If you preserve foods by canning foods at home, be sure you give the food the right amount of heat and that you can seal the can well. Be particularly careful with canning low acid or non-acid foods such as beans, peas, corn and meat. You must use a pressure cooker.

• Prevent foods from spoiling. Buy small quantities of perishables if you do not have a refrigerator or other appropriate forms of storage. Cook enough food for one meal only if you cannot store the leftovers properly. Eat food right after cooking. Store leftovers, covered, in the refrigerator and use them quickly. Keep cold foods cold and hot foods hot. Reap, dry and store peanuts and other grains properly so moulds do not develop. When you go shopping, pick up perishable and frozen foods last. Put away perishable and frozen foods in the refrigerator as soon as you get home after shopping.

• Use clean water to make ice, and to prepare drinks and other foods.

• Prevent contamination from flies, rats, chemicals: cover foods from flies; do not spray chemicals around uncovered food.

Some illnesses which you can get from unsafe foods are:

* gastroenteritis/diarrhoea/cholera
* hepatitis/liver disease
* other liver diseases (through toxins developed in mouldy peanuts and grains)

---

**Store Food Well! Keep it clean; keep it cool; keep it covered**

*In restaurants and markets and even in the home*

*Use only clean water; keep utensils clean*

*Cover all containers to avoid contamination*

*Preserve it well by keeping it cold*

*Don't take you health for granted whether you young or old*

*Keep it clean, keep it covered, keep it cold*

*Keep it clean, keep it covered, keep it cold.*
How Safe are You in Preparing, Serving and Storing Foods? Test yourself.

Look at yourself, and around your kitchen, home and shopping places and rate how safe your food supply is. Spot the wrong practices.

<table>
<thead>
<tr>
<th>Do you:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Have clean hands? Do you always wash them with soap and water before handling food, after using the toilet and every time they are soiled?</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>- Wipe your hands with clean hand towels and not with dish towels, on your apron or on the side of your clothes?</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>x - Sweep the kitchen or other food preparation area while foods are uncovered or being prepared?</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>- Cover any infected cuts on your finger, before handling food?</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>- Keep your nails short and clean?</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>- Wear little or no jewellery on your fingers and hands while preparing/serving foods, especially in public eating places?</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>x - Cough, sneeze, talk or sing over food, especially if you have a cold?</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>- Keep pets out of the kitchen and other food preparation areas?</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>x - Let meats, fish or chicken thaw for hours on the kitchen counter?</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>- Teach children not to eat left-overs from anyone, particularly a sick person?</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>
- Cover foods on the counter, table or refrigerator? [ ] [ ]
- Wash fruits and vegetables which will be eaten raw? [ ] [ ]
- Store kerosene oil and paint thinners in beverage bottles, or keep insecticides and/or cleaning supplies and other chemicals with foods? x [ ] [ ]
- Taste with the same spoon you use for stirring the pot while cooking? x [ ] [ ]
- Keep the garbage bin open? x [ ] [ ]
- Buy clean, sound foods from clean, tidy vendors in clean places? [ ] [ ]
- Select bulging, unlabelled, rusty cans or torn packages of food as they might be cheaper than sound ones? x [ ] [ ]
- Add large amounts of MSG (seasoning salt) to just about every dish you prepare? x [ ] [ ]
- Handle raw and prepared food on the same chopping board or with the same utensils? x [ ] [ ]
- Scrape dishes clean before putting them in a dish pan or sink for washing up? [ ] [ ]
- Pick up knives, forks, spoons, by the handles and grasp drinking utensils by the handles or around the center or base/bottom? [ ] [ ]

For how many of the above practices did you answer no? Why? You should have found nine. They are marked x.
How did you score? If you spotted 7-8 of the wrong practices you have a very good understanding of safe food preparation. If you got 4-6 you have a good knowledge, and if you got below 4 you need to brush up a lot on your food safety practices. **Safe food is healthy food.**
Taking good care of the nutritional needs of the pregnant or nursing mother and those of the new baby is a skill which requires special knowledge. Some common beliefs are wrong and harmful. Other "old time" customs, like breastfeeding, are much better than the modern bottle feeding trends. Here is a valuable collection of facts, explanations, meal plans, and advice on nearly every aspect of nutrition for this period.

When Pregnant or Breastfeeding

Women who are pregnant or nursing a baby need enough nourishing food, because of the rapid growth of the baby in the womb, for the making of breast milk, and for keeping the mother healthy.

They can meet their increased needs for energy and special nutrients such as iron, zinc and vitamins, through a well-balanced diet of a mixture of foods. If the woman is already eating a nutritious diet, she can meet her extra needs by eating about one-fifth more of her normal mixture of foods. Pregnant teenagers may need as much as half more of the normal mixture of foods to meet their other needs for growth and development, plus those of the baby.

Pregnant women do not need special or high-priced foods for good nutrition. The Multimix Principle of meal planning based on the six food groups can be used to help pregnant or nursing women eat well. Two examples of how a well-nourished adult woman can meet her extra food needs when she is pregnant or nursing a baby are given on the next two pages. The meal plans are based on the smaller amounts of food in the diagram shown on page 150.
## SAMPLE MEALS

<table>
<thead>
<tr>
<th>MEAL</th>
<th>NOT PREGNANT</th>
<th>PREGNANT</th>
<th>BREAST-FEEDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>1 Orange</td>
<td>Same as when not pregnant</td>
<td>Same as when not pregnant</td>
</tr>
<tr>
<td></td>
<td>4 Plantain cakes* made with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>240g/8 oz plantain</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Tbsp/12g oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 cup/120g steamed Callaloo/Spinach</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>1 poached or boiled Egg</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 cup Coffee/Tea with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Tbsp sugar +</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>½ cup/125 ml milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dinner or main meal</td>
<td>Stewed Peas with Mince made from:</td>
<td>Same as when not pregnant</td>
<td>Same as when pregnant</td>
</tr>
<tr>
<td></td>
<td>60g/2 oz peas</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60g/2 oz mince</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 tsp/4g oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>120g/4 oz Dasheen/Yam</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 small boiled Dumpling</td>
<td>Increase dumplings to 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>120g/4 oz Pumpkin</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 glass Fruit Ade made from:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>½ cup fruit juice</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Tbsp/15g sugar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supper or lunch</td>
<td>Cook-up Rice made from:</td>
<td>Increase fish to 120g/4 oz and margarine/butter to 3 tsp</td>
<td>Same as when pregnant</td>
</tr>
<tr>
<td></td>
<td>90g/3 oz rice</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60g/2 oz fish</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>120g/4 oz chopped cabbage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 tsp/8g margarine/butter</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>120g/4 oz sliced Pineapple</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snack</td>
<td>2 slices Bread or 6-12 Crackers (depending on size)</td>
<td>Add 120g/4 oz fruit</td>
<td>Add 1 cup/250 ml milk to when</td>
</tr>
<tr>
<td></td>
<td>½ cup/125 ml milk</td>
<td></td>
<td>pregnant</td>
</tr>
<tr>
<td>Estimated Total Calories</td>
<td>2,200</td>
<td>2,500</td>
<td>2,700</td>
</tr>
</tbody>
</table>

* See recipe in Part 4, Annex A.
<table>
<thead>
<tr>
<th>MEAL</th>
<th>NOT PREGNANT</th>
<th>PREGNANT</th>
<th>BREAST-FEEDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>1 medium-sized (100g) Mango Green Banana (fig) Porridge made from: 120g/4 oz grated banana 1 cup/250 ml milk 1 Tbsp/15g sugar 2 slices/40g Bread 1 tsp/5g butter/margarine</td>
<td>Same as when not pregnant</td>
<td>Add ½ cup orange juice</td>
</tr>
<tr>
<td>Lunch (noon) or evening supper if dinner is eaten at noon</td>
<td>Chicken or Meat Sandwich 60g/2 oz meat/chicken 2 slices/40g bread 4 slices tomato 4 leaves lettuce 1 tsp/4g butter/margarine 1 cup Fruit Salad</td>
<td>Increase bread to 3 slices</td>
<td>Same as when pregnant</td>
</tr>
<tr>
<td>Dinner (main meal)</td>
<td>Stewed Fish &amp; Onions: 120g/4 oz fish 2 tsp/8g cooking oil 60g/2 oz onion 1 cup/250 ml boiled Rice + Peas 120g/4 oz boiled Sweet Potato ½ cup/120g String Beans + Carrots 120g/4 oz Tossed Salad with vinegar + oil dressing 1 glass Tamarind Drink: 2 Tbsp/20g sugar 2 Tbsp/30g tamarind pulp</td>
<td>Same as when not pregnant</td>
<td>Increase Rice + Peas to 2 cups</td>
</tr>
<tr>
<td>Snack</td>
<td>1 Tbsp/20g Peanuts 1 Orange 6-12 crackers (depending on size)</td>
<td>Add 1 cup/250 ml milk</td>
<td>Same as when pregnant</td>
</tr>
<tr>
<td>Estimated Total Calories (Energy)</td>
<td>2,200</td>
<td>2,500</td>
<td>2,700</td>
</tr>
</tbody>
</table>
Some Important Points

• A mother must eat well to gain weight when she is pregnant and to produce milk during breastfeeding. The right amount of food and fluids will give her the best nutrition for nourishing the baby before and after birth.

• If a mother is already eating well, she needs to eat just a little more of the good foods she enjoys.

• It costs very little more to make the changes that will fill the needs of pregnancy. The cost of the extra foods for nursing the baby is much less than the cost of tinned feeds, bottles, nipples and sterilizer.

• It is not wise to severely restrict the diet during pregnancy and when nursing the baby. Even if the woman is fat, she should not try to lose weight at that time. She can try to lose the weight after the breastfeeding period.

• A mother needs enough energy so that the protein in the diet will be spared to form new tissue. The weight a woman gains in pregnancy should be in lean body tissue and not too much fat or water.

• “Eating according to appetite” may cause women to over-indulge in empty-calorie foods such as sweet drinks, alcoholic beverages and rich pastry. As a result, they become too fat, and have a difficult delivery among other problems. In addition, drinking alcohol while pregnant or breastfeeding is very harmful to the baby.

• Do not believe that whatever the developing baby needs, the mother will crave and consume. This is a common belief — but it is not true.

• Pregnant and breastfeeding women have a special need for iron. Iron makes the blood strong. The mother’s blood and breast milk carry the iron and other nutrients to the baby. It is very important that she develops adequate stores of iron for her own
health and that of the baby. She should eat iron-rich and vitamin C-rich foods and take iron tablets or iron in combination with vitamins such as folacin, daily.

If an expectant mother has enough iron stores she will not need more of this mineral when she becomes pregnant. This is because menstruation which is responsible for most iron loss, stops during pregnancy. In the Caribbean, however, many teenage girls and women who have had several closely-spaced children are already anaemic (lacking iron) when they conceive (become pregnant) again. They frequently have difficult pregnancies and childbirth. Babies of such anaemic mothers may be born without the 3-6 months’ supply of iron that a normal healthy full-sized baby should have. An anaemic mother’s breast milk may also be lacking in iron. (See anaemia in Chapter 11).

- A mother usually gains 12-14 kilograms (26-30 lbs) or even up to 18 kilograms (40 lbs) in weight during pregnancy. Some of this weight is the baby, some water, some lean tissue and some fat. The fat is deposited as a store of energy on which to draw in an emergency and during breastfeeding. A poorly-nourished mother may only gain from 5-7 kilograms (11-15½ lbs). This will mean that her baby may have a low birth-weight (that is, less than 5½ pounds or 2.5 kg). She will have little or no stores of fat or other nutrients. Low birth-weight babies born to women in these circumstances are more likely to have birth defects. They will be more likely to grow poorly, develop illnesses due to infections, and die in infancy, than babies who are born weighing more than 2.5 kg (5½ lbs).

- After the baby is born, the mother’s nutrition is still just as important for the baby’s health and growth. Poorly nourished mothers may only be able to make one-half to two-thirds as much breast milk as mothers who are well-nourished.

- A mother’s age, number of pregnancies, time between pregnancies and general health before pregnancy, will affect the outcome of her pregnancy. The over 17 and up to 35 age group with intervals of 2-3 years between pregnancies, usually have less troublesome pregnancies, and their babies are of the right weight.
Some pregnant women have eating and other problems which will affect their nutrition. These problems vary from one person to the next. Common difficulties include: nausea, constipation and heartburn.

Dealing with the Conditions

Nausea and Vomiting - She should have small, frequent meals, fairly dry foods which are easily digested and high in energy, e.g., crackers/biscuits and liquids between meals. Severe, prolonged, persistent vomiting may require hospitalization.

Constipation - Increase fluid intake, fruits, vegetables, peas, beans and other high fibre foods

Heartburn or "full-feeling" - Have several smaller meals rather than large meals at one time; chew well, eat slowly, relax and avoid tension/stress during meals.

Note: The pressure from the enlarging uterus (womb) crowding the stomach which is next to it often causes this full feeling or burning sensation. Food may be pushed back into the lower part of the passage leading to the stomach called the gullet. This causes the burning.

Pregnancy brings on special nutritional problems for the teenaged or adolescent girl, who needs to nourish the infant while she is still developing herself. Her own nutrient requirements are greater than those of the pregnant adult and depend on how healthy she was before getting pregnant. The younger the adolescent, the higher the nutrient requirements. If the adolescent is physically active, the needs are greater. The teenager’s weight gain should be greater than that of the adult female’s.
During the First Year of Life

1. Breastfeed

A mother should begin breastfeeding as soon after giving birth as she can. The following "version" of a letter which might be from a newborn sums up nicely the benefits and qualities of breast milk and the need for the doctor, nurse or other birth attendant to encourage and help a mother to breastfeed.
Dated today

Dear Doctor/ Dear Nurse,

This is the most crucial year of my life. And I am at your mercy.

I need my mother. I need love. I need my mother's milk. Will you help me to get them all?

My brain needs a fat-rich milk. I need protection from allergies. Will you help to get me breast milk, my only defence against these dangers?

In this way I will not be exposed to millions of bacteria or "germs", to the contaminated water and the dirty nipple so early in life, when I comfortably suck the warm, made-for-me milk of my mother.

My mother believes you and looks to you for information. Make her trust you. Tell her about (breast) feeding me right and show her how.

In short, give me a passport to good nutrition and a happy, healthy childhood and the coming years. Thank you dear doctor. Thank you dear nurse.

Yours sincerely,

The newborn

Adapted from Health for the Millions/Oct-Dec. 1981
BASICS OF BREASTFEEDING

How soon after delivery should a mother start breastfeeding?

A mother should keep her baby with her from birth in skin-to-skin contact. Her newborn baby should be put to the breast as soon as possible. Usually, this is within an hour of birth.

At first the mother's milk is watery and sometimes yellow. Is this milk good for the baby?

Yes. This milk is called colostrum. It helps protect the baby from illnesses such as diarrhoea. A few days after the baby is born the milk changes colour and consistency, but it is just as nutritious and healthy for the baby.

Can all mothers breastfeed?

Practically all mothers can. There are very few conditions which prevent a mother from breastfeeding her child.

How do you put the baby to the breast?

Most mothers know this. The mother should be comfortable. She may wish to sit up and rest her feet on a box, cushion or chair, or she may lie down. When the mother is comfortable, the milk flows easily. She should hold her baby close to her, support the baby's head and back with her arms and tease the baby's cheek and mouth with her nipple. The baby will automatically turn its head, open its mouth and feed. Both the nipple and the area around the nipple should be in the baby's mouth.

How often should a mother breastfeed?

As often as the baby wants, by day and by night. For the first few weeks the baby will cry when it wants milk and feedings will be frequent
and irregular. Later, the baby will be able to suck more milk at one feeding and there will be more time between feedings. A mother should breastfeed whenever the baby is hungry, thirsty or restless.

**How long should a baby be fed each time?**

The baby should be allowed to suck for as long as it wants. At first, the time may be quite short. When the baby gets older and stronger it will suck for a longer time because it needs more milk. The more baby sucks, the more milk is produced. Let baby rest on the breast from time to time.

**Up to what age should a child be breastfed?**

A mother should breastfeed for as long as she wishes — up to two or more years. After the first six months, the mother should begin to give the baby additional food to complement breast milk. Breast milk is still important for growth in the second year of life.

**How do you know if the baby is getting enough milk?**

Baby grows well. Most mothers produce enough milk for a baby to grow well for the first six months of life.

**What if a mother has to go to work or she is otherwise busy?**

If a mother goes out to work, she should breastfeed before going. If she comes home during the day, she should breastfeed at that time. During the nights she should breastfeed as often as she can. She should give only breast milk during weekends as this will keep up her milk supply. She can also express the milk (squeeze it into a clean container) and leave it for the baby. A mother should try to take a nap when her baby sleeps. But she can breast-feed even when her life becomes busy again.
Don't be put off breastfeeding by listening to mistaken beliefs such as:
- nursing the baby will make your breast sag and make you lose your shape;
- breast milk will burn the baby's skin, upset his or her stomach, give running belly (diarrhoea) or become sour if a mother's body gets hot because of being in the sun, ironing clothes or getting into a temper. These are not true.

Breastfeeding Has a Lot to Offer Mother and Baby

- Breast milk has all the nourishment a baby needs from birth until about six months old. It is full of energy, protein, fat, vitamins — everything necessary, even plenty of water to make baby grow well and keep well.

- Breast milk contains substances which protect a baby from many infections and diseases. It also has substances that help in the development and maturation of organs in the body. These substances are not present in infant formula and other products made from cow's milk.

- Breast milk is clean, warm and ready whenever baby needs it.

- Breastfeeding is the natural way for a mother to feed her baby.

- When a mother breastfeeds and holds her baby close, she gives warmth and security, as well as food. This makes mother and baby close and loving.

- Giving baby breast milk alone for the first six months without any other kind of milk, juice, water or other foods can help prevent a woman from getting pregnant during that period. She should use a contraceptive method, however, if her period returns, or if she starts giving baby other food or drink, and when baby reaches six months.

- If a mother breastfeeds, she loses the weight put on during pregnancy more quickly than if she does not. The womb will get back to its normal size much faster when a mother breastfeeds.

- Breast milk does not make baby's stomach upset. It doesn't give baby a rash, make him or her constipated or cause running belly (diarrhoea). The breastfed baby passes stools often and they are mostly loose and yellow. This is normal.
The mother who breastfeeds will not have to use a feeding bottle or buy cans of baby feed. It costs much less for the mother to eat a little more than to buy special foods for the baby. Eating extra food gives her energy to make breast milk. Breastfeeding also saves time as the milk is always there ready, warm and convenient.

2. **Begin Semi-solids at 4-6 Months**

Many babies are fed solid foods far too soon. Some mothers believe that if their babies eat solid foods while they are still very young, and eat a variety of foods at this stage, they are advanced in their development. But introducing solid foods too early has its problems: the baby will get more calories than needed, and the rest will be stored as fat. Consequently, there will be more weight gain than is normal.

What's more, if solid foods are introduced too early, the baby will take less and less breast milk. This means replacing a perfectly balanced food with one that is not specially adapted to the infant's needs at that stage of development.

Yet another drawback is that introducing solid foods before six months increases baby's chances of becoming allergic to, or, not being able to tolerate certain foods. The digestive system is not yet well-developed and
cannot tolerate a variety of foods. So there may be symptoms of distress such as diarrhoea or colic (indigestion).

As a general rule, babies should not be given solid food before four months of age. They thrive perfectly well until then on breast milk alone. Breast milk is a complete food, so the baby who is fed on demand (when it cries for it) thrives on breast milk alone until about the fourth to sixth month. At that time a baby begins to need other nutritious foods to get enough calories and nutrients to grow properly and resist disease.

Complementary Feeding

---

The process of introducing baby to foods, besides milk, is called *complementary feeding*. It means more than simply stopping breast-feeding. It is a very important stage in an infant's life. The infant slowly adapts to adult foods while continuing to breastfeed, and becomes more independent.

The additional foods and drinks which are given to baby at six months are called complementary foods. The term "complementary foods" is used to emphasize that these additional foods should complement breast milk rather than replace it.

Porridges prepared in the correct way and fruits are good first foods. A nutritious porridge is thick. It is made from a staple cereal and milk, with a small amount of fat and sugar added to provide extra energy. A thin porridge may not meet the infant's energy needs for growth. The baby may even end up being malnourished.

Over the following months introduce mashed and softened foods from the family pot. These foods should not be too spicy or highly seasoned. By the second year, the child should be eating most items from the family table. Even then, breastfeeding may continue.

Tips for Successful Complementary Feeding

Young children have small stomachs and need lots of nutrients relative to their size. They need to eat several small meals spread out during the day.
Here are some guidelines which will make the transition or change from breast milk to family meals a pleasant experience for baby and parents:

- Make each meal a happy social experience for the baby and family. The introduction of solid foods is the beginning of a new feeding pattern for a child, one that will continue to develop until adulthood.

- Encourage the young child to explore new tastes and smells. Be responsive to his or her obvious likes and dislikes. Mealtime is a good time for the whole family, including the other children, to have adventures discovering new foods.

- In addition to getting accustomed to the new taste and textures of the foods, the child needs to learn the skill of eating. At six months, start with 2-3 tablespoons (10 ml) of complementary food twice a day. Feed in small amounts so the child can practice swallowing without being choked by large amounts of food. Then gradually increase the amount and the variety of foods at each meal as the child gets older. By 12 months of age, the child should be having three meals and two snacks, with a bowl of full cup (250 ml) of porridge or family foods at each meal.

- Introduce one new food at a time. That way, if for some reason a food does not agree with the baby, it can be easily identified.

- Provide soft to semi-solid foods which the child can swallow easily. The four-month-old cannot chew and is just learning to swallow food that is fed from a spoon. So offer foods that are smooth, sieved, strained or blended so that they go down easily. Older babies can eat foods that are not as smooth, because they are beginning to learn to use their gums to “chew”. But obviously, if a baby has no teeth, or teeth so arranged that they are not yet functional, don't give coarse foods that need real chewing. But do encourage the child to “chew” his or her food using the gums. This will help create proper chewing and eating habits later and may strengthen the gums and emerging teeth.
• Do not encourage a taste for too much salt and sugar. At birth, infants already prefer sweet tastes. Do not encourage this preference by adding too much sugar to baby's foods. On the other hand, a taste for salt does not seem to be inborn, but acquired. A good rule is not to add salt to baby's food. In almost all cases the baby will accept it without added salt or sugar.

Preparing Baby's Food

Baby's foods can be prepared easily at home using a little grinder/mill or a fork for mashing, and then a sieve or strainer to remove the parts which baby cannot chew or digest.

When babies start real chewing (with their teeth rather than gums), they are ready to enjoy mashed foods, but don't sieve or puree the food. By 12 months of age, they can have family foods chopped or mashed, if necessary.

A whole new world of tastes, colours, smells and textures will open up for a baby. When solid foods are introduced, each new food taste becomes an exciting experience in discovery for the child and for the whole family. This special time in the baby's life can provide a unique opportunity for the entire family to eat well and keep healthy.

Prepare a wide variety of foods from the family's food supply and combine them according to the multimix principle. Young children should
of their energy from staple foods (cereals, ground provisions, food from animals and peas and beans. A good guide is to use 4 parts of staples (mostly cereals); 2 parts legumes/nuts; 1 part of food from animals, dark green leafy or yellow vegetables and fruits with small amounts of fats and sugar. Some combinations or mixtures of foods/multimixes for infant feeding are given below.

**MULTIMIXES FOR INFANT FEEDING**

<table>
<thead>
<tr>
<th>Mixtures</th>
<th>Food Groups</th>
<th>Examples of Food Mixtures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double Mix</td>
<td>Cereal Staple + Legume</td>
<td>Rice and Peas, Dahl and Roti</td>
</tr>
<tr>
<td></td>
<td>or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cereal Staple + Food from Animal</td>
<td>Cornmeal and Milk or Rice and Fish</td>
</tr>
<tr>
<td></td>
<td>or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provision Staple + Food from Animal</td>
<td>Yam and Sardine; Potato and Meat</td>
</tr>
<tr>
<td>Mix of Three</td>
<td>Cereal Staple + Legume + Food from Animal</td>
<td>Rice and Peas and Chicken</td>
</tr>
<tr>
<td></td>
<td>or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cereal Staple + Legume + Vegetable</td>
<td>Cornmeal, Stewed Peas, Callaloo/Spinach</td>
</tr>
<tr>
<td></td>
<td>or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cereal Staple + Food from Animal + Vegetable</td>
<td>Rice, Chicken and Pumpkin</td>
</tr>
<tr>
<td></td>
<td>or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provision Staple + Food from Animal + Vegetable</td>
<td>Sweet Potato, Liver and Tomato</td>
</tr>
<tr>
<td>Mix of Four</td>
<td>Provision Staple + Legume + Vegetable + Food</td>
<td>Green Bananas (Figs), Beans, Callaloo/Spinach and Fish</td>
</tr>
<tr>
<td></td>
<td>from Animal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cereal Staple + Legume + Vegetable + Food from Animal</td>
<td>Rice, Stewed Peas with Beef, Carrot</td>
</tr>
</tbody>
</table>
GUIDE TO FEEDING A 12 MONTH OLD BABY

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Type of Food</th>
<th>Amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early morning</td>
<td>Breast milk*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Family meal:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Porridge</td>
<td>1 cup</td>
</tr>
<tr>
<td>Mid-Morning</td>
<td>Snack:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bread &amp; butter</td>
<td>1 slice</td>
</tr>
<tr>
<td></td>
<td>Pawpaw Juice</td>
<td>¼ cup</td>
</tr>
<tr>
<td>Lunch</td>
<td>Family Meal:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mashed Green Banana (Fig)</td>
<td>2/4 cup</td>
</tr>
<tr>
<td></td>
<td>Pumpkin</td>
<td>1 Tbsp</td>
</tr>
<tr>
<td></td>
<td>Fish + Gravy</td>
<td>1 Tbsp</td>
</tr>
<tr>
<td></td>
<td>Snack:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fruit - ripe banana</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Breast milk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Family meal:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rice + Stewed Peas</td>
<td>4 Tbsp</td>
</tr>
<tr>
<td></td>
<td>Minced Meat</td>
<td>1 Tbsp</td>
</tr>
<tr>
<td></td>
<td>Grated Carrot</td>
<td>1 Tbsp</td>
</tr>
<tr>
<td></td>
<td>Breast milk</td>
<td></td>
</tr>
</tbody>
</table>

*Breast milk as often as desired.

Some parents think that their fat baby is well developed and healthy. However, a fat baby is not necessarily a healthy baby. If a child is getting enough of the right foods, he or she will keep healthy and gain weight steadily. There is no standard weight a child should have by a specific time, because children's birth weights differ and they may get several bouts of illnesses which retard their growth and development.

The Vegetarian Baby

Take special precautions in managing the diet of young babies and children who are vegetarians. Breastfeed for at least six months and add milk, eggs and a good blend of cereals with peas, beans and nuts when appropriate. Proper preparation is key. (See pages 196-197). The amount and type of food for growth and development are very important. Commercial soy formulas are recommended for the totally vegetarian infant who is not breastfed. Ask the advice of the health worker about the use of iron and vitamin supplements for this baby.
Planning, supervision and plenty of encouragement are needed to make sure growing children are properly nourished. The tips, advice and information in this chapter will help you through those all-too-common problems of feeding children.

Feeding the Toddler

Between the ages of one and three years the child will be walking, trying to dress and feed him or herself and gradually becoming more independent. Remember that the child is still growing and developing, so continue feeding many different nourishing foods, like the rest of the family, and supervise him or her at mealtime.

Following the multimix principle, the toddler should now get larger portions of mixtures of foods from the food groups. Serve regular meals and nutritious snacks. Include nourishing foods that the child can manage easily with the fingers and which help to encourage chewing such as fruits, raw carrots and crisp crackers. In a day a toddler may eat as follows.
<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Type of Food</th>
<th>Amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Morning</strong></td>
<td>Family meal:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orange or other fruit</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Fish Fritter</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Milk/Cocoa</td>
<td>½ cup</td>
</tr>
<tr>
<td><strong>Mid Morning</strong></td>
<td>Porridge made with milk</td>
<td>1 cup</td>
</tr>
<tr>
<td><strong>Mid-Day</strong></td>
<td>Family Meal:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pumpkin Soup with:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eddoe (Coco)</td>
<td>1 slice</td>
</tr>
<tr>
<td></td>
<td>Meat</td>
<td>30 g (1 oz)</td>
</tr>
<tr>
<td></td>
<td>Soft Dumplings</td>
<td>1</td>
</tr>
<tr>
<td><strong>Afternoon</strong></td>
<td>Small Biscuits (Crackers)</td>
<td>2-3</td>
</tr>
<tr>
<td></td>
<td>Milk or</td>
<td>½ cup</td>
</tr>
<tr>
<td></td>
<td>Fruit, e.g. Ripe Banana</td>
<td>1</td>
</tr>
<tr>
<td><strong>Evening</strong></td>
<td>Family meal:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cool-up Rice + Chicken</td>
<td>1 cup</td>
</tr>
<tr>
<td></td>
<td>+ Tomato + Cabbage + Butter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lemonade</td>
<td>½ cup</td>
</tr>
<tr>
<td><strong>Bedtime</strong></td>
<td>Milk</td>
<td>1 cup</td>
</tr>
<tr>
<td></td>
<td>Buttered Bread</td>
<td>1 slice</td>
</tr>
</tbody>
</table>
Making Vegetables Appetizing for Children

Toddlers who are not offered vegetables at the beginning of implementing feeding, may not want to eat vegetables. Make vegetables more appealing and encourage children to eat them every day.

- Mash them instead of serving them in large pieces.
- Cut into match stick sized pieces.
- Cook vegetables lightly or serve them raw, so that they are chewy and crunchy.
- Serve them with a little sweetish dressing, before other foods, or with a snack.

Serve Nutritious Snacks

Snacks have a place in children's daily eating habits. It is important that the snacks are nutritious, tasty, interesting in shape, texture and colour, not too expensive and easy to eat. Serve small portions, for example: ½ glass milk; 3-4 biscuits/crackers; ½ fruit, a slice of bread or a small piece of pudding.

Supervision at Mealtime is Important

Supervise the toddler while he or she snacks or eats other meals. Let the child sit in an upright position and cut the food into bite-size pieces so that he or she cannot choke easily. Avoid giving the teething child dry toasted snacks as they may break into pieces large enough to block the windpipe. Smooth rounded pieces of sausages, should be cut into strips or mashed to prevent their slipping down the child's throat.
What About Supplements?

Some parents are also in the habit of giving their children a vitamin supplement in the mistaken belief that this will make up for poor eating habits. Vitamin/mineral pills or syrups are supplements or additions and not substitutes for food. They are usually not necessary for healthy children who are getting a good mixture of foods.

Some supplements may be dangerous. For example, there is extra vitamin C in some varieties of children's supplements. If these acidic supplements are in chewable form they may damage the child's teeth. The high acidity may wear away the tooth surface. Dental researchers advise that vitamin C supplements should not be given in chewable form. Give the children their vitamin C in vitamin C-rich foods such as mangoes, guavas, garden cherries, oranges, tangerines, grapefruits and sweet peppers.

Monitor (Check) the Child's Growth and Development

It is important for parents to feed their young children well and to monitor (check) their growth and development. They can do this by taking them for health checks including weighing and measuring, also checking them for anaemia (weak blood).

Pre-schoolers may become anaemic if they do not get enough iron-rich foods and vitamin C-rich fruits and vegetables to help their body to use iron well. (See page 91 on how to protect young children from getting anaemia).

Feeding the Pre-Schooler

By the time a child is about four to six years old, he or she has formed lasting eating patterns and attitudes about food. Reinforce the good habits and help the child to eat wisely for a lifetime. Children's appetites vary from day to day, but here is what a pre-schooler may eat in a day:
### MORNING
- ½ cup orange juice
- 1 cup cocoa made with milk
- 2-3 banana fritters

### LUNCH
- 1 fried chicken wing with gravy
- ½ cup boiled rice
- 2 slices boiled plantain
- 1 slice boiled pumpkin
- ½ cup ginger beer

### BEDTIME
- 1 slice bread pudding
- 1 cup milk

### MID-MORNING
- 1 small packet peanuts
- 1 cup lemonade or fruit

### SUPPER/DINNER
- 2-4 Tablespoons cook-up sweet potato or green banana with:
  - fish, peas, cabbage,
  - margarine
- 1 cup soursop/lime punch (sweetened)

### Helping Children to Enjoy Their Meals

Teachers and parents are often concerned when pre-schoolers will not eat what is considered “good for them”, meaning foods which make them grow well, keep healthy and have plenty of energy.

Here is how to help children to enjoy nutritious meals:

- Offer them many different foods.
- Make their meals attractive, tasty and appetizing.
- Serve small portions and allow the children to ask for more if they wish.
• Make them comfortable at meal time. That is, let them sit on a chair, stool or box that provides proper support for their feet and legs. Let them rest just a little before meals and feel relaxed while eating.

• Allow them to prepare some foods for themselves, e.g., butter bread, peel fruit or make a drink.

• Set a good example by eating wisely yourself.

• Do not allow too many cakes, cookies, sweets, chips and puffed corn snacks and encourage them to have juices, fruits, nuts and milk.

• Do not force them to eat foods they dislike.

• Serve favourite foods at the same time with those they don't like as much.

• Introduce new foods one at a time and serve the new food with a familiar food, especially when the children are hungry, in good health and in a good mood.

• Do not be afraid to set rules, such as refusing to let children have foods you think they should not have.

• Explain the facts about food to counter the propaganda children see and hear in advertisements and from others.

• Serve foods in ways children can handle easily with fingers, forks or spoons.

• Encourage them to eat slowly. Rushing a child to finish quickly may spoil his or her pleasure in eating.

• Supervise their eating to ensure that they eat enough.

• Do not use food as a pacifier or a reward, or withhold it as punishment.
• Avoid providing substitutes by cooking something else or preparing an item in a different way for children who are not sick.

The consequences of improper feeding of children (which result in malnutrition) were discussed in Part Two of this book.

Feeding the Young School Child

Children between the ages of 6 and 10 are still growing at a rapid rate. They need more food than some adults. The 10 year-old girl needs just slightly less food than her 35 year-old mother and as much as her 60 year-old grandmother.

It is normal for children at this age to get deeply involved in a game, project or TV show. They may not want to leave the activity to eat. They may hurry through a part of the meal to get back to the activity. Also, they may get up late in the mornings and be so anxious to get to school that they feel they have no time to eat. It is important that they eat properly to stay healthy, grow and develop as they should. Eating properly also helps them to pay attention in school, to learn well and be alert and fit physically, mentally and socially.

Meals for School Children

Every child should eat at least three meals, containing enough foods from the six food groups. Since school children can easily get anaemia, parents and guardians should make sure that they get foods that are rich sources of iron (see page 62 in Chapter 8).

Breakfast/Morning Meal

The child's breakfast should provide one-fourth to one-third of the daily needs. Here are some examples of what that child may have:

1. fruit
   1 cup porridge made with milk
   2 slices buttered bread

2. fruit
   2-3 Johnny cakes (bakes)
   cocoa made with milk
Breakfast/Morning Meal (cont'd)

3. 1 ripe banana  
   2 fish fritters  
   1 slice bread  
   1 cup cocoa made with milk  

4. fruit  
   1 bowl dry cereal with milk  
   1 slice bread with jam/jelly  

5. 2-4 slices reheated or fried, leftover breadfruit, yam, green banana, plantain or potato  
   callaloo/spinach with fish  
   hot or cold beverage of choice

Remember that ground provision/produce staples should always be accompanied by a food from an animal source for good nutrition.

Lunch

A good mid-morning snack and/or a mid-day meal enhances a child's ability to undertake school work or take part in afternoon sports and games. Encourage your child to join the school feeding programme if lunches are served at school. School lunches are usually more nourishing and better value for money than some lunches and snacks that children buy from shops and school vendors. A good school lunch programme provides an opportunity for teaching about nutrition in a practical way. If the child carries a packed lunch, he or she should help to prepare it because if the child knows what is taken, he or she will be more likely to eat it.

Ideas for Packed Lunches

- Sandwiches with meat, cheese, egg, fish, nuts, peas and other fillings.

- Fritters, fried Johnny cakes (bakes), crackers, puddings, and buns with pieces of cheese, sausage, or leftover meat and nuts.
Along with:

Fruit or fruit/milk drink and raw vegetable — carrot, cucumber, tomato, lettuce; nuts or chocolate bar, a packet of chips or cookies are treats to add, but only occasionally.

Let the child prepare the drink for school the evening before and freeze it in a plastic bottle. It will be cold and ready at lunch time. Wrap the bottle of drink in a small towel or absorbent paper so that on thawing it does not make a mess in the lunch kit or school bag.

Dinner

Sometimes the main meal is served at noon. These may be tasty cook-ups, one-pot stews, thick soups with peas, meat and provisions/produce, stir-fried chicken, meat or fish and vegetables over rice. After a hearty noon meal, and perhaps an afternoon snack, a tired, exhausted school-age child and working parents need not make the evening meal a laborious affair. Sometimes a breakfast-type or light lunch-type meal will be just right for those who have had a big cooked meal at noon.

Snacks

School children are very active and are growing rapidly, so they need snacks that are the size of mini-meals. A good snack might be a sandwich and a glass of fruit juice, or a piece of pudding and a glass of milk.

How Much Food Does the Young School Child Need?

Children’s appetites vary from day to day. No two children will need the same amount of food per day. Divide the daily food intake into three main meals with in-between-meal snacks, or serve five or more smaller meals appropriately spaced.
The total amount of food a 4-6 year old child would need in a day is shown in the chart below and sample meals follow.

DAILY FOOD CHOICES FOR HEALTHY LIVING

4-6 YEAR OLD SCHOOL CHILDREN

- Fruits & Vegetables
  - 5 Portions Fresh Fruits
  - E.g. 1 Orange, ½ Ripe Banana,
    2 Slices Pineapple, 1 Otahiti Apple
  - 1 Portion Vegetables - ½ cup cooked

- Cereal Grains
  - 180-240g (6-8 oz) or 6 Portions
  - 1 cup Porridge, 2 slices Bread
  - 2 cups Cooked Rice

- Fats & Oils
  - 2 Tablespoons Vegetable Cooking Oil

- Peas & Beans
  - 39g (1 oz) or ½ cup cooked

- Eggs
  - 1 egg

- Dairy
  - 1 Glass Milk 1/2 cup

- Ground Provisions
  - 1 Glass Beans 1/2 cup
SAMPLE MEALS

Morning (breakfast)
2 Plantain Cakes or slices of roasted Breadfruit
1 Mackerel ball (30g/1 oz)
¼ cup Steamed Callaloo/Spinach
Cocoa made with milk and sugar

Mid-morning Snack
Fruit in season (ripe banana, or medium mango)
3 Crackers or 1 slice buttered Bread

Noon
Cheese Sandwich (1 slice cheese) with lettuce and cucumber
1 cup Fresh Cherry Juice (1 Tbsp sugar) or Fruit

Mid-afternoon Snack
1 Roasted Corn
1 orange

Evening
60g/2 oz Fresh Fish with tomato sauce
¼ cup Stewed Peas
½ cup cook-up Rice
1 slice Sweet potato or Dasheen
¼ cup Stir-fried Cabbage + Sweet pepper
Water

Bedtime Snack
1 cup cornmeal porridge with milk and sugar
Youngsters are most likely to “follow fashion” with bad eating habits during the pre-teen and teenage years. But good nutrition is more important than ever during this period of rapid growth and development. Here are the vital nutritional facts. Share them with the adolescents in your family — they will be more likely to cooperate if they understand why proper nourishment is necessary.

The pre-teen period, from age 10 to 13, is a time of rapid growth in girls. Boys have a growth spurt a year or so later when they catch up and pass the girls. Girls get taller and weigh more just before the start of menstruation (monthly periods). Their nutritional needs are greatest during this period of intensive growth. Yet children of this age are often careless about eating properly. They are more interested in being popular, attractive and athletic, and in pursuing the latest fad or trend in the company of their friends and schoolmates. Regardless of these interests though, they must be encouraged to find time to eat well.

Feeding Pre-Teens

Pre-teens need lots of food to help them grow, build blood and muscle, guard against infections and to keep alert, healthy and active.

They have a special need for energy (calories); for the minerals iron and calcium; and for vitamins, especially vitamin A. It is likely that they will satisfy mineral and vitamin needs if they eat a variety of foods from the six food groups.
The amount of food a pre-teen boy needs each day from the six food groups, is about the same as, or a little less than that needed by the average adult male. So that boy needs the larger amounts of food shown on page 150. The girl would need the smaller amounts. A day's meals for pre-teens would therefore be similar to those of teenagers.

Improving Pre-Teens' Food Choices

Some pre-teens, especially girls, tend to eat very small amounts; but because of their tremendous growth spurt they should be eating a lot. Boys never seem to have enough — they are always hungry. Some clamour for hot dogs, hamburgers, patties (meat pies), pizza, french fries, chips, cakes and pastry. These are big calorie "fast foods" which have a disproportionately high level of fats, especially saturated fat. They are usually thirsty and satisfy that thirst with carbonated sodas and other sweet drinks.

While no harm will be done by eating these foods occasionally and in small amounts, it is better for children to eat economical, nutritious snack items such as biscuits, milk, fruits, buns, puddings, and sandwiches and to drink water. A good way to get pre-teens to take an interest in making better food choices is to let them help with meal planning and with food shopping and preparation. Both boys and girls should be involved. They could take turns preparing meals on weekends when they have more time. They can help start the dinner when they come home early from school, prepare packed lunches or help to start breakfast the evening before.

You can also ask the physical education teacher, sports coach, nurse, guidance counsellor and cosmetology teacher to help motivate pre-teens to make better food choices. When they connect good eating with good athletic performance and good looks, they may take more interest in what they are really eating.

Eating Well in Adolescence

Teenagers grow and develop rapidly. The composition of their bodies changes: muscles increase, the quantity and distribution of fat alters, and organ systems get bigger. These and other changes affect their nutritional
needs. They have special needs for energy, protein, the minerals calcium, iron and zinc, and for all vitamins. A teenage girl who is pregnant will need even more for the maintenance of her own health and that of the developing baby.

**Energy and Nutrient Requirements**

The requirement for energy peaks at about 12-14 years, followed by a gradual decline. The amount of energy adolescents need is affected by how physically active they are, how well they were growing before, and whether they were well nourished when they were younger. Different activities demand different levels of energy. If they are active in sports, they will need more than the recommendations of 2200 calories for girls and 2700-3000 for boys.

Calcium, iron and zinc are particularly important for teenagers. The calcium is needed for the growth of the skeleton, iron to help increase red blood cell and muscle tissues, and for the growth of bone and zinc for growth and formation of new tissue.

Teenagers need more of all the vitamins which are available in a balanced, varied diet. Eating more of the right foods will provide ample amounts of all these nutrients. If the teenager smokes or uses oral contraceptives, there will be a need to pay special attention to vitamin C intake, as both practices change the way the body uses this vitamin.

A sample menu for a teenage girl, with modifications for a boy, follows on the next page. Pre-teen boys and girls would get just about the same amount.
SAMPLE MENU FOR PRE-TEENS AND TEENAGERS

GIRLS

Morning Meal
1 Orange
Porridge made with:
  ¼ cup 60g Cornmeal
  ½ cup Milk and
  1 Tbsp Sugar
2 slices Bread
1 tsp Butter

Mid-Morning Snack
1 ripe Banana
1 small packet (30g) Peanuts

Noon
(If home for lunch)
½ cup Stewed Peas with:
  30g/1 oz ground Beef and
  ½ cup diced Pumpkin
1 cup Rice
3 slices (100g) Sweet Potato
2 slices (65g) Avocado pear
1 cup Lemonade sweetened with
  2 Tbsp Sugar

(If lunch is packed)
1 Egg Sandwich with lettuce and tomato
1 Rock Bun
1 cup Lemonade sweetened with
  2 Tbsp Sugar
1 Fruit in season

ADDITIONS FOR BOYS

Increase:
orange to 2 or
add another fruit,
e.g., ripe banana

Increase:
stewed peas to ¾ cup;
bread to 60g (2 oz)
rice to 2 cups
pumpkin to 1 cup
potato to 5 slices (150g) and
add fruit in season

Increase bread to 4 slices
GIRLS cont'd

Evening (Dinner or Supper)

1 cup Callaloo Soup
60g/2 oz Stewed Chicken with
30g/1 oz Broad Beans
60g/2 oz Carrots
60g/2 oz White Potato
2 Tbsp Gravy
2 slices (100g) fried Breadfruit
1 buttered Roll
½ cup Fruit Salad

ADDITIONS FOR BOYS cont'd

Increase:
chicken to 90g/3 oz
breadfruit to 4 slices (200g)
rolls to 2
fruit salad to 1 cup
NUTRITION THROUGH THE LIFE-CYCLE: ADULTS AND THE ELDERLY

Old timers used to call weight gain in adulthood the "middle age spread". Adults need less food as they get older, and if they don't eat less, they will get too fat, which is dangerous. Then, there are the special needs of our older family members, linked to changes in their bodies and lifestyles. These are all explained in this chapter, which offers practical tips to guide you in providing the right nourishment for adults of all ages.

By the late teens a person reaches the adult size and again the body's needs change. It is from this time on that food needs vary most. Less food is needed since the body is not growing much. The amounts of food depend on the level of physical activity and the person's weight. Women need far more iron than men, to replace that lost in menstruation. If a woman becomes pregnant, she will need a bit more of all foods, along with an iron supplement, if the baby is to grow properly and she is to remain healthy. (See Chapter 20).

At middle age, people usually need to cut back on the amount of foods eaten. This continues into old age if the amount of energy being used gradually falls. It is still very important, however, to make sure that the elderly get enough nourishment even though their overall need for food may be lower than when they were middle aged or young.

The normal, healthy woman up to age 59 needs about 2200 calories or less per day while men of that age need about 2700-3000 or more. Women who are pregnant and nursing need 300-500 more calories per day than those who are not. Men or women who do heavy physical activity need more than those who do less physical work. People who are fat and those who do not work hard or are sedentary need fewer calories than those suggested above.
From 60 years and over, men need about 2300 calories per day while women need about 1800. So, an adult man up to 59 needs the same amount (or a bit less) than his teenage son, depending on the level of activity. The same principle holds for women and their teenage daughters. However, at about age 35, if we continue to eat the same amounts of food as we did when we were younger, and if we are not as physically active, we will gain too much weight.

So, women 35 and over should take fewer calories per day than when they were younger, unless they are involved in strenuous exercise or need more calories for special health conditions, like pregnancy. Examples of the amounts of food which would provide 2000 and 3000 calories are given in the chapter on Meal Planning and Preparation. An example of the amounts for an 1800 calorie diet is given at the end of this chapter.

Some things that adults need to watch to ensure that they are eating properly are:

- **The amount of food they eat.** Too much food makes a person fat. Fat puts us at risk of getting many chronic diseases.

- **The type of food they eat.** A good mix of foods from the 6 food groups will help them to get a nutritious, varied diet and enough fibre.

- **The total amount and type of fat they eat.** There should be an equal amount of saturated and unsaturated fats or slightly more of the latter.

- **Their intake of the mineral calcium.** There is a special need for calcium for healthy bones in later years. Sources of calcium are given on page 68.

- **Their intake of the mineral iron.** Adult women, especially those who are pregnant and breastfeeding, have a special need for iron to build strong, healthy blood. Men do not need as much and should be careful about taking iron supplements.

- **When they eat.** Breakfast is important for adults. Studies have shown that skipping breakfast causes tiredness, low "brain power" (not being able to think clearly) and poor work performance.
**Nutrition in the Golden Years**

There are many great differences among people 60 years and older. They differ in the state of their nutrition and health, according to their surroundings, family history and social and economic circumstances. All these factors combine to affect the way they age. Nutrition also plays a role in the way we age.

Good nutrition throughout life is one of the best ways of reducing the effects of age and avoiding age-related diseases. The same nutrients are essential for people of all ages. Changes that come with the aging process call for changes in the amounts of nutrients eaten by the elderly.

**The Aging Process**

Several organs change during the aging process. They do not function as well and diseases may develop. Aging is largely due either to loss of cells by the organs or to a reduction in the way these organs work. However, aging is not the same as illness.

The general trends of aging include:

- Rising blood pressure and less tolerance for glucose, the sugar from digested food
- Less protein (muscle) and more fat in the body
- Being less sensitive to thirst and hence, more at risk of dehydration or "drying out"
- Reduction in the amount of energy needed for basic body processes such as heart beat and breathing (basal metabolic rate)
- Loss of teeth
Development of chronic diseases such as diabetes, high blood pressure, heart disease, atherosclerosis, arthritis and osteoporosis (softening of the bones)

Increasing stressful circumstances

Loss of taste. With increasing age, replacement of taste cells slows down. It is estimated that people at age 70 have just about one-third the taste buds they had when they were age 30.

Reduced secretion of hydrochloric acid (one of the “digestive juices”) in the stomach. This affects iron absorption and iron deficiency anaemia, if present.

Nutritional Needs

Nutrition for the elderly must take into account the changes in the functioning of the body systems, and also mental, social, physical, cultural and economic changes associated with aging. Generally, the elderly need fewer calories because of decreased use of energy for basic body functions, as they may not be as active as when they were young. The elderly may need fewer, the same, or greater amounts of some nutrients depending on the circumstances which affect aging.

As far as possible, nutrition for the elderly should be the same as for young adults, that is, the same types of nutrients but in different quantities. There are aging changes which may affect their nutrition, and special considerations should be given to these when planning meals.

These considerations include:

1. The form in which the food is presented

Older people with poor teeth or false teeth and those who produce less saliva than when they were young, may have difficulty with very dry foods. Having moister and softer foods, or in some cases cutting the food into smaller pieces, can help solve the problem. However,
everything should not be soupy or mashed. Vary the texture of foods by grinding or grating some if necessary.

2. **How palatable and digestible the foods are**

Since some people no longer taste foods well, they may need highly seasoned foods. On the other hand, certain spicy foods may cause “heartburn” or “gastritis”. The degree of spicing will depend on the person’s likes and what he or she can tolerate.

Some elderly people may not digest well some foods, such as: milk and other dairy products, peas, beans and some raw vegetables and fruits. They should try to eat these foods in small amounts many times throughout a day or week, instead of having large portions all at once. This is particularly important for the very nutritious dairy products and for peas, beans and vegetables. Cooking the vegetables may make the elderly tolerate them better.

3. **How meals are served**

Serve food for the elderly attractively in order to ‘pep up’ their appetite. The elderly should eat three or more meals, including a good breakfast each day. They may prefer light meals or snacks and fewer main meals. Most older persons love bedtime snacks, commonly called “night caps”. Care must be taken that these do not cause indigestion if persons fall asleep right after eating.

4. **Physical condition and attention to specific nutrients**

a) If elderly people are overweight, they should try to correct this by eating less and doing regular exercises such as walking and swimming.

b) On the other hand, those who are underweight, would need more energy. If the appetite is poor, the addition of yeast or meat extract or wheat germ will help to provide the required amount of some B vitamins to help them use energy from foods better.

c) If a nutrition-related chronic disease such as diabetes or high blood pressure is present, modify the diet accordingly. If the
elderly are anaemic they should make sure to eat iron-rich foods and those foods such as fresh fruits and vegetables which help the body get the iron from the food. They should avoid having too much of items such as strong tea and coffee, which interfere with how much iron is absorbed.

d) It is important that the elderly get enough calcium and sunlight for healthy bones.

e) They may need extra fibre to prevent constipation, help reduce cholesterol and other lipids and reduce the chances of disorders of the colon and other parts of the digestive system. See page 28 for the fibre content of foods. They should also have lots of fluid mainly water, as the fibre content of their diet increases.

5. The eating environment

The surroundings should be pleasant and when possible the elderly should try to eat with others. The company helps to make meal time enjoyable and gratifying.

6. Many different foods

The elderly should have as many different foods as possible without making radical changes in the supply of their favourite foods. They should be able to live happily, economically and healthily with the changes suggested above.

7. Avoiding food fads

The elderly, like everyone else, should not be taken in by the promises of food faddists — those who have a certain craze about the benefits of particular foods. For example, bear in mind that so-called “organic” and “no chemical” foods have nothing of real extra value to offer — only fear and a higher price. And watch out for claims regarding bee pollen or “royal jelly”. There is no scientific evidence that they prolong life and delay aging.
It is well recognized that a good diet, exercise, recreation and sound sleep, contribute to the health of all persons. They are extremely important for the elderly. Keeping well adjusted, socially and physically, after retirement may require imagination and initiative on the part of the elderly. One good line of action is through sensible eating.

Depending on the appetite, an elderly woman may eat the following, or more in a day. These meals provide approximately 1700-1800 calories.

<table>
<thead>
<tr>
<th>Time</th>
<th>Meal Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>1 slice pawpaw, 1 scrambled egg, 2 slices buttered bread, 1 cup tea/coffee with milk</td>
</tr>
<tr>
<td>Mid-morning</td>
<td>1 cup plantain porridge made with milk</td>
</tr>
<tr>
<td>Noon</td>
<td>1 cup pea soup with meat, carrot, yam, eddoe/coco, 1 glass sweetened passion fruit juice</td>
</tr>
<tr>
<td>Mid-afternoon</td>
<td>1 slice cornmeal pudding, 1 glass limeade</td>
</tr>
<tr>
<td>Evening</td>
<td>1½ cups cook-up rice with fish, cabbage, tomato, margarine, 1 scoop ice cream, 1 cup tea with sugar</td>
</tr>
<tr>
<td>Bedtime</td>
<td>1 cup hot cocoa + a few crackers</td>
</tr>
</tbody>
</table>

The elderly male should have 3 slices of bread and larger amounts of porridge, soup and cook-up.
PART FOUR

ANNEXES
SELECTED RECIPES
(For the Health Conscious)

MAIN DISHES

CALLALOO/SPINACH AU GRATIN (6 servings)

4 cups (packed) callaloo/spinach leaves
¼ cup finely chopped onion
2 tablespoons cooking oil
1 cup Cheese Sauce

Topping
1 tablespoon grated cheese
1 tablespoon bread crumbs

Steam callaloo/spinach in ½ cup water in a covered saucepan for 10 minutes, turning from time to time. Sauté onion in the oil and add the drained, chopped callaloo. Place in a one-quart/litre casserole dish.

Make sauce using the following recipe and pour hot sauce over callaloo/spinach and top with grated cheese and bread crumbs. Bake at 180°C/350°F until brown on top. Serve hot.
CHEESE SAUCE (6 servings)

30g/1 oz margarine
¼ cup flour
1 cup milk
½ teaspoon prepared mustard
1/8 teaspoon pepper
½ cup grated Cheddar cheese


NB: This sauce may be used to coat any cooked food and goes well with vegetables and fish.

Source: Ministry of Agriculture, Jamaica

SWEET AND SOUR BEANS (6 servings)

450g/1 lb broad beans
1 cup water
1½ tablespoons cornstarch
2 tablespoons diced onion
½ small clove garlic, sliced
¼ teaspoon salt
¼ teaspoon pepper
2 tablespoons molasses
½ cup catsup
3/4 cup sugar
¼ cup vinegar

Soak beans overnight and cook in soaking water until tender. Mix cornstarch in 1 cup water and add seasonings, molasses, catsup, sugar and vinegar. Add to cooked beans, stirring carefully to avoid breaking beans. Cover and cook on top of stove or bake at 180°C/350°F for about 30 minutes. Serve with cornbread, dumplings, bread or rice and vegetables.

Source: Ministry of Agriculture, Jamaica
STIR-FRIED VEGETABLES (5-6 servings)

1 medium-sized, ripe sweet pepper, cut in thin strips
1 large chocho/christophene peeled and cut into match stick pieces
1 large carrot cut in thin circles
½ cup chopped onion
1 tablespoon cooking oil
1 clove garlic, minced
1 tablespoon soy sauce
1 tablespoon grated, fresh ginger
1 teaspoon cornstarch
½ cup water


PIGEON/GUNGO PEAS SURPRISE LOAF (4-6 servings)

4 cups cooked pigeon/gungo peas, crushed
4 tablespoons margarine
½ cup milk
2 tablespoons chopped escallion/chive and thyme
2 eggs (hard boiled)
2 teaspoons sugar
2 cups mashed yam or other ground provision
½ cup bread crumbs

Place crushed peas, seasoning, milk, 2 tablespoons margarine, and mashed ground provision in a mixing bowl and combine well. Pour half mixture in a greased 1.5 kg/3 lb loaf pan; place shelled hard-boiled eggs in this mixture; pour the other half of the mixture over the eggs. Sprinkle with bread crumbs and dot with margarine. Bake in a moderately hot (180°C/350°F) oven for 25-30 minutes. Slice and serve hot with rice, cornmeal or macaroni and a green or yellow vegetable.
CHEESY YAM (3-4 servings)

3 cups cooked, mashed yam
½ cup grated cheese
¼ medium-sized onion
4 tablespoons milk
2 tablespoons margarine
2-3 tablespoons bread crumbs
1 sprig parsley

Place yam in a bowl and add the next four ingredients and combine thoroughly. Put mixture into a 1-1½ litre (4-6 cup) baking dish. Sprinkle top with bread crumbs and dot with margarine. Bake at 180°C /350°F for 10-15 minutes until top is lightly browned. Garnish with parsley. Serve with a vegetable salad.

GROUND PROVISION FRITTERS (makes 6-8)

1 cup finely crushed, boiled ground provision
(banana, dasheen, potato, yam, breadfruit)
1 egg
3 tablespoons milk powder
1 tablespoon chopped escallion or onion
1 tablespoon chopped cooking tomato or sweet pepper
1 small piece hot pepper, finely chopped
or
dash ground black pepper
½ teaspoon salt
2 tablespoons water (if necessary)
oil for frying

Combine the first seven (7) ingredients mixing well. Add just enough water to get a batter that slides off the spoon easily. (The drier the batter, the better, as it absorbs less oil). Fry in hot fat until lightly browned.
CORNMEAL AND CHEESE CAKES (makes 12)

1 cup cornmeal
4 cups water
¼ teaspoon salt
½ - ⅔ cup grated cheese
fat for frying

Bring 3½ cups water to the boil. Moisten cornmeal with ½ cup cold water; add with salt to pot. Stir constantly until mixture thickens. Add the cheese and cool mixture. Shape into round cakes, about 6 cm/2½ inches across and 1 cm/½ inch thick. Pan-fry and drain.

GREEN PLANTAIN CAKE/CRISPS (2-3 servings)

1 green plantain
2 Tbsp cooking oil
sprinkling of salt

Peel plantain and save skin. Cut plantain diagonally in 1 cm/½ inch slices. Heat oil in heavy frying pan or pot (which has a cover). Put in plantain slices and brown lightly on both sides. Sprinkle with salt, cover, lower flame and let steam for 5-10 minutes. Remove 2-3 pieces at a time and press flat between the plantain skin or piece of wax paper. Return to pan and keep hot until ready to use.

SPICED BAKED PLANTAIN (2-4 servings)

1 large ripe plantain
1 tablespoon melted margarine
1 tablespoon sugar
⅛ teaspoon cinnamon or mixed spice
⅛ teaspoon ground ginger

Peel and cut plantain crosswise in four. Place in greased baking dish. Brush with margarine and sprinkle with sugar, ginger and cinnamon. Bake at 180°C/350°F for 15 minutes until lightly browned. Serve with fish, chicken or meat of choice and a vegetable salad.
SPICY BAKED/STEAMED FISH (5-6 servings)

1½ - 2 kg/3-4 lbs whole fish, cleaned
juice of 1 lime
½ teaspoon salt
2 tablespoons chopped escallion
1 clove garlic, chopped
1 onion, sliced
¼ teaspoon chopped hot pepper
¼ teaspoon ground pimento (allspice)
¼ teaspoon fresh ginger, grated
2 tablespoons margarine

Make gashes slantingly on both sides of fish. Sprinkle lime juice and salt into gashes and inner portion of fish. Blend seasonings to a fine mash (puree). Rub the seasoning mixture all over the fish enclosing most on the inside. Set aside for 1-2 hours to allow seasoning to seep in. Place fish in a greased oven-proof dish. Add a few dabs of margarine or butter and place in oven preheated at 180°C/350°F and bake for 30-40 minutes. Or place fish with margarine in Dutch pot. Add ½ cup broth or water; cover tightly and steam. Serve hot.

Variations:
Cut uncooked fish in serving size pieces. Season and let sit. Brown each piece lightly on all sides in margarine. Add remaining seasonings, cover and simmer on top of stove or bake as for whole fish.

Wrap the fish in aluminum foil or quailed banana/plantain leaves before baking/steaming, to keep in all the juice.
STIR-FRIED CHICKEN AND VEGETABLES (3-4 servings)

250-375g/½-3/4 lb chicken
2 teaspoons curry powder
¼ teaspoon hot pepper
¼ teaspoon salt
1 clove garlic
100g/¼ lb carrots
1 medium-sized onion
1 green sweet pepper
4-6 large callaloo/amaranth/baghi stalks (no leaves)
2 tablespoons cooking oil
¼ cup water

Cut chicken in thin strips; season with curry powder, hot pepper, salt and minced garlic and set aside. Prepare vegetables — wash, peel and cut carrots into thin round slices. Cut onion into wedges and separate the layers. Cut sweet pepper into one inch (2-3 cm) squares. Strip callaloo stalks and cut crosswise in neat pieces. Heat oil in a large frying pan, wok or Dutch pot (which has a cover). Add seasoned chicken; toss quickly and cook for 1-2 minutes until lightly browned. Add vegetables and water; cover; lower flame and steam until vegetables are crisp-tender. Serve hot over mashed green bananas (figs) or rice.
SALADS

FRESH FRUIT CUP (5-6 Servings)

1 cup orange sections
1 cup grapefruit sections
1 cup firm, ripe pawpaw cubes or balls
1 large, firm ripe banana, peeled, cut in thin circles or semi-circles
1 cup orange juice

Combine fruits, orange juice and any juices from the preparation of the other fruits. Toss lightly and add freshly grated nutmeg and a dash of bitters or wine. Chill or serve with cracked ice.

HONDURAN NO-WASTE CARROT TREAT (8-10 servings)

4-5 medium-sized carrots
3½ cups water
4 cups orange juice
2-4 tablespoons sugar (optional)

Wash, scrape and cut carrots finely. Place with water in a blender and puree or grind very finely. Combine blended carrots with orange juice and sugar (if needed). Chill and serve with a spoon to eat the carrot pulp.

ORANGE AND PEANUT SALAD (5-6 servings)

2 large oranges (preferably seedless)
1 head lettuce or 2 cups shredded cabbage
½ cup mashed peanuts
1 teaspoon chopped mint leaves
½ cup home-made dressing

Wash, peel, section and remove membrane from oranges. Wash, drain and tear lettuce into tiny bits or finely shred cabbage. Combine with the rest of ingredients in a bowl; toss with citrus dressing until well blended. Serve immediately.
THREE BEAN/VEGGIE SALAD WITH OIL and VINEGAR DRESSING
(5-6 servings)

1 cup cooked green pigeon (gungo) peas
1 cup cooked string beans broken into small pieces*
1 cup cooked red peas/kidney beans
250g/½ lb cucumber, streaked with fork & cut in thin slices
125g/¼ lb tomato, cut into wedges
½ cup dressing (equal parts oil and vinegar with crushed garlic or garlic powder)
½ teaspoon salt
¼ teaspoon ground pepper

Mix peas/beans together and place in the middle of the salad bowl or deep dish. Arrange cucumber slices and tomato wedges around beans. Sprinkle with salt and pepper and pour dressing mostly on beans. Let sit for a while. Toss beans together lightly again just before serving.

VEGGIE/FRUIT PLATTER (5-6 servings)

Cover large serving platter with layer of lettuce leaves. Arrange in a decorative pattern any or all of the following:

1 cup fresh peas or beans cooked and cooled
125g/¼ lb carrots, cooked, cooled and cut in sticks
250g/½ lb cucumber, streaked with a fork and sliced
250g/½ lb chocho (christophene) diced and cooked
1 medium-sized avocado pear, cut in rings
3 seedless, large (navel) oranges, sectioned into pegs
125g/¼ lb tomatoes cut in wedges
1 cup shredded coconut or toasted coconut strips

Drizzle with oil and vinegar dressing or serve dressing on the side. Chill before serving.

*Beans should be a lively, green colour. To achieve this colour, cook beans in boiling water until crisp-tender (about 8-10 minutes), drain and cool immediately.
BEAN AND TOMATO SALAD (4 servings)

1 cup cooked green broad beans
1 cup chopped tomato
1 tablespoon finely chopped onion
2 tablespoons finely chopped parsley or
1 teaspoon basil or mint

Combine ingredients. Add 4 tablespoons tomato and garlic dressing and toss lightly.

YAM SALAD (3-4 servings)

4 cups diced, cooked yellow yam
1 hard-boiled egg, chopped
½ medium-sized onion; finely chopped
¼ medium-sized sweet pepper; chopped
3 tablespoons mayonnaise
1 tablespoon chopped parsley
½ teaspoon prepared mustard
1 stalk celery, chopped
paprika

Place freshly cooked, diced yam in a bowl and add remaining ingredients, except paprika. Mix thoroughly. Place in a serving dish and sprinkle with paprika. Serve hot or cold with roasted meat, poultry or fish and vegetables.

Variations:

Add ½ cup chopped peanuts or 1 cup cooked carrots/peas/corn.

Substitute ½ cup cream or evaporated milk and 3 tablespoons vinegar for mayonnaise and chopped parboiled callaloo stalks for celery.
SALAD DRESSINGS AND SAUCES

CITRUS DRESSING (5-6 servings)

4 tablespoons orange juice
2 tablespoons lime juice or vinegar
1 ½ tablespoons sugar
2 teaspoons grated orange rind
2 teaspoons vegetable oil
½ teaspoon mustard

Combine ingredients in a clean jar. Cover and shake well until creamy. Toss Orange and Peanut Salad with the dressing.

ORANGE AND GINGER DRESSING (3 servings)

½ cup orange juice
1 tablespoon vinegar
1 tablespoon salad oil
2 teaspoons grated ginger
1 teaspoon honey

Mix all ingredients together until well combined.

TOMATO AND GARLIC DRESSING (4 servings)

½ cup chopped tomato
1 clove crushed garlic or ¼ teaspoon garlic powder
1 tablespoon salad oil
2 tablespoons vinegar

Blend or process all ingredients until smooth. Use with Bean and Tomato Salad.
VEGGIE FRUIT DRESSING (makes 1 cup)

½ cup freshly squeezed lime juice
1 teaspoon paprika
½ cup oil
¼ teaspoon dry mustard
1 tablespoon sugar
½ teaspoon pepper
1 teaspoon finely chopped onion or escallion

Shake ingredients in a tightly covered jar. Chill and shake well before using on fresh fruit and vegetables.

ORANGE SAUCE (makes 1 cup)

½ cup granulated sugar
2 tablespoons wheat flour
½ cup boiling water
2 tablespoons firm butter or margarine
½ cup orange juice

Combine sugar and flour in a saucepan. Stir in boiling water, place pan over moderate heat and cook, stirring until the mixture thickens (2-3 minutes after boiling starts). Remove from heat; beat in margarine until it melts, then stir in orange juice. Serve lukewarm, over potato pudding.
QUICK BREADS AND CAKES

CARROT CAKE (6 servings)

- 1 cup shredded, uncooked carrot
- 1/2 cup brown sugar
- 1 egg, beaten
- 1/2 cup vegetable oil
- 1/2 teaspoon vanilla
- 1 cup flour
- 1/4 teaspoon nutmeg
- 1/4 teaspoon mixed spice
- 1/2 teaspoon baking powder
- 1/4 teaspoon baking soda
- 1/4 teaspoon salt
- 1/2 teaspoon cinnamon

Mix together shredded carrot and sugar; add beaten egg, oil and vanilla; mixing well after each addition. Sift together, three times: flour, spices, baking powder, soda and salt. Gradually add the dry ingredients to the wet mixture. Pour into a 20x20 cm (8"x8") greased pan. Bake for 40 minutes at 180°C/350°F.

Source: Ministry of Agriculture, Jamaica

BANANA BREAD (6-8 servings)

- 2-3 large, firm ripe bananas
- 1 teaspoon lime juice
- 1/2 cup sugar
- 2 cups wheat flour
- 1/4 cup cooking oil
- 2 teaspoons baking powder
- 1/4 teaspoon baking soda
- 2 teaspoons vanilla
- 1/2 cup chopped nuts/dried fruit (optional)
- 1 egg (optional)
- 1/4 cup milk

Heat oven 150°C (300°F). Wash, peel and mash bananas adding 1 teaspoon lime juice (to prevent darkening). Combine bananas with all other ingredients mixing well. Pour into greased 1 kg (2-lb) loaf pan and bake until done (about 50 minutes).

Note: Let sit a day before using or slice or leave whole, wrap and freeze for later use.
PEASY CAKE (12 servings)

1 cup butter or margarine
1 cup sugar
1 ½ cups sifted flour
2 teaspoons baking powder
2 eggs, beaten
1 cup cooked, finely mashed red peas/kidney beans
¼ cup milk or water

Cream butter or margarine and sugar until light and fluffy. Sift together flour and baking powder. Add beaten eggs to creamed mixture and blend well. Add peas, beating until all peas have been mixed in. Fold in dry ingredients, adding water or milk, alternately with the dry mixture, until all the dry ingredients are folded in to produce a smooth, soft batter. Pour into a greased 22.5cm x 6cm (9” x 2½”) circular pan and bake at 180°C/350°F for 1 hour.

Source: Ministry of Agriculture, Jamaica

GINGER PEAS BUN (25 x 100g servings)

2 cups cooked red peas/kidney bean puree
3 ½ cups flour
4 teaspoons baking powder
½ teaspoon bicarbonate of soda
2 cups brown sugar
2 eggs, lightly beaten
1 ½ cups milk
½ cup melted margarine/butter
4 teaspoons grated fresh ginger
1 cup candied mixed fruit and peel
½ cup raisins or finely diced, dried ripe banana
2 teaspoons cinnamon
2 teaspoons mixed spice
½ cup brown sugar and 3 tablespoons water heated together for glaze

Sift flour, baking powder and soda together in a bowl. Add sugar, milk and lightly beaten eggs. Add peas puree to flour mixture and blend. Add fruits, ginger and other spices and mix well. Pour into greased 3 kg loaf pan and bake at 180°C/350°F until done. Glaze with sugar syrup.

Source: Ministry of Agriculture, Jamaica
PUMPKIN ORANGE CAKE (12 servings)

1¼ cups granulated sugar  ½ cup orange juice
1 cup butter or margarine  2 teaspoons vanilla
4 eggs  ½ teaspoon orange rind
1¼ cups cooked, mashed pumpkin  3 teaspoons baking powder
2 cups flour

Cream butter and sugar until fluffy. Add eggs to mixture one at a time, beating well. Add cooked, mashed pumpkin to mixture. Sift together all dry ingredients. Add orange rind. Fold in dry ingredients alternately with orange juice. Add vanilla. Pour into a greased 22.5cm x 6cm (9"x2½") baking pan and bake at 180°C/350°F for 30 minutes or until done.

SWEET POTATO PUDDING WITH ORANGE SAUCE (6-8 servings)

750g/½ lb sweet potato  2 teaspoons freshly grated nutmeg
750g/½ lbs dasheen  ½ teaspoon grated orange rind
1 medium-sized dry coconut  ½ teaspoon ground black pepper
2 cups warm water  2 teaspoons vanilla
1 cup brown sugar  2 tablespoons melted margarine or butter
1 teaspoon salt

Peel, wash and grate sweet potato and dasheen and set aside. Grate coconut; add warm water and extract “milk”. In a large bowl, combine sweet potato/dasheen mixture, coconut “milk”, and all other ingredients, mixing them until well blended. Pour into greased baking pans* and bake in oven pre-heated at 180°C/350°F for 1-1½ hours or until done. Cool in pan. Serve with Orange Sauce (Page 233).

Variation: Substitute yam or eddoe (coco) for dasheen. Add ½ cup chopped, dried fruits and/or grated coconut.

*Pans may be 1 kg (2x2 lb) tube or loaf-type or one 2 kg (4 lb) capacity. When a tube pan (which has a hole in the middle) is used, the pudding is done in a shorter time, as heat penetrates the mixture from the middle as well.
PEAS BREAD (makes 8 servings)

½ cup margarine or butter
¼ cup sugar
1 egg
2 cups flour
1 cup cooked red peas/kidney beans puree
3 teaspoons baking powder
1 teaspoon vanilla
½ cup water in which the peas were boiled
3 teaspoons grated ginger
½ teaspoon nutmeg

Cream margarine and sugar. Add well beaten egg and peas puree, mix well. Sift flour and baking powder; add alternately with the liquid to the peas mixture. Add vanilla, grated ginger and nutmeg, mix well and pour into greased baking pan. Bake in a moderate oven 180°C/350°F for 30 minutes or until done.

Source: Ministry of Agriculture, Jamaica

TRY MAKING YOUR OWN YOGHURT

You will need a “starter”, so buy a small container of plain yoghurt (no sugar or fruits added).

Milk is your basic ingredient, so decide which type you would like to use. If you use skimmed milk powder, add an extra amount for a creamier yoghurt. For example, if you wish to make 1 litre/a quart of skimmed milk yoghurt, use 120-150g/4.5 ounces of powder; 90g/3 ounces would be the normal amount to make a litre/quart of milk and the 30-60g/1-2 ounces would be the extra. You use 80 gram/1½-2 sachets of skimmed milk powder to 4 cups or 1 litre/quart of water.

Gently heat the four cups of milk until it just begins to boil.

Remove milk from heat and cool to lukewarm (test a few drops on the wrist). The milk should not feel hot.
Stir starter thoroughly. Put 4 tablespoons in the quart/litre of lukewarm milk and stir gently. Pour the mixture in a clean, dry yoghurt maker or containers for the maker, depending on the type you have. Cover the container or containers and plug in the maker, setting the timer to remind you how long you wish it to ferment. If you do not have a yoghurt maker, pour the lukewarm milk with starter in a glass (pyrex) dish. Cover and place in either your oven or on top of the stove with the pilot light on. Leave overnight. The next morning the yoghurt will be done. Put the container in the refrigerator for about 3 hours before you use it.

If you wish to use evaporated milk, add 1 can of lukewarm water to 1 can milk and mix well. Stir in 3-4 tablespoons of the starter and proceed in keeping with the steps outlined above. If you wish to have a very firm yoghurt, add skimmed milk powder (about 4 tablespoons) to the evaporated milk mixture. Stir well to ensure that no lumps from the milk powder remain.

If the yoghurt you have made suits you, save a little to start a new batch or continue using the one you bought to start new batches.

If the yoghurt does not thicken, several things may have gone wrong:

The time you gave it to thicken or ferment may have been too short. Try again and increase the time by 1-2 hours.

The starter may be too old. You may have had it for about a week or more. Get a new starter.

You may have added the starter to the milk when it was too hot. The hot milk kills the bacteria which you need.

The utensils used may not be thoroughly clean or the starter was not mixed in well.

SOUR MILK

If you wish to make milk sour quickly for baking and other purposes, add one tablespoon of vinegar or lime juice to one cup of milk.
MAKING HOME-MADE ICE CREAM

General principles of making ice cream:

- Use milk with fat, sweeteners and flavourings.

- Add substances which tend to thicken the mixture, make it smooth and stabilize it. These include skimmed milk powder, fats, eggs, gelatin or vegetable gums and cooked starch (corn starch, custard powder).

- Select wholesome materials and/or heat the mixture to make it safe from harmful bacteria.

- Use clean utensils. If in doubt, sterilize them with boiling water before using.

- Freeze the mixture rapidly while whipping air into it. Without this air, ice cream would be a solid, icy mass.

Air can be whipped in by hand cranking, using the traditional crank freezer; using an electric motor to turn the freezer crank or beating the mixture in a bowl with a hand beater or in a food processor periodically while it is being frozen in the freezing compartment of the refrigerator.

DIRECTIONS FOR FREEZING ICE CREAM IN BUCKET

You will need about 2.25 kg/5 lbs or 4 litres/quarts of chipped ice and 2 cups of coarse salt or 1 cup/250 ml of fine salt for freezing ice cream in a 2-litre/quart ice cream bucket. You will need the same amounts of ice and salt if you leave the ice cream in the bucket to ripen or harden.

Pour boiling water over washed cream can and over the dasher or beater; drain and set aside to cool. Chill the mixture thoroughly before pouring into the can for freezing. Fit the dasher and can into place before pouring in the chilled ice cream mixture. Pour in mixture to about ⅓ the can, then fit lid and crank into place.

Pack layers of ice, then layers of salt around the can with a wooden spoon. Turn crank several times while packing, so ice doesn’t pack enough
to keep freezer can from turning easily. Continue adding ice and salt until ice chamber over top of cream can is filled. Turn the crank slowly (about 40 times per minute) for the first 3 minutes, then rapidly until it is very difficult to turn. (The turning must be continuous so that the mixture will be frozen evenly and the crystals will be very fine).

When the cream is frozen, clear away the salt and ice to about 2.5 cm (1 inch) below the lid of the cream can. Wipe the lid carefully to remove all ice and salt; take off the lid. Take out the beater and scrape clean. Transfer the cream to containers and place in the refrigerator freezer or leave it in the cream can to "ripen" for a few hours before serving. When it is to be put in the refrigerator, pack gently into containers. Cover with grease-proof or waxed paper and quickly put in the freezing compartment.

If it is left in the bucket, push the ice cream gently down into the can; replace the lid and cork the hole in the lid to prevent brine from seeping in. Drain the water from the ice chamber. Repack with ice and salt to come over the top of the can. Fill the space left in the bucket with old newspaper, cloth or jute (crocus) bag to keep out air and leave in a cool place for 2-3 hours.

SOUR SOP ICE CREAM (4 quarts/litres)

4 cups thick soursop puree
2 cups cow's milk
½ cup cornstarch or custard powder
2½ cups sugar
1 can evaporated milk
1 teaspoon grated nutmeg
2 teaspoons vanilla

Scald cow's milk (preferably in the top of a double boiler). Blend cornstarch and sugar, moisten with a little cold water and stir in hot milk slowly. Cook and stir until thick, smooth and cornstarch is well cooked. Cool. Stir in evaporated milk, soursop puree and spices. Pour mixture into freezer can or other and freeze according to directions.

<table>
<thead>
<tr>
<th>FOOD GROUPS</th>
<th>FOODS</th>
<th>SERVING PORTION</th>
<th>ENERGY (kcal)</th>
<th>PROTEIN (g)</th>
<th>FAT (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAPLES</td>
<td>Cooked rice, rice &amp; peas</td>
<td>1 cup</td>
<td>180-200</td>
<td>4-6</td>
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</tr>
<tr>
<td></td>
<td>Bread (pre-sliced)</td>
<td>2 slices (50g)</td>
<td>140-150</td>
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<td>4</td>
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<tr>
<td></td>
<td>Porridge with milk (no sugar added)</td>
<td>1 cup</td>
<td>180-200</td>
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<td>Cooked mashed yam or other ground provision</td>
<td>1 cup</td>
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<td>Bammy (cassava bread)</td>
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<td></td>
<td>Soda crackers</td>
<td>6-8 small</td>
<td>140-150</td>
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<td>Pancake</td>
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<td>Sweet roll/coffee cake</td>
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<td>French toast</td>
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<td>AND NUTS</td>
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<tr>
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<td>Cashew nuts</td>
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<td>Okra/ochro, cabbage, pak choi, lettuce, spinach, watercress, chocho (christophene), cucumber, eggplant, tomato</td>
<td>¼ lb/1 cup raw</td>
<td>15-25</td>
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<td>FRUITS</td>
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<td></td>
<td>Grapefruit</td>
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<td></td>
<td>Naseberry (Sapodilla)</td>
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<td>Sweet sop (sugar apple)</td>
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<td>Juices (unsweetened)</td>
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<td>Pineapple</td>
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<td>(2-3 slices)</td>
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<td>Nectars</td>
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<td>Otahiti apple (plumrose)</td>
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<td>PROTEIN (g)</td>
<td>FAT (g)</td>
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<td>FOOD FROM ANIMALS</td>
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<td>Frankfurter</td>
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<tr>
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<td>Milk (powder/skimmed)</td>
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<td>120g/4 oz</td>
<td>120-160</td>
<td>22-28</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Fish (salted/dried)</td>
<td>30g/1 oz</td>
<td>105</td>
<td>23</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Shrimp/lobster</td>
<td>120g/4 oz</td>
<td>100-110</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>FATS &amp; OILS</td>
<td>Bacon</td>
<td>1 strip (rasher)</td>
<td>60-70</td>
<td>&lt;1</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Butter, margarine, cooking oil, shortening, mayonnaise</td>
<td>1 tsp</td>
<td>36-45</td>
<td>0</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>Cream cheese</td>
<td>2 tsp</td>
<td>36-45</td>
<td>1</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>Gravy</td>
<td>1 Tbsp</td>
<td>36-45</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Avocado pear</td>
<td>1 slice (1/6 med-size)</td>
<td>50</td>
<td>0.5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Jamaican ackees</td>
<td>60g/2 oz (6-8 pieces yellow arilis)</td>
<td>100</td>
<td>2.5</td>
<td>10</td>
</tr>
<tr>
<td>MISC. FOODS/ CONDIMENTS/ BEVERAGES</td>
<td>Milk chocolate</td>
<td>Small bar (1½-2 oz)</td>
<td>260-300</td>
<td>4.5</td>
<td>16-20</td>
</tr>
<tr>
<td></td>
<td>Plain cake</td>
<td>1½-2 oz slice</td>
<td>165-215</td>
<td>2-3</td>
<td>6-8</td>
</tr>
<tr>
<td></td>
<td>Jamaican Patty (meat pie)</td>
<td>1 standard size</td>
<td>300-400</td>
<td>7.9</td>
<td>15-20</td>
</tr>
<tr>
<td></td>
<td>Ice cream</td>
<td>1 scoop/½ cup</td>
<td>130</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Wine</td>
<td>120-150</td>
<td>100-140</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Rum, gin, brandy, etc.</td>
<td>1½ oz/45 ml</td>
<td>100-140</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Carbonated soft drink/beef/stout</td>
<td>12 oz bottle/can/360 ml</td>
<td>140-170</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td>Sugar</td>
<td>1 tsp</td>
<td>15-20</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Jelly/jam</td>
<td>1 tsp</td>
<td>14-15</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Ketchup</td>
<td>1 Tbsp</td>
<td>16</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
USEFUL HOUSEHOLD MEASUREMENTS, EQUIVALENTS AND OTHER HINTS

A. Some Common Household Measurements and Equivalents

3 teaspoons = 1 tablespoon
4 tablespoons = ¼ cup
8 tablespoons = ½ cup
16 tablespoons = 1 cup
1 cup = ¼ pint
2 cups = 1 pint
1 pint liquid/or peas and beans = 1 pound
2 pints = 1 quart
4 quarts = 1 gallon
1 fluid ounce = 2 tablespoons
8 fluid ounces = 1 cup
16 ounces = 1 pound
1 pound butter, margarine, rice, granulated sugar = 2 cups
1 pound brown sugar = 2½ cups
1 pound confectioner's/icing sugar = 4 cups
1 pound flour = 3½ cups
¼ pound cheese = 1 cup grated
¼ pound peeled “ground provisions” e.g., yam = ½ - 2/3 cup cooked, mashed
¼ pound peeled green bananas (figs) = 2 medium-sized or 1 large
2 ounces sweetened condensed milk/1 ounce brown sugar = 3 tablespoons
1 ounce skimmed milk powder = 2 tablespoons
1 ounce flour/cornmeal = ¼ cup
1 small egg (without shell) = 1½-2 ounces (50 grams)
1 large egg (without shell) = 3 ounces (70-80 grams)

Note:
• Weight is more reliable, but volume is more practical.
• 2 ounces cereal such as cornmeal thickens 1 pint (2 cups) of fluid for a porridge of the right, thick consistency
B. Some Units of Metric Measurement

Weight/Mass

1000 kilograms = 1 metric ton (tonne)
1000 grams = 1 kilogram
1 kilogram (shortened kg) = a little more than 2 pounds (2.2 or 2\(\frac{1}{5}\) lbs)
500 grams (shortened g) = a little more than 1 pound (1.1 or 1\(\frac{1}{10}\) lbs)
454 grams = 1 pound
250 grams = a little more than \(\frac{1}{2}\) pound (9 oz)
100 grams = a little more than \(\frac{3}{4}\) pound (3\(\frac{3}{8}\) oz)
28.4 grams = 1 ounce
1 gram = 0.035 ounce
1 milligram (shortened mg) = one-thousandth of 1 gram (\(\frac{1}{1000}\) g)
1 microgram (shortened µg) = one-millionth of 1 gram (\(\frac{1}{1,000,000}\) g)

Capacity/Volume

1 litre (shortened l or L) = a little more than 1 US quart/32 ozs (35 ozs)
1 litre = a little less than 1 Imperial quart/40 ozs
1000 millilitres (shortened ml) = 1 litre
500 millilitres = 2 measuring cups
250 " = 1 measuring cup
125" = \(\frac{1}{2}\) "
60 " = \(\frac{3}{4}\) "
15 " = 1 tablespoon
5 " = 1 teaspoon

Length/Distance

1.6 kilometres (shortened km) = 1 mile
1 kilometre = 0.6 mile
1000 metres (shortened m) = 1 kilometre
1 metre = a little more than a yard (1.09 yards or 39 inches)
30.5 centimetres (shortened cm) = 1 foot
2.5 " = 1 inch
25.4 millimetres (shortened mm) = 1 inch
When You Know

ounces
pounds
teaspoons
tablespoons
fluid ounces
cups
inches
feet
yards
miles
degrees fahrenheit (°F)

Multiply By

28
0.45
5
15
30
0.24
2.5
30
0.9
1.6

To Find

grams
kilograms
millilitres
millilitres
millilitres
litres
centimetres
centimetres
metres
kilometres

\[
\frac{5}{9} \text{ (after subtracting 32)} \quad \text{degrees Celsius (°C)}
\]

C. Oven Temperatures

(120°C - 140°C) 250°F - 275°F  very slow oven
(150°C - 160°C) 300°F - 325°F  slow oven
(180°C - 190°C) 350°F - 375°F  moderate oven
(200°C - 220°C) 400°F - 425°F  hot oven
(230°C - 240°C) 450°F - 475°F  very hot oven
(260°C - 270°C) 500°F - 525°F  extremely hot oven

D. Substitution of Ingredients

<table>
<thead>
<tr>
<th>Items</th>
<th>Substitutes</th>
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</thead>
<tbody>
<tr>
<td>1 Tbsp flour (used as thickener)</td>
<td>½ Tbsp cornstarch, cassava starch, arrowroot starch</td>
</tr>
<tr>
<td>1 medium clove garlic</td>
<td>¼ tsp garlic powder or ¾ tsp garlic salt</td>
</tr>
<tr>
<td>1 tsp lime/lemon juice</td>
<td>½ tsp vinegar</td>
</tr>
<tr>
<td>1 tsp lime/lemon/orange peel</td>
<td>½ tsp extract</td>
</tr>
<tr>
<td>1 small onion</td>
<td>1 tsp onion powder or minced dry onion</td>
</tr>
<tr>
<td>1 cup butter</td>
<td>¾ cup cooking oil</td>
</tr>
<tr>
<td>Items</td>
<td>Substitutes</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1 tsp baking powder</td>
<td>¼ tsp baking soda + ½ tsp cream of tartar</td>
</tr>
<tr>
<td>or</td>
<td>¼ tsp baking soda + ½ cup soured milk</td>
</tr>
<tr>
<td>or</td>
<td>¼ tsp baking soda + ½ Tbsp vinegar</td>
</tr>
<tr>
<td>or</td>
<td>¼ tsp baking + ½ cup molasses or yoghurt</td>
</tr>
<tr>
<td>1 Tbsp active dry yeast</td>
<td>1 package active dry yeast or 1 compressed yeast cake</td>
</tr>
<tr>
<td>1 oz unsweetened chocolate</td>
<td>3 Tbsp cocoa + 1 Tbsp fat</td>
</tr>
<tr>
<td>2 tsps minced fresh herbs</td>
<td>¼ tsp dried product</td>
</tr>
<tr>
<td>1 cup milk</td>
<td>3 Tbsp regular skimmed milk powder or ½ cup instant nonfat dry milk + 1 cup (250 ml) water</td>
</tr>
<tr>
<td>1 cup whole (regular) milk</td>
<td>1 cup reconstituted skimmed milk (from powder) + 2½ tsp butter or margarine</td>
</tr>
<tr>
<td>or</td>
<td>½ cup evaporated milk + ½ cup water</td>
</tr>
<tr>
<td>1 cup sifted cake flour</td>
<td>⅛ cup sifted all-purpose flour</td>
</tr>
<tr>
<td>or</td>
<td>¼ cup sifted counter flour</td>
</tr>
<tr>
<td>1 cup honey</td>
<td>1¼ cups sugar + ¼ cup liquid</td>
</tr>
</tbody>
</table>
ANNEX D

ENERGY OUTPUT (EXERCISE) AND
ENERGY INPUT (DIET) GO HAND IN HAND

A: HEALTH BENEFITS OF REGULAR EXERCISE

Regular physical exercise helps us to gain the following health benefits:

- reduced risk of cardiovascular (heart and blood vessels) diseases
- reduced blood pressure
- reduced fat and cholesterol in the blood
- reduced body fat — weight control
- released tension and ability to cope with stress
- strong bones into old age
- more enjoyable and perhaps longer life
- improved skin and muscle tone
- improved sleeping habits
- physical and mental energy and confidence
- improved appearance

B: POINTERS ON EXERCISE AND WEIGHT CONTROL

1. An exercise programme is something that should be followed for a lifetime. So the exercises must be enjoyable and fit into the person's particular lifestyle.

2. Exercise can sometimes be harmful, depending on a person's state of health. So it is best for adults to see a doctor before starting an exercise programme.

3. An individual should not expect to lose weight in the early days of the exercise/diet programme. It will be at least 2 months on an exercise/diet programme before he or she can begin to observe appreciable loss of
weight. In fact, the person is losing body fat during this time but the weight will not show the change because at the same time he or she is gaining weight by improving muscle and increasing blood volume.

4. A person should not try to lose more than 1 kg (2 lbs) a week without the supervision of a qualified person.

5. Normally, the weight reading may go up and down about 2 kg (4½ lbs) in a day so, a person should weigh once a week at the same time of day.

6. Regular exercise does not increase appetite. The athlete who practises hard and for long hours, does need to eat more, however.

7. Different kinds of exercise produce different results. Those intended for muscle building and sports are different from those recommended for reducing weight.

* Exercises done on machines with vibrating belts or through a massage will not help much to lose weight. These are not effective in increasing endurance, or reducing weight in certain areas of the body (“spot reducing”) either.

* Sauna, steam or whirlpool baths are not effective in helping a person to reduce fat weight

* Fat cannot be lost from certain parts of the body alone, such as the abdomen! Fat lost during exercise is from all over the body.

* Special equipment and gadgets are not needed for reducing weight. They are expensive; but if a person can afford it and decides to go that route, they may be effective in helping him or her to lose weight.

* It is not necessary to join a club, spa or salon to do exercise for reducing weight, but one may join for training or if it makes him or her want to exercise or if it forces the person into a routine.
C: HOW TO EXERCISE PROPERLY

To exercise properly bear in mind the following:

1. **Type of Activity**
   Brisk walking, jogging, cycling, swimming and even energetic dancing burn a lot of calories, because the large muscles in the body work hard.

2. **How Often?**
   Exercise regularly — at least three to four times per week. Less than that does not help to control weight, as calories burnt during exercise are easily replenished on the days without exercise.

3. **How Vigorous or Intense?**
   The exercise should be moderate to vigorous to increase the depth and frequency of breathing. Never over exert yourself. To check the level of exertion it is necessary to take the pulse and know the resting as well as the maximal (fastest) heart rates. For maximum effectiveness your heart rate during exercise should be 60-75% of the difference between your resting and maximal heart rates.

4. **How Long Each time?**
   In the beginning it may be for only 10-15 minutes until you are adapted and can cope without becoming breathless. Then do for longer periods. You should exercise for at least 20-30 minutes each session. An obese person who starts light exercise such as slow walking can lose weight if he or she walks for longer and longer periods of time. Of course, a fat person uses up much more energy to perform the same task than someone of normal weight.

5. **Start an exercise programme slowly and build up to the level needed.**
   Start each exercise session with warm up stretches for about 5 minutes and end by cooling down with similar stretches for about 5 minutes. Warming up and cooling down are important parts of healthy exercise.

6. **Drink lots of water when you exercise.** Drinking too little water could lead to dehydration as water is lost in sweat and exhaled air.
In Part 1 when we talked about nutrient needs, we mentioned daily recommended amounts called Recommended Dietary Allowances (RDAs). RDAs are benchmarks or guides to the amounts of energy and nutrients which different groups of people may need to keep healthy. They are mainly based on the average requirements of groups of people according to their age, gender, body weight and levels of physical activity. How the body utilizes or uses some nutrients also helps to decide what is recommended.

The amounts of nutrients recommended are scaled up to varying degrees above the average to cover variations among individuals in the age and/or gender grouping. Remember that energy is derived from carbohydrate, fat and protein in the diet, but that protein performs other specific functions in the body. So in the summary table of the RDAs which is given on pages 251-252, energy and protein are listed. Remember too that energy needs are influenced by levels of physical activity. The more physically active a person is the more energy he or she needs. Also when growth and development are taking place more energy is required. Some people will therefore need more energy while others will need less. Some people's bodies utilize or use some nutrients such as minerals differently depending on the food source of the mineral and other nutrients which are present at the same time; so be careful when you apply the RDAs to your individual need. Don't panic if you do not meet the RDAs on a specific day. Over a period of time they balance out if you make a good effort to eat a healthy diet.

The RDAs are intended to meet the needs of ordinary life situations and each allowance is applicable only when the needs for energy and all nutrients are met. They do not cover additional needs that may result from stress, drug treatment, or from conditions such as severe infections, or absorption of nutrients in the body. They do not apply to persons recovering from malnutrition or suffering from any other nutrition-related condition.
<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Body Weight</th>
<th>Energy</th>
<th>Protein</th>
<th>Fat-Soluble Vitamins</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>kg</td>
<td>kcal</td>
<td>MJ</td>
<td>Vitamin A RE (µg)</td>
</tr>
<tr>
<td>0-3 mths</td>
<td>MF</td>
<td>4.5</td>
<td>520</td>
<td>2.18</td>
<td>9</td>
</tr>
<tr>
<td>4-6 mths</td>
<td>MF</td>
<td>7.0</td>
<td>700</td>
<td>2.90</td>
<td>13</td>
</tr>
<tr>
<td>7-9 mths</td>
<td>MF</td>
<td>8.5</td>
<td>810</td>
<td>3.40</td>
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</tr>
<tr>
<td>10-11 mths</td>
<td>MF</td>
<td>9.6</td>
<td>960</td>
<td>4.03</td>
<td>14</td>
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<tr>
<td>1-3 years</td>
<td>M</td>
<td>13.5</td>
<td>1390</td>
<td>5.81</td>
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</tr>
<tr>
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<td>F</td>
<td>12.9</td>
<td>1295</td>
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</tr>
<tr>
<td>4-6 years</td>
<td>M</td>
<td>19.7</td>
<td>1800</td>
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<td>F</td>
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<td>1625</td>
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<td>7-9 years</td>
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<td>26.7</td>
<td>2070</td>
<td>8.66</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>26.6</td>
<td>1825</td>
<td>7.64</td>
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<td>2065</td>
<td>8.66</td>
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<tr>
<td>15-18 years</td>
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<td>2720</td>
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<td>19-29 years</td>
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<td>30-60 years</td>
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<td>&gt; 60 years</td>
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<td>F</td>
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<td>Pregnancy</td>
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<td>Lactation</td>
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<td></td>
<td>+500</td>
</tr>
<tr>
<td></td>
<td>6+ mths</td>
<td></td>
<td></td>
<td></td>
<td>+8</td>
</tr>
</tbody>
</table>

*a*The allowances represent daily amounts of energy and nutrients sufficient for the maintenance of health in nearly all people in the Caribbean.

*b*BM*<sub>R</sub> x PAL (Physical Activity Level) for 10 year olds and above

*c*Adapted from WHO based on egg protein assuming complete digestibility, but adjustment may be necessary for diets based on high vegetable protein.

*d*RE = Retinol Equivalents. 1 µg RE = 1 µg retinol (3.3 IU) or 6 µg β carotene (10 IU)

*e*1 µg = 40 IU

*f*α-tocopherol equivalents; 1 mg d-α-tocopherol = 1 α-TE
OF NUTRIENTS FOR USE IN THE CARIBBEAN*, Revised 1993

<table>
<thead>
<tr>
<th>Minerals</th>
<th>Calcium</th>
<th>Magnesium</th>
<th>Iron</th>
<th>Sodium</th>
<th>Potassium</th>
<th>Zinc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mg</td>
<td>mg</td>
<td>mg</td>
<td>mg</td>
<td>mg</td>
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<tr>
<td>0.3</td>
<td>400</td>
<td>50</td>
<td>6</td>
<td>120</td>
<td>500</td>
<td>5</td>
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<tr>
<td>0.3</td>
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<td>50</td>
<td>6</td>
<td>120</td>
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<td>0.4</td>
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<tr>
<td>1.1</td>
<td>700</td>
<td>350</td>
<td>10</td>
<td>500</td>
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</tr>
<tr>
<td>0.9</td>
<td>700</td>
<td>250</td>
<td>15</td>
<td>500</td>
<td>2000</td>
<td>12</td>
</tr>
<tr>
<td>0.7</td>
<td>700</td>
<td>250</td>
<td>10</td>
<td>500</td>
<td>2000</td>
<td>12</td>
</tr>
<tr>
<td>+ 0.1</td>
<td>1000</td>
<td>+20</td>
<td>30</td>
<td>500</td>
<td>2000</td>
<td>15</td>
</tr>
<tr>
<td>+ 0.2</td>
<td>1000</td>
<td>+50</td>
<td>15</td>
<td>500</td>
<td>2000</td>
<td>19</td>
</tr>
<tr>
<td>+ 0.2</td>
<td>1000</td>
<td>+50</td>
<td>15</td>
<td>500</td>
<td>2000</td>
<td>16</td>
</tr>
</tbody>
</table>

*NE (niacin equivalent) = 1 mg Niacin or 60 mg tryptophan
*Expressed as free folate activity
*Based on 15% absorption for diets containing 14-20% of energy from food from animals
*INRC (USA) values. Sodium values are minimum requirements; total day's intake should not exceed 1600-2000 mg.
*Supplementation may be required.
RDAs may be used in a number of ways. They can be used to:

1. evaluate the adequacy of national food supplies;

2. estimate future food needs;

3. interpret food consumption data in relation to the nutritional status of population groups;

4. estimate and assess the adequacy of food supplies in health programmes, for school feeding, institutional feeding and other public assistance programmes;

5. plan normal diets used to treat certain health conditions for groups of individuals; and

6. provide a basis for nutrition education programmes and food regulation/nutrient labelling.
ANNEX F

SOME WORDS/TERMS USED AND THEIR MEANING

**Absorption**
The process by which nutrients from food pass into the blood stream after digestion

**Alcoholic**
Containing or pertaining to alcohol; a person addicted to alcohol

**Alcoholism**
A diseased state or condition caused by excessive consumption of alcohol, interfering with the person's health and social or economic functioning

**Amino Acid**
The "building blocks" of protein

**Amputated**
Cut off (e.g., limbs with spreading infections in some diabetics)

**Anaemia**
The name given to the condition which occurs when the blood cannot carry enough oxygen to all parts of the body. Persons who have anaemia usually feel weak and tired and may get infections often. Anaemia is caused by a lack of iron and certain vitamins in the diet as well as by blood loss.

**Angina**
Chest pain experienced when there is a partial blocking of the normal supply of oxygen to the heart muscle

**Anti-bodies**
Substances which help the body to guard against disease

**Anorexia nervosa**
An eating disorder; self-imposed starvation related to emotional problems

**Arteries**
Blood vessels through which the heart pumps blood containing oxygen and nutrients throughout the body

**Arteriosclerosis**
The name of the disease when an artery hardens; the passage through which blood flows, becomes narrow and the artery loses its elasticity

**Arthritis**
Inflammation of a joint or joints

**Ascorbic acid**
Scientific name for vitamin C

**Atherosclerosis**
A form of arteriosclerosis associated with fatty deposits in the arteries
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteria</td>
<td>Types of organisms not visible to the naked eye</td>
</tr>
<tr>
<td>Basal metabolic rate</td>
<td>Amount of energy (calories) used for basic body processes such as heart beat and breathing</td>
</tr>
<tr>
<td>Beriberi</td>
<td>Disease caused by a lack of vitamin B₁ (thiamine). Its symptoms are nerve changes</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>The force of blood against the walls of the blood vessels</td>
</tr>
<tr>
<td>Blood sugar</td>
<td>Glucose from digested food</td>
</tr>
<tr>
<td>Body mass index</td>
<td>Relationship of weight to height in metric measures</td>
</tr>
<tr>
<td></td>
<td>$= \frac{\text{weight (kg)}}{\text{height}^2 (\text{m}^2)}$</td>
</tr>
<tr>
<td>Calorie</td>
<td>The common name for the energy or heat value of foods. (The proper name is kilocalorie.)</td>
</tr>
<tr>
<td>Cancer</td>
<td>Abnormal cell growth and cell mass or tumour in any tissue of the body</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>Nutrient group which includes sugar and starches</td>
</tr>
<tr>
<td>Carcinogens</td>
<td>Cancer-producing agents</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>Fat-like, waxy substance found only in animal sources of food, e.g., eggs, meats, butter</td>
</tr>
<tr>
<td>Chronic diseases</td>
<td>Conditions such as diabetes and high blood pressure which take a long time to develop and often have no clear-cut origin, symptoms and cures</td>
</tr>
<tr>
<td>Cirrhosis</td>
<td>Disease of the liver due to excessive alcohol consumption</td>
</tr>
<tr>
<td>Colic</td>
<td>Severe abdominal pain due to indigestion of food</td>
</tr>
<tr>
<td>Complex carbohydrates</td>
<td>Starches and fibre in food; found in peas, beans, fruits, vegetables, cereals, roots and tubers</td>
</tr>
<tr>
<td>Coronary arteries</td>
<td>Blood vessels which supply the heart with oxygen and nutrients</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>Thickening of the coronary arteries resulting in the heart muscle not getting enough blood and ultimately heart attacks result</td>
</tr>
<tr>
<td>Dehydration</td>
<td>Loss of water and salts from the body, usually during diarrhoea</td>
</tr>
</tbody>
</table>
Diabetes

A disease in which there is excess sugar (glucose) in the blood. There is excess sugar because sugar from digested food cannot get into the body cells as it should. Sugar cannot get to the cells because there is either not enough insulin or the body cannot use the insulin present effectively.

Diastolic pressure

Blood pressure that exists in the arteries when the heart is relaxing between beats.

Dietitian

A person trained in the science or study of diets/nutrition and applies them in health and disease.

Digested

When food is broken down in the body into simple substances.

Energy

The ability or capacity to do work; the heat or calorie value of foods.

Enhancer

That which aids or intensifies, e.g., vitamin C intensifies iron absorption in the body and so is an enhancer of iron absorption.

Enzyme

Chemical substance which speeds up specific reactions as in the digestion of food.

Fibre

A group of chemical substances found in the cell walls of plants. They are very important in the diet, helping to maintain good health.

Folate

One of the B vitamins.

Food energy

Chemical energy contained in the form of chemical bonds linking the carbon, hydrogen and oxygen together. When the foods interact with oxygen, this energy is given off as heat. The energy (calories) contained in a given food is the sum of the calories in the three energy-containing nutrients (carbohydrate, protein and fat). If alcoholic beverages are also taken, the alcohol will also provide calories.

Food faddists

Those who have a certain craze about the benefits of particular foods.

Food groups

Sorting foods according to their approximate nutrient contribution. Six groups are recognized in the Caribbean: Staples, Legumes/Nuts, Vegetables, Fruits, Food from Animals, Fats and Oils.
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<tr>
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</tr>
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<tbody>
<tr>
<td>Gastro-intestinal</td>
<td>Another name for the digestive system</td>
</tr>
<tr>
<td>(GI) tract</td>
<td>Study of heredity (inherited traits) and variations in animals and plants</td>
</tr>
<tr>
<td>Genetics</td>
<td>Study of heredity (inherited traits) and variations in animals and plants</td>
</tr>
<tr>
<td>Gout</td>
<td>A disease which causes inflammation of the joints, especially of the big toe</td>
</tr>
<tr>
<td>Ground provisions</td>
<td>Starchy fruits, roots and tubers such as breadfruit, yam, potato, cassava</td>
</tr>
<tr>
<td>Haemoglobin</td>
<td>A substance in the blood containing iron which allows oxygen to be carried through the body</td>
</tr>
<tr>
<td>Heart attack</td>
<td>Sudden heart failure</td>
</tr>
<tr>
<td>Heartburn</td>
<td>A warm, burning sensation in the oesophagus (gullet) due to the reflux of fluid and food particles from the stomach</td>
</tr>
<tr>
<td>Hormone</td>
<td>A chemical messenger, for example insulin</td>
</tr>
<tr>
<td>Hypercalcaemia</td>
<td>Too much calcium in the blood</td>
</tr>
<tr>
<td>Hyperglycaemia</td>
<td>High blood sugar</td>
</tr>
<tr>
<td>Hyperkalaemia</td>
<td>Too much potassium in the blood</td>
</tr>
<tr>
<td>Hypertension</td>
<td>High blood pressure</td>
</tr>
<tr>
<td>Hypoglycaemia</td>
<td>Low blood sugar</td>
</tr>
<tr>
<td>Immune system</td>
<td>Foreign substance-destroying system in the body</td>
</tr>
<tr>
<td>Immunization</td>
<td>Protection against infectious diseases</td>
</tr>
<tr>
<td>Indigestion</td>
<td>Difficulty in digesting food; pain caused by this</td>
</tr>
<tr>
<td>Inhibitor</td>
<td>An agent that slows or interferes with a chemical action. (Tannic acid in tea and coffee inhibit iron absorption in the body.)</td>
</tr>
<tr>
<td>Insulin</td>
<td>A hormone produced by the pancreas which transports sugar from the blood and into the body cells</td>
</tr>
<tr>
<td>Ischaemic heart disease</td>
<td>When the heart is deprived of oxygen due to the hardening of the coronary arteries</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>Individual's way of life</td>
</tr>
</tbody>
</table>
**Lipids**
Collective name for fats and fat-like materials such as cholesterol

**Lipoproteins**
Compounds of fat, cholesterol and specific proteins. Fats and cholesterol travel in the blood in this way. Cholesterol is transported to certain target cells by two of these lipoproteins — the low density lipoproteins (LDL) and high density lipoproteins (HDL).

**Malnutrition**
Faulty nutrition due to not eating enough food or the right types and amounts of nutrients.

**Metabolism**
The process by which food is built up into living things or used to supply energy in living things

**Millimole/Litre (mmol/L)**
It is a unit of measurement of certain chemical or biochemical substances in the blood representing one-thousandth of the molecular weight of the substance in one litre of blood.

**Multimix principle**
Combining different foods from different food groups for good nutrition

**Myocardial infarction**
A type of heart attack caused by the blockage in a main artery which cuts off the blood supply to the heart

**Myocardium**
The strong muscle which makes up the heart

**Night cap**
Snack taken at bed time

**Nutrients**
Nourishing substances in foods, e.g., proteins, minerals, vitamins, carbohydrates, fats, water

**Nutrition**
The sum of the processes by which humans take in and use food substances

**Nutritionist**
Person who has received training at university level for specializing in nutrition

**Obesity**
A condition characterized by excessive body fat

**Oedema**
An abnormal accumulation of too much fluid in the body tissues

**Osteoporosis**
Softening of the bones

**Pellagra**
Disease caused by a lack of vitamin B3 (niacin). Its symptoms are disorders of the skin and the digestive and nervous systems.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plaques</strong></td>
<td>Mounds of fatty and other material lodged in the inner side of arterial walls; accumulation of materials on the teeth</td>
</tr>
<tr>
<td><strong>Proof (as in rum)</strong></td>
<td>Refers to the alcohol (ethanol) concentration, usually twice the amount stated</td>
</tr>
<tr>
<td><strong>Protein</strong></td>
<td>A type of nutrient in food which contains the element nitrogen</td>
</tr>
<tr>
<td><strong>Psychiatrist</strong></td>
<td>Physician (doctor) who studies and treats mental disease</td>
</tr>
<tr>
<td><strong>Psychologist</strong></td>
<td>One who studies the science of the human mind</td>
</tr>
<tr>
<td><strong>Rickets</strong></td>
<td>Disease caused by a lack of vitamin D. Bones fail to calcify (harden) normally and become weak that they bend when they have to support the body's weight.</td>
</tr>
<tr>
<td><strong>Saturated fat</strong></td>
<td>Hard, waxy fat found mostly in food from animal sources; coconut oil is also highly saturated</td>
</tr>
<tr>
<td><strong>Scurvy</strong></td>
<td>Disease caused by a lack of vitamin C (ascorbic acid). Its symptoms are weakness, anaemia, bleeding spongy gums and bleeding in the mucous membranes in the body.</td>
</tr>
<tr>
<td><strong>Sedentary</strong></td>
<td>Characterized by much sitting and little physical exercise</td>
</tr>
<tr>
<td><strong>Sphygmomanometer</strong></td>
<td>The instrument used to measure blood pressure</td>
</tr>
<tr>
<td><strong>Stroke</strong></td>
<td>Sudden inability to feel and move, because of blockage or bursting of an artery (blood vessel) in the brain</td>
</tr>
<tr>
<td><strong>Syrup</strong></td>
<td>Usually a mixture of sugar (sucrose) and water in different proportions. A heavy syrup contains an equal weight of sugar and water, e.g., 500 grams of each; a medium syrup contains half of much sugar as water, e.g., 500 grams sugar in one litre of water and a light syrup contains a fourth as much sugar as water, e.g., 250-300 grams sugar in one litre of water.</td>
</tr>
<tr>
<td><strong>Systems</strong></td>
<td>Sets of organs in the body with a common structure or function, e.g., the digestive system</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>Systolic pressure</td>
<td>Pressure produced in the artery each time blood is pushed forcibly from the heart into the large blood vessels</td>
</tr>
<tr>
<td>Tetany</td>
<td>Disease with continuous painful contraction of some or all voluntary muscles</td>
</tr>
<tr>
<td>Therapeutic</td>
<td>Pertaining to the art of healing; curative</td>
</tr>
<tr>
<td>Trait</td>
<td>Distinguishing feature</td>
</tr>
<tr>
<td>Tissue</td>
<td>Groups of the same kinds of cells working together to perform the same function</td>
</tr>
<tr>
<td>Vegan</td>
<td>A strict vegetarian who eats no food from animals</td>
</tr>
<tr>
<td>Vegetarian</td>
<td>a) A diet which does not contain meat but may contain other animal products such as milk and cheese</td>
</tr>
<tr>
<td></td>
<td>b) A person who eats only a vegetarian diet</td>
</tr>
<tr>
<td>Veins</td>
<td>Blood vessels which take blood from all parts of the body to the heart</td>
</tr>
<tr>
<td>Yoghurt</td>
<td>Semi-solid sourish food prepared from milk fermented by added bacteria</td>
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ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>BMI</td>
<td>Body Mass Index</td>
</tr>
<tr>
<td>BMR</td>
<td>Basal Metabolic Rate</td>
</tr>
<tr>
<td>CFNI</td>
<td>Caribbean Food and Nutrition Institute</td>
</tr>
<tr>
<td>dl</td>
<td>decilitre (100 millilitres)</td>
</tr>
<tr>
<td>EPM</td>
<td>Energy-protein Malnutrition</td>
</tr>
<tr>
<td>g</td>
<td>gram</td>
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<tr>
<td>Kcal</td>
<td>Kilocalorie</td>
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<tr>
<td>kg</td>
<td>kilogram</td>
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<tr>
<td>kJ</td>
<td>kilojoule</td>
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<tr>
<td>L or l</td>
<td>litre</td>
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<tr>
<td>lb</td>
<td>pound</td>
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<tr>
<td>mg</td>
<td>milligram</td>
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<td>ml</td>
<td>millilitre</td>
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<tr>
<td>mmol</td>
<td>millimole</td>
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<tr>
<td>oz</td>
<td>ounce</td>
</tr>
<tr>
<td>PAHO</td>
<td>Pan American Health Organization</td>
</tr>
<tr>
<td>PAL</td>
<td>Physical Activity Level</td>
</tr>
<tr>
<td>SMP</td>
<td>Skimmed milk powder</td>
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<tr>
<td>Tbsp</td>
<td>tablespoon</td>
</tr>
<tr>
<td>tsp</td>
<td>teaspoon</td>
</tr>
<tr>
<td>µg</td>
<td>microgram</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<td>- Nutrition in</td>
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<td>Angina</td>
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<td>Artery</td>
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<td>At-risk groups</td>
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<td>Bacteria</td>
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<td>Basal Metabolic Rate</td>
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<td>Bee pollen</td>
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<td>Beri-beri</td>
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<td>Blood Sugar</td>
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<tr>
<td>Body Mass Index (BMI)</td>
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<td>Breastfeeding</td>
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<td>Breast milk</td>
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    prevention

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ABOUT THE AUTHORS

_Nutrition Made Simple_ is a clear, easy-to-read summary of the science and art of nutrition, written specifically for Caribbean people by two of our leading experts in the field Versada (Sadie) Campbell and Dinesh Sinha. It is produced and published by the Caribbean Food and Nutrition Institute (CFNI), a specialised centre of the Pan American Health Organization and the World Health Organization (PAHO/WHO).

The authors, Versada (Sadie) Campbell and Dinesh Sinha are two of the most experienced and qualified nutrition resource professionals in the Caribbean region. Versada Campbell served as the Nutrition Educator at CFNI from 1982 to 1993 when she retired from the position. Prior to that she was the Principal Scientific Officer in Food Sciences and Nutrition at the Scientific Research Council (SRC) in Jamaica where she worked for 20 years. She also has authored or co-authored several well received publications. These include, *Street Foods of Jamaica, Caribbean Foodways, Food Budgeting for Caribbean Families, Nutrition Education for College Tutors,* and *Nutrition Education for Primary School Teachers.*

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Mrs. Campbell and Dr. Sinha have co-authored a nutrition/health resource package for primary schools and the first three grades in secondary schools, titled *Graded Student Workbooks and Teachers’ Guide.* Together they have designed and developed Project Lifestyle, which is an attempt to develop healthy lifestyles in school children sequentially from first to eleventh grade. The project includes development of knowledge and skills about healthy eating, doing exercise and keeping body weight under control. For _Nutrition Made Simple_ they have teamed up to produce the most complete Caribbean resource book on the subject.