Food & Nutrition: Food: Definition, Function, Classification with examples; Name of basic nutrients requirement of human body;

Six Basic Nutrients Required for Good Health

1. Carbohydrates

Carbohydrates can be grouped into two categories: simple and complex. Simple carbohydrates are sugars whereas complex carbohydrates consist of starch and dietary fibre. Carbohydrate provides about 4 kcal (kcal = kilocalories = Calories) per gram (except for fibre) and is the energy that is used first to fuel muscles and the brain. Soluble fibre (fruits, legumes, nuts, seeds, brown rice, and oat, barley and rice brans) lowers blood cholesterol and helps to control blood sugar levels while providing very little energy. Insoluble fibre (wheat and corn bran, whole-grain breads and cereals, vegetables, fruit skins, nuts) doesn't provide any calories. It helps to alleviate digestive disorders like constipation or diverticulitis and may help prevent colon cancer. Most calories (55-60%) should come from carbohydrates. Sources of carbohydrates include grain products such as breads, cereals, pasta, and rice as well as fruits and vegetables.

2. Protein

Protein from food is broken down into amino acids by the digestive system. These amino acids are then used for building and repairing muscles, red blood cells, hair and other tissues, and for making hormones. Adequate protein intake is also important for a healthy immune system. Because protein is a source of calories (4 kcal per gram), it will be used for energy if not enough carbohydrate is available due to skipped meals, heavy exercise, etc. Main sources of protein are animal products like meat, fish, poultry, milk, cheese and eggs and vegetable sources like legumes (beans, lentils, dried peas, nuts) and seeds.

3. Fat

The fat in food includes a mixture of saturated and unsaturated fat. Animal-based foods such as meats and milk products are higher in saturated fat whereas most vegetable oils are higher in unsaturated fat. Compared to carbohydrate and protein, each gram of fat provides more than twice the amount of calories (9 kcal per gram). Nevertheless, dietary fat does play an important role in a healthy diet. Fat maintains skin and hair, cushions vital organs, provides insulation, and is necessary for the production and absorption of certain vitamins and hormones. Nutrition guidelines state that Canadians should include no more than 30% of energy (calories) as fat and no more than 10% of energy as saturated fat.

4. Vitamins

Vitamins help to regulate chemical reactions in the body. There are 13 vitamins, including vitamins A, B complex, C, D, E, and K. Because most vitamins cannot be made in the body, we must obtain them through the diet. Many people say that they feel more energetic after consuming vitamins, but vitamins are not a source of energy (calories). Vitamins are best consumed through a varied diet rather than as a supplement because there is little chance of taking too high a dose.

5. Minerals

Minerals are components of foods that are involved in many body functions. For example, calcium and magnesium are important for bone structure, and iron is needed for our red blood cells to transport oxygen. Like vitamins, minerals are not a source of energy and are best obtained through a varied diet rather than supplements.

6. Water

Water is a vital nutrient for good health. Most of our body weight (60-70%) is made up of water. Water helps to control our body temperature, carries nutrients and waste products from our cells, and is needed for our cells to function. It is recommended that adults drink 8 glasses of fluid daily (or more in hot weather or during physical activity). This fluid does not have to be water alone. It can also be obtained from juice, milk, soup, and foods high in water such as fruits and vegetables. Caffeine-containing beverages (coffee, tea, cola) don't count because caffeine is a diuretic, making us lose water. A great plus for water in comparison to the other fluids is that it hydrates our body without extra calories.

Unit of energy, Calorie value of Carbohydrates,

This is the accepted standard unit of energy used in human energetics and it should also be used for the expression of energy in foods. Because nutritionists and food scientists are concerned with large amounts of energy, they generally use kiloJoules (kJ = 10^3 J) or megaJoules (MJ = 10^6 J). while the use of joules alone is recommended by international convention, values for food energy also use side by side by the scientists. The conversion factors for joules and calories are: 1 kJ = 0.239 kcal; and 1 kcal = 4.184 kJ. Carbohydrate provides about 4 kcal (kcal = kilocalories = Calories) per gram of energy.

How many kilocalories are in 1 gram of carbohydrate, of protein, and of fat?
Carbohydrates have 4 kilocalories per gram; proteins have 4 kilocalories per gram; and fats have 9 kilocalories per gram.

Balanced diet: Definition, a diet consisting of the proper quantities and proportions of foods needed to maintain health or growth. A balanced diet provides all the necessary nutrients for overall health and long life. Eating a balanced diet reduces your risk for heart disease, cancer, diabetes and other health problems. Achieving this goal in a culture where you're surrounded by unhealthy foods can be challenging. When you understand the factors that contribute to a balanced diet, however, you can make choices that support your health and well-being.

Components & Name factors to be considered to formulate a balanced diet;

Carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, and water

Illustration of balanced diet chart for adult, total calorie requirements for adult Male and Female;

Estimated amounts of calories needed to maintain energy balance for various gender and age groups at three different levels of physical activity. The estimates are rounded to the nearest 200 calories and were determined using the Institute of Medicine equation.

Gender	Age (years)	Sedentary[b]	Moderately Active[c]	Active[d]
Child	2-3	1,000	1,000-1,400	1,000-1,400
Female	4-8	1,200	1,400-1,600	1,400-1,800
	9-13	1,600	1,600-2,000	1,800-2,200
	14-18	1,800	2,000	2,400
	19-30	2,000	2,000-2,200	2,400
	31-50	1,800	2,000	2,200
	51+	1,600	1,800	2,000-2,200
Male	4-8	1,400	1,400-1,600	1,600-2,000
	9-13	1,800	1,800-2,200	2,000-2,600
	14-18	2,200	2,400-2,800	2,800-3,200
	19-30	2,400	2,600-2,800	3,000
	31-50	2,200	2,400-2,600	2,800-3,000
	51+	2,000	2,200-2,400	2,400-2,800

[a] These levels are based on Estimated Energy Requirements (EER) from the Institute of Medicine Dietary Reference Intakes macronutrients report, 2002, calculated by gender, age, and activity level for reference-sized individuals. "Reference size," as determined by IOM, is based on median height and weight for ages up to age 18 years of age and median height and weight for that height to give a BMI of 21.5 for adult females and 22.5 for adult males.

[b] Sedentary means a lifestyle that includes only the light physical activity associated with typical day-to-day life.

[c] Moderately active means a lifestyle that includes physical activity equivalent to walking about 1.5 to 3 miles per day at 3 to 4 miles per hour, in addition to the light physical activity associated with typical day-to-day life

[d] Active means a lifestyle that includes physical activity equivalent to walking more than 3 miles per day at 3 to 4 miles per hour, in addition to the light physical activity associated with typical day-to-day life.

What is BMI?

BMI is a person's weight in kilograms divided by the square of height in meters.BMI appears to be as strongly correlated with various metabolic and disease outcome as are these more direct measures of body fatness. In general, BMI is an inexpensive and easy-to-perform method of screening for weight category, for example underweight, normal or healthy weight, overweight, and obesity.

A high BMI can be an indicator of high body fatness. BMI can be used as a screening tool but is not diagnostic of the body fatness or health of an individual.

Why is BMI used to measure overweight and obesity?

BMI can be used for population assessment of overweight and obesity. Because calculation requires only height and weight, it is inexpensive and easy to use for clinicians and for the general public. BMI can be used as a screening tool for body fatness but is not diagnostic.

How is BMI calculated?

BMI is calculated the same way for both adults and children. The calculation is based on the following formulas:

Measurement Units	**Formula and Calculation**
Kilograms and meters (or centimeters)	Formula: weight (kg) / [height (m)]^2 With the metric system, the formula for BMI is weight in kilograms divided by height in meters squared. Because height is commonly measured in centimeters, divide height in centimeters by 100 to obtain height in meters. Example: Weight = 68 kg, Height = 165 cm (1.65 m) Calculation: 68 ÷ (1.65)^2 = 24.98
Pounds and inches	Formula: weight (lb) / [height (in)]^2 x 703 Calculate BMI by dividing weight in pounds (lbs) by height in inches (in) squared and multiplying by a conversion factor of 703. Example: Weight = 150 lbs, Height = 5'5" (65") Calculation: [150 ÷ (65)^2] x 703 = 24.96

How is BMI interpreted for adults?

For adults 20 years old and older, BMI is interpreted using standard weight status categories. These categories are the same for men and women of all body types and ages.

The standard weight status categories associated with BMI ranges for adults are shown in the following table.

BMI	Weight Status
Below 18.5	Underweight
18.5 – 24.9	Normal or Healthy Weight
25.0 – 29.9	Overweight
30.0 and Above	Obese

For example, here are the weight ranges, the corresponding BMI ranges, and the weight status categories for a person who is 5' 9".

Height	Weight Range	BMI	Weight Status
5' 9"	124 lbs or less	Below 18.5	Underweight
	125 lbs to 168 lbs	18.5 to 24.9	Normal or Healthy Weight
	169 lbs to 202 lbs	25.0 to 29.9	Overweight
	203 lbs or more	30 or higher	Obese

Vitamins: Definition, Classification, One deficiency disorder of each vitamins and food sources;

A vitamin is an organic compound required as a nutrient in tiny amounts by an organism. A compound is called a vitamin when it cannot be synthesized in sufficient quantities by an organism, and must be obtained from the diet. Thus, the term is conditional both on the circumstances and the particular organism. For example, ascorbic acid functions as vitamin C for some animals but not others, and vitamins D and K are required in the human diet only in certain circumstances.

All natural vitamins are organic food substances found only in living things, that is, plants and animals. With few exceptions, the body cannot manufacture or synthesize vitamins. They must be supplied by the diet or in dietary supplements. Vitamins are essential to the normal functioning of our bodies. They are necessary for growth, vitality, health, general well being, and for the prevention and cure of many health problems and diseases.

Vitamins are classified by their biological and chemical activity, not their structure.

Thus, each "vitamin" may refer to several vitamer compounds that all show the biological activity associated with a particular vitamin. Such a set of chemicals are grouped under an alphabetized vitamin "generic descriptor" title, such as "vitamin A," which includes the compounds retinal, retinol, and many carotenoids. Vitamers are often inter-converted in the body. The term vitamin does not include other essential nutrients such as dietary minerals, essential fatty acids, or essential amino acids, nor does it encompass the large number of other nutrients that promote health but are otherwise required less often.

There are 13 vitamins your body needs.

They are vitamins A, C, D, E, K and the B vitamins (thiamine, riboflavin, niacin, pantothenic acid, biotin, vitamin B-6, vitamin B-12 and folate).

You can usually get all your vitamins from the foods you eat.

Your body can also make vitamins D and K. People who eat a vegetarian diet may need to take a vitamin B12 supplement.

Vitamins are classified as either water-soluble or fat soluble.

In humans there are 13 vitamins: 4 fat-soluble (A, D, E and K) and 9 water-soluble (8 B vitamins and vitamin C).

- **Water-soluble** - Water-soluble vitamins dissolve easily in water, and in general, are readily excreted from the body, to the degree that urinary output is a strong predictor of vitamin consumption. Because they are not readily stored, consistent daily intake is important. Many types of water-soluble vitamins are synthesized by bacteria.
- **Fat-soluble** - Fat-soluble vitamins are absorbed through the intestinal tract with the help of lipids (fats). Because they are more likely to accumulate in the body, they are more likely to lead to hypervitaminosis than are water-soluble vitamins. Fat-soluble vitamin regulation is of particular significance in cystic fibrosis.

Vitamin A - Important for vision, reproductive function, and normal cell reproduction. Beta-carotene, a precursor to Vitamin A, helps to fight disease-causing free radicals. Vitamin A is found in milk products, organ meats, and fish oils. Beta-carotene is found in colorful vegetables, such as carrots, broccoli, spinach, and sweet potatoes.

Vitamin A Sources:

- Egg yolk
- Dark-colored fruit
- Dark leafy vegetables
- Liver, beef, and fish
- Fortified milk and dairy products (cheese, yogurt, butter, and cream)

Vitamin B-1 - (thiamin) processes carbohydrates into energy and is necessary for nerve cell function. Breads and cereals are often fortified with thiamin, though it is also found in whole grains, fish, lean meats, and dried beans.

Thiamine (vitamin B1) Sources:

- Egg
- Peas
- Dried milk
- Lean meats
- Organ meats
- Whole grains

- Nuts and seeds
- Legumes (dried beans)
- Enriched bread and flour

Vitamin B-2 - (riboflavin) helps the production of red blood cells and is important for growth.

Vitamin B-3 - (niacin) helps control cholesterol, processes alcohol, maintains healthy skin, and converts carbohydrates to energy.

Niacin (vitamin B3) Sources:

- Nuts
- Eggs
- Potato
- Poultry
- Avocado
- Legumes
- Lean meats
- Fish (tuna and salt-water fish)
- Enriched breads and fortified cereals

Vitamin B-5 - (pantothenic acid) serves several bodily functions, such as converting fats to energy and synthesizing cholesterol.

Pantothenic acid (vitamin B5) Sources:

- Milk
- Eggs
- Poultry
- Avocado
- Mushroom
- Organ meats
- Legumes and lentils
- Whole-grain cereals
- White and sweet potatoes
- Broccoli, kale, and other vegetables in the cabbage family

Vitamin B-6 - (pyridoxine) is important in the production of hormones such as serotonin, dopamine, and melatonin, as well as for processing amino acids.

Pyroxidine (vitamin B6) Sources:

- Nuts
- Meat
- Poultry
- Banana
- Avocado
- Legumes (dried beans)
- Whole grains (milling and processing removes a lot of this vitamin)

Vitamin B-12 - A crucial component of DNA replication and nerve cell regulation. It is found in milk products, poultry, meat, and shellfish.

Vitamin B12 Sources:

- Meat
- Eggs
- Poultry
- Shellfish
- Milk and milk products
- Fortified foods such as soymilk
- Organ meats (liver and kidney)

Animal sources of vitamin B12 are absorbed much better by the body than plant sources

Vitamin C - Important in wound healing and acts as an antioxidant. It also helps the body absorb iron. It's found in citrus fruits, potatoes, and greens.

Vitamin C Sources:

- Broccoli
- Spinach
- Cabbage
- Potatoes
- Tomatoes
- Cauliflower
- Citrus fruits
- Strawberries
- Tomato juice
- Brussels sprouts

Vitamin D - Helps the body absorb calcium, which creates healthy bones and teeth. The body can synthesize Vitamin D after exposure to sunshine, but it can also be found in fortified milk products and cereals, as well as in fish.

Vitamin D Sources:

- Fortified cereals
- Fish liver oils (cod's liver oil)
- Fortified milk and dairy products (cheese, yogurt, butter, and cream)
- Fish (fatty fish such as salmon, mackerel, herring, and orange roughy)

Vitamin E - Helps to combat free radicals, which can damage our cells. It's found in nuts and seeds, green leafy vegetables, corn, asparagus, and wheat germ.

Vitamin E Sources:

- Avocado
- Seeds and nuts

- Papaya and mango
- Wheat germ and wheat germ oil
- Oils (safflower, corn, and sunflower)
- Margarine (made from safflower, corn, and sunflower oil)
- Dark green vegetables (spinach, broccoli, asparagus, turnip greens)

Vitamin K - What makes the blot clot. While our bodies produce some Vitamin K, it can also be found in vegetables like cauliflower and cabbage.

Vitamin K Sources:

- Cabbage
- Cereals
- Cauliflower
- Fish, liver, beef, eggs
- Dark leafy vegetables (spinach, kale, collards, turnip greens)
- Dark green vegetables (broccoli, Brussels sprouts, asparagus)

Biotin Sources:

- Milk
- Nuts
- Pork
- Yeast
- Cereal
- Egg yolk
- Legumes
- Chocolate
- Organ meats (liver, kidney)

Folate Sources:

- Beets
- Lentils
- Wheat germ
- Peanut butter
- Peanut butter
- Brewer's yeast
- Fortified cereals
- Asparagus and broccoli
- Oranges and orange juice
- Dried beans (cooked pinto, navy, kidney, and lima)
- Green, leafy vegetables (spinach and romaine lettuce)

Deficiencies of vitamins are classified as either primary or secondary.

- A primary deficiency occurs when an organism does not get enough of the vitamin in its food.

- A secondary deficiency may be due to an underlying disorder that prevents or limits the absorption or use of the vitamin, due to a "lifestyle factor", such as smoking, excessive alcohol consumption, or the use of medications that interfere with the absorption or use of the vitamin.

Minerals: Important minerals of life: Sources, deficiency disorder name.

The body needs many minerals; these are called essential minerals. Essential minerals are sometimes divided up into major minerals (macrominerals) and trace minerals (microminerals). These two groups of minerals are equally important, but trace minerals are needed in smaller amounts than major minerals. The amounts needed in the body are not an indication of their importance.

A balanced diet usually provides all of the essential minerals. The two tables below list minerals, what they do in the body (their functions), and their sources in food.

Macrominerals

Major minerals		
Mineral	**Function**	**Sources**
Sodium	Needed for proper fluid balance, nerve transmission, and muscle contraction	Table salt, soy sauce; large amounts in processed foods; small amounts in milk, breads, vegetables, and unprocessed meats
Chloride	Needed for proper fluid balance, stomach acid	Table salt, soy sauce; large amounts in processed foods; small amounts in milk, meats, breads, and vegetables
Potassium	Needed for proper fluid balance, nerve transmission, and muscle contraction	Meats, milk, fresh fruits and vegetables, whole grains, legumes
Calcium	Important for healthy bones and teeth; helps muscles relax and contract; important in nerve functioning, blood clotting, blood pressure regulation, immune system health	Milk and milk products; canned fish with bones (salmon, sardines); fortified tofu and fortified soy milk; greens (broccoli, mustard greens); legumes
Phosphorus	Important for healthy bones and teeth; found in every cell; part of the system that maintains acid-base balance	Meat, fish, poultry, eggs, milk, processed foods (including soda pop)
Magnesium	Found in bones; needed for making protein, muscle contraction, nerve transmission, immune system health	Nuts and seeds; legumes; leafy, green vegetables; seafood; chocolate; artichokes; "hard" drinking water

Sulfur	Found in protein molecules	Occurs in foods as part of protein: meats, poultry, fish, eggs, milk, legumes, nuts

Trace minerals (microminerals)

The body needs trace minerals in very small amounts. Note that **iron** is considered to be a trace mineral, although the amount needed is somewhat more than for other microminerals.

Trace minerals		
Mineral	**Function**	**Sources**
Iron	Part of a molecule (hemoglobin) found in red blood cells that carries oxygen in the body; needed for energy metabolism	Organ meats; red meats; fish; poultry; shellfish (especially clams); egg yolks; legumes; dried fruits; dark, leafy greens; iron-enriched breads and cereals; and fortified cereals
Zinc	Part of many enzymes; needed for making protein and genetic material; has a function in taste perception, wound healing, normal fetal development, production of sperm, normal growth and sexual maturation, immune system health	Meats, fish, poultry, leavened whole grains, vegetables
Iodine	Found in thyroid hormone, which helps regulate growth, development, and metabolism	Seafood, foods grown in iodine-rich soil, iodized salt, bread, dairy products
Selenium	Antioxidant	Meats, seafood, grains
Copper	Part of many enzymes; needed for iron metabolism	Legumes, nuts and seeds, whole grains, organ meats, drinking water
Manganese	Part of many enzymes	Widespread in foods, especially plant foods
Fluoride	Involved in formation of bones and teeth; helps prevent tooth decay	Drinking water (either fluoridated or naturally containing fluoride), fish, and most teas
Chromium	Works closely with insulin to regulate blood sugar (glucose) levels	Unrefined foods, especially liver, brewer's yeast, whole grains, nuts, cheeses
Molybdenum	Part of some enzymes	Legumes; breads and grains; leafy greens; leafy, green vegetables;

		milk; liver

Other trace nutrients known to be essential in tiny amounts include nickel, silicon, vanadium, and cobalt.

Diabetes and Lipid Profile: Diabetes Mellitus: Definition;

Diabetes mellitus: More commonly referred to as "diabetes" -- a chronic disease associated with abnormally high levels of the sugar glucose in the blood. Diabetes is due to one of two mechanisms: 1) Inadequate production of insulin (which is made by the pancreas and lowers blood glucose), or 2) Inadequate sensitivity of cells to the action of insulin.

Diabetes is a disease that involves high blood glucose levels. When a person eats food, the body converts it to glucose. The glucose is then transported from the bloodstream into the cells by a hormone called insulin. This hormone is made in the pancreas. When the body does not make enough insulin, diabetes occurs. It is a disease that puts individuals at risk for several diseases such as heart disease, kidney failure, stroke and eye problems.

Type of Diabetes: Characteristics features,
The two main types of diabetes correspond to these two mechanisms and are called insulin dependent (type 1) and non-insulin dependent (type 2) diabetes. In type 1 diabetes there is no insulin or not enough of it. In type 2 diabetes, there is generally enough insulin but the cells upon it should act are not normally sensitive to its action.

Hyperglycemia: Hyperglycemia is the technical term for high blood glucose (blood sugar). High blood glucose happens when the body has too little insulin or when the body can't use insulin properly.

What Causes Hyperglycemia?
Answer: A number of things can cause hyperglycemia:
If you have type 1, you may not have given yourself enough insulin.
If you have type 2, your body may have enough insulin, but it is not as effective as it should be.
You ate more than planned or exercised less than planned.
You have stress from an illness, such as a cold or flu.
You have other stress, such as family conflicts or school or dating problems.

You may have experienced the dawn phenomenon (a surge of hormones that the body produces daily around 4:00 a.m. to 5:00 a.m.).

Mechanisms involved for the development of type I and type II diabetes;
Answer: The underlying mechanism involves for type I diabetes are an autoimmune destruction of the insulin-producing beta cells in the pancreas. On the other hand body doesn't produce enough insulin or body can't use insulin properly in case of Type-II diabetes.

Differences of type I and type II Diabetes;

Differences between type 1 and type 2 diabetes	
Type 1 diabetes	Type 2 diabetes
Symptoms usually start in childhood or young adulthood. People often seek medical help, because they are seriously ill from sudden symptoms of high blood sugar.	The person may not have symptoms before diagnosis. Usually the disease is discovered in adulthood, but an increasing number of children are being diagnosed with the disease.
Episodes of low blood sugar level (hypoglycemia) are common.	There are no episodes of low blood sugar level, unless the person is taking insulin or certain diabetes medicines.
It cannot be prevented.	It can be prevented or delayed with a healthy lifestyle, including maintaining a healthy weight, eating sensibly, and exercising regularly.

Gestational diabetes: Gestational diabetes is a type of diabetes that develops only during pregnancy. The hormones produced during pregnancy increase the amount of insulin needed to control blood glucose levels. If the body can't meet this increased need for insulin, women can develop gestational diabetes during the late stages of pregnancy.

Gestational diabetes usually goes away after the baby is born. Shortly after pregnancy, 5 to 10 percent of women with gestational diabetes continue to have high blood glucose levels and are diagnosed as having diabetes, usually type 2. Research has shown that lifestyle changes and the diabetes medication, metformin, can reduce or delay the risk of type 2 diabetes in these women. Babies born to mothers who had gestational diabetes are also more likely to develop obesity and type 2 diabetes as they grow up.

Sign and symptoms of Diabetes;

Answer: Common symptoms of diabetes:
Urinating often.
Feeling very thirsty.
Feeling very hungry - even though you are eating.
Extreme fatigue.
Blurry vision.
Cuts/bruises that are slow to heal.
Weight loss - even though you are eating more (type 1)
Tingling, pain, or numbness in the hands/feet (type 2)

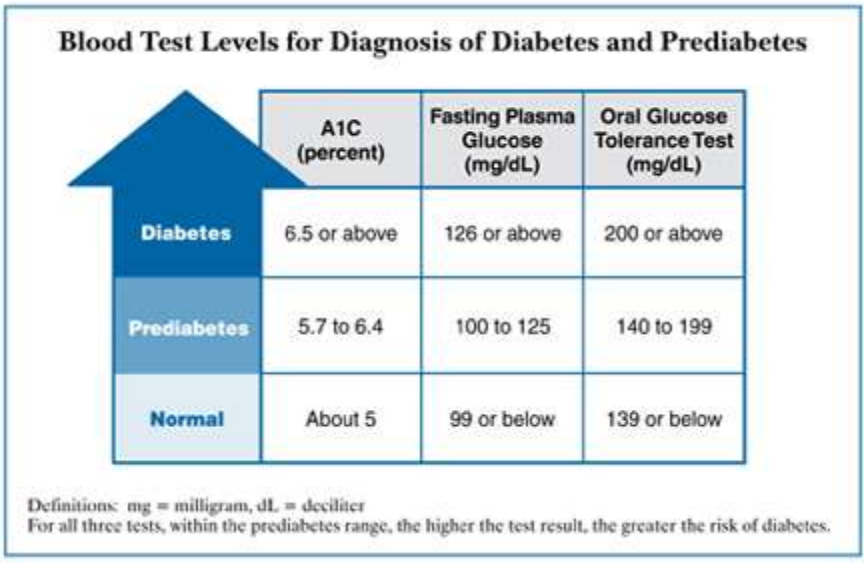
How are diabetes and prediabetes diagnosed?

Blood tests are used to diagnose diabetes and prediabetes because early in the disease type 2 diabetes may have no symptoms. All diabetes blood tests involve drawing blood at a health care provider's office or commercial facility and sending the sample to a lab for analysis. Lab analysis of blood is needed to ensure test results are accurate. Glucose measuring devices used in a health care provider's office, such as finger-stick devices, are not accurate enough for diagnosis but may be used as a quick indicator of high blood glucose.

Testing enables health care providers to find and treat diabetes before complications occur and to find and treat prediabetes, which can delay or prevent type 2 diabetes from developing.

Any one of the following tests can be used for diagnosis:

- an **A1C** test, also called the hemoglobin A1c, HbA1c, or glycohemoglobin test
- a **fasting plasma glucose (FPG)** test
- an **oral glucose tolerance test (OGTT)**



Recommendations for Testing Pregnant Women for Diabetes

Time of testing	**ACOG** (American College of Obstetricians and Gynecologists)
At first visit during pregnancy	No recommendation
At 24 to 28 weeks of pregnancy	Test women for diabetes based on their history, risk factors, or a 50-gram, 1-hour, nonfasting, glucose challenge test—a modified OGTT. If score is 130–140 mg/dL, test again with fasting, 100-gram, 3-hour OGTT.

Normal and diabetic blood sugar ranges

For the majority of healthy individuals, normal blood sugar levels are as follows:

- **Between** 4.0 to 6.0 mmol/L (72 to 108 mg/dL) when fasting
- **Up to** 7.8 mmol/L (140 mg/dL) 2 hours after eating

For people with diabetes, blood sugar level targets are as follows:

- **Before meals**: 4 to 7 mmol/L for people with type 1 or type 2 diabetes

- **After meals**: under 9 mmol/L for people with type 1 diabetes and under 8.5mmol/L for people with type 2 diabetes

Lipid profile: Definition,
Lipid profile or **lipid** panel is a panel of blood tests that serves as an initial broad medical screening tool for abnormalities in **lipids**, such as cholesterol and triglycerides.

Tests included in lipid Profile,
A lipid profile typically includes:

- *Total cholesterol* — this test measures all of the cholesterol in all the lipoprotein particles.
- *High-density lipoprotein cholesterol (HDL-C)* — measures the cholesterol in HDL particles; often called "good cholesterol" because it removes excess cholesterol and carries it to the liver for removal.
- *Low-density lipoprotein cholesterol (LDL-C)* — calculates the cholesterol in LDL particles; often called "bad cholesterol" because it deposits excess cholesterol in walls of blood vessels, which can contribute to atherosclerosis. Usually, the amount of LDL-C is calculated using the results of total cholesterol, HDL-C, and triglycerides.
- *Triglycerides* — measures all the triglycerides in all the lipoprotein particles; most is in the very low-density lipoproteins (VLDL).

Some other information may be reported as part of the lipid profile. These parameters are calculated from the results of the tests identified above.

- *Very low-density lipoprotein cholesterol (VLDL-C)* — calculated from triglycerides/5; this formula is based on the typical composition of VLDL particles.
- *Non-HDL-C* — calculated from total cholesterol minus HDL-C.
- *Cholesterol/HDL ratio* — calculated ratio of total cholesterol to HDL-C.

An extended profile (or advanced lipid testing) may also include low-density lipoprotein particle number/concentration (LDL-P). This test measures the number of LDL particles, rather than measuring the amount of LDL-cholesterol. It is thought that this value may more accurately reflect heart disease risk in certain people.

Implication of doing Lipid Profile test: Lipid profile or lipid panel is a panel of blood tests that serves as an initial broad medical screening tool for abnormalities in lipids, such as cholesterol and triglycerides. The results of this test can identify certain genetic diseases and can determine approximate risks for cardiovascular disease, certain forms of pancreatitis, and other diseases.

	Test	Acceptable (mg/dL)	Borderline (mg/dL)	High (mg/dL)
Children and Adolescents	Total Cholesterol	Less than 170	170-199	Greater than or equal to 200
	Non-HDL Cholesterol	Less than 120	120-144	Greater than or equal to 145
Young Adults	Total Cholesterol	Less than 190	190-224	Greater than or equal to 225

	Non-HDL Cholesterol	Less than 150	150-189	Greater than or equal to 190