

# Guide to Diabetes

An essential resource for learning about  
diabetes

By John Ngijseh

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## About The Author

John Ngijseh is a qualified pharmacist with a special interest in diabetes. He has worked as a pharmacist for over 13 years in both community and with a government primary care trust. Much of the work in community was at the front line with diabetic patients. With the primary care trust John Ngijseh worked in a number of projects identifying, screening and providing advice people with diabetes.

In 2004 John Ngijseh became involved in the online field and started by creating a diabetes information website. This website would later form the platform for the creation of a major supplier of glucose meters and related diabetic supplies, [www.Glucosemeters4u.com](http://www.Glucosemeters4u.com). A few years latter John was a part of the team that put together one of the few truly specialised websites for wound care supplies, [www.dressingsonline.com](http://www.dressingsonline.com).

Also, since 2004 John Ngijseh has used his expertise in writing articles on diabetes and blood glucose testing on a number of channels. His work can be found all over the web, most recently on the diabetes magazine, Diabetes Health.

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## What is Diabetes?

Diabetes is a condition where the level of blood glucose (sugar in the blood) is persistently raised above the normal range because the body doesn't properly use or produce insulin.

When we eat, our food is broken down and some of it is turned into glucose. When the glucose level in the blood rises, the pancreas releases insulin. Insulin then helps glucose to be transported to the muscles where it provides energy for our body and by doing so results in a fall in blood glucose levels. With diabetes there isn't enough insulin or it doesn't work properly and so the amount of glucose transported from the blood to the muscles is low. As a result, the level of glucose in the blood rises abnormally and the body doesn't have enough energy to function properly.

## What are the Symptoms of Diabetes?

If you have diabetes may have some or none of the following symptoms:

- Increased thirst
- Frequent urination
- Extreme tiredness
- Extreme hunger
- Blurred vision
- Unusual weight loss
- Recurrent infections
- Tingling or numbness in the hands or feet

With type 1 diabetes the symptoms usually come on quickly and are very obvious. Whilst with type 2 diabetes some people may not know they even have it. That's because often there are no obvious symptoms or the symptoms are not severe and people just put up with it.

## Myths about Diabetes

- Eating sweets or sugar does not cause diabetes
- Stress does not cause diabetes
- An accident or illness may reveal diabetes if it is already there, but they do not cause it.
- Mostly importantly, you cannot catch diabetes from somebody nor can you give it to anyone.

# Types of Diabetes

There are 3 main types of diabetes:

- **Type 1**
- **Type 2**
- **Gestational**

## Type 1 Diabetes

Often called Insulin dependent diabetes and develops when the cells, which produce insulin in the pancreas, have been destroyed. The exact reason why these cells are destroyed is not known. As a result the body is unable to produce any insulin.

This type of diabetes usually begins in young adults and children but can occur at any age.

## Type 2 Diabetes

Most people with diabetes will have Type 2. In Type 2 diabetes the pancreas still makes insulin but either does not produce enough insulin for the body's needs, or the insulin it produces cannot be properly used (called insulin resistance).

Type 2 diabetes was previously known as non-insulin dependent diabetes mellitus (NIDDM) or maturity onset diabetes as it usually appeared in middle aged or elderly people (although it can appear at any age). People who are overweight are much more likely to develop Type 2 diabetes as well as those that have a family history of diabetes. Type 2 diabetes tends to be more common in Asian and African-Caribbean communities.

Type 2 diabetes is sometimes wrongly described as 'mild diabetes'. There is no such thing as mild diabetes. All diabetes should be taken seriously and treated properly.

**The table below summarizes the main differences between Type 1 and Type 2 diabetes.**

Feature	Type 1	Type 2
Age	Child/young adult	Middle-age/elderly
Type of onset	Rapid	Gradual
Build	Thin (mostly)	Obese (mostly)
Weight loss	Common	Uncommon
Family history	Uncommon	Common
Insulin	Low/absent	Normal/high

## Gestational Diabetes

This occurs when a pregnant woman, who has never had diabetes before, has high blood glucose levels during pregnancy. The condition develops in 2-5 % of all pregnancies. Treatment usually involves diet and exercise and may include regular blood glucose testing and insulin.

# Managing Diabetes

Unlike many other diseases, in diabetes you are in charge of your day-to-day care and how you choose to live your life can have a big impact on the treatment of the disease.

Diabetes education is an important first step. If you have diabetes you need to learn about it in order to make healthy lifestyle choices and manage your diabetes.

## Type 1 Diabetes

Thanks to the Canadian Diabetes Association this section is covered in a comprehensive PDF file. Click on the link below to learn more about managing Type 1 Diabetes. A new page will open and you will be directed to the Canadian Diabetes Association website to the relevant section.

<http://www.diabetes.ca/Files/Insulintysk.pdf>

## Type 2 Diabetes

Often Type 2 diabetes will initially be managed by eating the right foods, getting enough exercise and weight management. These lifestyle changes work for some people and they are able to control their diabetes. However, for others lifestyle changes alone are not enough and they may be prescribed medication to help control their blood glucose. The medication is used in addition to lifestyle changes (such as exercise, diet and weight control) and not instead of.

# Eating the Right Foods

One of the most important steps you can take to manage your diabetes is controlling your diet.

We're all advised to eat a healthy, balanced diet which is low in fat and sugar and high in fibre, with plenty of fruit and vegetables. The same basic guidelines are also recommended for people with diabetes.

This means that you can still eat your usual meals but you may need to alter them slightly to make them more healthy. The rest of your family can join you in your new eating plan and this will help their health too. You can buy all the foods that you need from normal shops and supermarkets - you don't need to buy special "diabetic foods".

If you are overweight, losing weight will help you control your diabetes. You should aim to lose weight slowly over time rather than by drastic dieting. Even if you don't manage to get to your ideal weight, losing a few pounds (and keep them off) will help.

How should I change my eating pattern?

When you are first diagnosed with diabetes, your doctor should arrange for you to see a state registered dietician who will give you individual dietary advice and discuss, if needed, how to change your meals to make them healthier. In the meantime here is some information to get you started.

**We have divided the foods up into 6 categories:**

- Carbohydrates
- Fat
- Sugar
- Salt
- Alcohol
- Special diabetic foods

## Carbohydrates

- Base meals on carbohydrate foods such as bread, pasta, rice, chapattis and potatoes. These foods are filling and not fattening (provided you don't add extra fat). Where possible choose high fibre varieties of these foods, like wholemeal bread.
- Eat regular meals.
- Eat more fruit and vegetables, aim for 4 or 5 portions a day. This will give you fibre and vitamins.

## Fat

- Cut down on fried food, fatty foods and fatty red meat, choose lean meat, skinless chicken/poultry instead.
- Choose lower fat milk. Skimmed milk is virtually fat free and lower in calories but still contains all the protein and calcium found in full fat milk. Semi-skimmed milk is half-fat and also lower in calories than full cream.
- Use low-fat cooking methods such as grilling, microwaving and barbecuing. Trim excess fat and skin off meat before cooking.

- Choose low fat versions of margarine and cheese.
- If you need to use an oil in cooking, use an unsaturated one such as olive, sunflower or corn oil. Try using less oil too.

## Sugar

- You don't need to avoid sugar **all together**. However, food and drinks that contain a lot of sugar can make your blood sugar go up very quickly, especially if eaten on their own.
- Change to low sugar and sugar-free foods such as low calorie fizzy drinks, diet squash, low sugar jams and diet yoghurts.
- Artificial sweeteners can be used to sweeten drinks and foods instead of sugar. They are virtually carbohydrate and fat free and do not affect blood sugar levels. Its recommended that you use a variety of sweeteners and not to consume too much of any type.

## Salt

- Reduce your salt intake gradually so that you can get used to the taste change. Adding herbs and spices may help.
- Use as little salt as possible in meals and cut down on salt added at the table.
- Eat less processed foods such as tinned and packet foods, salty meats, crisps and salted nuts.

## Alcohol

- Drink alcohol in moderation only. For men that's 3 units a day and for women it's 2 units a day. If you're trying to lose weight then this should be less.
- Never drink on empty stomach as it can increase the likelihood of hypoglycemia

## Special Diabetic foods

- Do not buy "special diabetic foods". They are very expensive and contain no less fat or calories than other foods. They will not help if you are trying to lose weight.
- Often such foods can cause diarrhoea.

# Diabetes and Medication

For some diet changes will not be sufficient to control blood glucose levels and medication will be needed.

The tablets used to treat type 2 diabetes are not insulin. Instead, they work with insulin to help control blood glucose. This is why they don't work for people who have type 1 diabetes.

There are several different groups of tablets for Type 2 diabetes. Each group can control blood glucose in a different way. Most tablets have at least two names. One is the scientific name (generic) and the other is the name given to it by the company who makes it (known as brand name). We've used the generic names.

The main groups are as follows:

## Sulphonylureas

These are the most commonly prescribed diabetes tablets and work by helping the pancreas produce more insulin. They also help insulin to work more effectively. Tablets in this group include: Gliclazide, Glibenclamide, Chlorpropamide, Tolbutamide, Glimpiride. Their main side effects is hypoglycemia (low blood glucose) and some may encourage weight gain.

## Biguanides

This group of tablets are often used as the first line of treatment, especially for people who are overweight. This is because they do not encourage weight gain. Biguanides work by helping to stop the liver producing new glucose and helps insulin carry glucose into muscle and fat cells more effectively. They don't raise insulin levels so there is little risk for lows (hypoglycemia) when the pills are taken alone. Their side effects include: stomach upsets and nausea which may be lessened by taking Biguanides with food. The main tablet in this group is Metformin.

## Alpha-glucosidase inhibitor

This is usually given as an add-on treatment with Biguanides or Sulphonylureas. It works by delaying the absorption of starchy food from the intestine and so slowing down the rise in blood glucose after meals. The only pill in this group is Acarbose. Acarbose should always be chewed with the first mouthful of food or swallowed whole with a little liquid immediately before food. Its side effects can include an upset stomach and wind.

## Thiazolidinediones (Glitazones)

These pills help overcome insulin resistance, allowing the body to use its own natural insulin more effectively. As Glitazones lower the need for insulin there is little risk of lows (hypoglycemia) when these pills are taken alone. Pills in this group include Rosiglitazone and Pioglitazone.

## Repaglinide

This is a new type of tablet – brand name Novonorm. It works by increasing the amount of insulin produced during a meal. It is similar to Sulphonylureas, but unlike Sulphonylureas, it is taken with each meal and encourages the body to produce exactly the right amount of insulin.

## Medicine Combinations

When a single diabetes tablet is not able to lower blood glucose well enough, a combination of drugs can be used to work on several causes of high blood glucose at the same time. For some people even this will not be enough and they will need to take insulin injections. Diabetes is a progressive condition and more than one type of treatment is likely to be needed during the lifetime of someone with diabetes. This does not always mean that the patient is doing anything wrong but that the body needs more help over time, to keep control and complications at bay.

Which choice of medicine or combination of medicines is best for you can only be decided by a physician.

# When Blood Glucose is Not Controlled

## Hyperglycemia

When the amount of blood glucose is above the target range (the general rule is higher than 180 mg/dl measured two hours after food) it is called hyperglycemia.

### How is Hyperglycemia Caused?

Hyperglycemia can occur when food, activity and medications are not balanced. Below are common causes:

- Too much food or the wrong type food
- Not enough medication
- Not enough insulin
- Poor injection technique
- Overuse of injection sites
- Untreated diabetes
- Infections or illness
- Stress
- Increase in weight

### Symptoms of Hyperglycemia

In the early stages, there are likely to be no symptoms at all and even when symptoms do arise they may come on so slowly that they are not noticed. As blood glucose levels rise the following symptoms may occur:

- More hunger or thirst than usual
- Excessive urination
- Tiredness and lethargy
- Frequent infections
- Blurred vision

Left untreated, hyperglycemia may result in diabetic ketoacidosis. Diabetic ketoacidosis is a serious condition due to a lack of insulin. This causes the body to try to find energy from other sources as it cannot use the glucose in the blood. Ketones and acid form as a result. The condition is characterised by vomiting, drowsiness, smell of acetone (like pear drops) on the breath and can result in coma.

### What To Do if you Experience Hyperglycemia

- Consult your doctor
- Continue with your diabetes treatment
- Consume plenty of fluids
- Test your blood glucose levels every 2-4 hrs
- Adjust your meal plan
- Adjust your medication or insulin (only if instructed by doctor to do so)

Over time persistently high blood glucose levels can lead to serious long-term complications.

# Hypoglycemia

When the blood glucose level falls too low (less than 70mg/dl) it is called hypoglycemia or “hypo” for short.

What causes hypoglycemia?

- Too much insulin or diabetic medication
- More physical activity than usual
- Not eating on time
- Not eating enough or as usual
- Drinking alcohol

Low blood glucose occurs for only one reason, there is more insulin in the body than it needs at the time. This is true whether the insulin comes from a syringe or your body. Unless the excess insulin is balanced by food you will have low blood glucose.

What are the possible signs and symptoms of a hypo?

Symptoms of hypoglycemia can vary from person to person and anyone with diabetes should be familiar with his or her individual symptoms. These might include:

- Sweating
- Hunger
- Irritable
- Shaking
- Dry mouth
- Dizziness
- A feeling of weakness
- Headache
- Confused

Hypoglycemia can occur quickly. It is therefore important to treat it right away. If blood drops very low the following could occur:

- Become confused and disorientated
- Lose consciousness
- Have a seizure

In such a situation you will need help of others.

How should Hypoglycemia be treated?

If you experience any of the above symptoms then you must check your blood glucose levels straight away. If you cannot, treat the symptoms anyway. It is better to be safe. The goal is to get your blood glucose back to a safe level in a hurry.

1) Immediately take 15 grams of fast acting glucose such as:

- 3 to 6 dextrose tablets
- A sweet soft drink (not diet) or juice
- 3 teaspoons of table glucose dissolved in water

- 2) After 15 minutes test your blood glucose again
- 3) If your blood glucose has not increased then take another dose of glucose as described above.  
Test your blood glucose again in 15 minutes.
- 4) If your next meal is more than an hour away eat a snack like a sandwich or some fruit.

It is also important that you make your friends and family aware of the symptoms to look out for, and how they can be of help if you suffer from a hypo.

### Severe Hypoglycemia

Very low blood glucose may cause you to become unconscious. This will mean you will need help to raise your blood glucose. You must not be given anything by mouth if unconscious. If possible you should be put in the recovery position. In such a situation you will need a glucagon injection, perhaps by a trained friend or relative.

Glucagon only raises your blood glucose for a short time – you must eat something as soon as you are able to swallow.

If Glucagon does not help, call the emergency services.

What must you remember?

- Always carry some form of sugar with you (and in your car)
- Always carry/wear some form of diabetes identification such as an identity bracelet or necklace in case you become disorientated where people don't know you.
- Tell your friends, relatives and colleagues you have diabetes and how to help with a hypo
- Think about the causes of your hypo – check your blood glucose levels

# Long Term Complications

Diabetes can lead to serious complications and often occurs in those who have poor blood glucose control. Complications can include the following areas:

- Heart
- Eyes (Retinopathy)
- Kidneys (Nephropathy)
- Nerves (Neuropathy) and Feet

## Heart

This is one of the most serious problems with diabetes. People with diabetes are more than twice as likely to have heart disease or a stroke than people without diabetes. Both men and women with diabetes are at risk. Controlling blood pressure, blood glucose and blood cholesterol can reduce this risk. If you smoke, quitting will also be a major factor in reducing your risk.

## Eyes (Retinopathy)

Diabetic retinopathy is a major cause of blindness in working age people in the Western world. Retinopathy occurs when some of the smallest blood vessels in the retina (the seeing part of the eye) become blocked or start to leak or bleed. This is painless and doesn't initially affect vision but if left untreated can damage vision. Retinopathy develops over time and generally there are no obvious symptoms until it is well advanced.

Retinopathy can be treated with laser surgery and vision loss can be prevented if the damage is caught early enough. The surgery is generally pain free. However, laser surgery cannot restore any vision that has already been lost.

The best way to protect yourself against retinopathy is to keep your blood glucose levels as near as normal as possible. Also, you should have a check for retinopathy at least once a year as a part of the regular annual diabetes review. Early detection is the key to successful treatment.

## Kidneys (Nephropathy)

Diabetes can cause damage to the kidneys, which is known as nephropathy. About a quarter of people with diabetes may develop nephropathy, although the numbers are steadily declining. In many cases if detected early the condition can be treated successfully

### Symptoms

There are no obvious symptoms of nephropathy in the early stages, which is why regular testing is so important to detect the condition. If left untreated the body will lose a lot of protein in the urine and this can lead to water retention or oedema, especially around the ankles. Eventually the condition may result in the kidneys being unable to remove waste products from the body. The person would then need dialysis or a transplant. Testing for nephropathy can often be done using a urine dipstick, which will show if there is any protein present.

### **What causes Nephropathy?**

Nephropathy is caused by damage to the tiny blood vessels which supply the kidneys. The walls of these blood vessels in the kidneys become thickened or irregular and this means they are unable to filter waste products out of the blood into the urine properly.

### **Treatment**

This involves dietary changes, restricting the amount of protein in the diet, and controlling high blood pressure, which can worsen the problem. The most important thing to remember is to make sure you have your urine tested for protein at least once a year.

## **Nerves (Neuropathy) and Feet**

Diabetes can cause nerve damage, called neuropathy. There are different types of neuropathy but the most common in diabetics is sensory neuropathy. Sensory nerves carry messages of touch, pain, temperature and other sensations from the skin, bones and muscles to the brain. Damage to these nerves may lead to a loss of feeling in the feet. The main danger here is that you may not feel any pain, heat or cold in your feet. Thus a sore or cut on your foot could get worse and lead to an infection because you don't know it is there.

### **How does diabetes cause sensory neuropathy?**

The exact way in which diabetes damages the nerves is still not known. One possibility is that it is a result of damage to small blood vessels, which prevent essential nutrients reaching the nerves. The nerve fibres then become damaged or disappear altogether. Good blood glucose control can reduce the risk of neuropathy developing, as well as good foot care and help with detection of problems.

## What You Can Do To Prevent Complications

**Monitor your blood glucose regularly** – good blood glucose control can prevent or delay the onset of most of the diabetes-related complications. A desirable blood glucose range for most people is 80 to 120 mg/dL before breakfast, 180 mg/dL or less, 2 hours after meals and 100 to 140 mg/dL before bedtime.

**Check your A1C levels** – also known as HbA1c or glycosylated haemoglobin level. This test provides a “picture” of how well your diabetes has been controlled over a period of 2-3 months. Ideally all diabetics should have this measurement at least annually if not more frequent. Good diabetic control is assumed at levels of 7 per cent or below.

**Monitor your blood pressure regularly** – tight blood pressure control can be essential in preventing heart problems later on. High blood pressure often occurs in diabetes and since it has no symptoms it is very important to measure your blood pressure routinely at least every three months. Blood pressure levels for a person with diabetes should be kept ideally at less than 130 mm Hg systolic and less than 80 mm Hg diastolic.

**Monitor your cholesterol levels** – Your doctor should check your cholesterol levels at least once a year. You can help control your cholesterol levels by maintaining a healthy eating plan with regular exercise and if you smoke, stop!! Smoking is a major risk factor for heart disease and even more so for diabetics.

## Further Suggested Reading

### Blood Glucose Monitoring

1) For information on the different types of blood glucose meters available visit:

[http://www.glucosemeters4u.com/Guide\\_to\\_meters.htm](http://www.glucosemeters4u.com/Guide_to_meters.htm)

2) For advice on choosing the best method to monitor your glucose levels read:

<http://www.glucosemeters4u.com/monitoring-your-blood-glucose.htm>

3) For some useful tips on reducing the pain of blood glucose testing reading this essential article:

<http://www.glucosemeters4u.com/Diabetes-articles/less-painful-testing.htm>

### Diabetes Learning

To see this diabetes guide in an easy to use web format visit:

<http://www.glucosemeters4u.com/Learn-about-diabetes.htm>

### Health Organizations

#### **American Association of Diabetes Educators (AADE)**

100 West Monroe Street  
Chicago, IL 60603  
(312) 424-2426  
Diabetes Educator Access Line: 1-800-TEAMUP (338-3633)  
[www.aadenet.org](http://www.aadenet.org)

#### **American Diabetes Association (ADA)**

1701 North Beauregard Street  
Alexandria, VA 22311  
(703) 549-1500 or 1-800-342-2383  
[www.diabetes.org](http://www.diabetes.org)

#### **American Dietetic Association (ADA)**

216 West Jackson Boulevard  
Chicago, IL 60606  
Hotline: 1-800-366-1655  
[www.eatright.org](http://www.eatright.org)

#### **Juvenile Diabetes Research Foundation International (JDRF)**

120 Wall Street  
New York, NY 10005-4001  
1-800-533-2873  
[www.jdrf.org](http://www.jdrf.org)

**Diabetes UK**

The charity for people with diabetes

10 Parkway, London. NW1 7AA

Tel :0207 424 1000

[www.diabetes.org.uk](http://www.diabetes.org.uk)

**WebMDHealth**

[www.webmd.com](http://www.webmd.com)

## Diabetic and Related Supplies

**Glucosemeters4u.com**

Find guides, comparison tables and products for all your diabetes needs

[www.Glucosemeters4u.com](http://www.Glucosemeters4u.com)

**Dressingsonline.com**

Find an extensive range of wound dressings and wound care products with detailed information on their uses.

[www.dressingsonline.com](http://www.dressingsonline.com)

## How You Can Help

We hope you have found this guide useful and we would like you to tell others about this guide. You can tweet on twitter, post on facebook and let your circle know on Google+. If need be you can even use the “old fashioned” email a link to a friend. However you choose to do it please let others know.

The idea of this guide is to inform and educate. The more people that have a chance to read this guide the more we can help.

We’d also appreciate your feedback. If this guide was helpful to you, please let us know or even write a testimony and we will add it to our site. To contact us use our contact form here:

<http://www.glucosemeters4u.com/Contactus.htm>