

*P A T I E N T I N F O R M A T I O N*

**DIABETES PRACTICAL GUIDE:  
INSULIN ANALOGUES**

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## INTRODUCTION

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Diabetes mellitus is a chronic illness for which there is as yet no cure. An estimated 246 million people worldwide currently suffer from diabetes. This number is expected to increase still further by 2025 to 380 million. In Belgium 7.9% of the population have diabetes, or approximately 600,000 people. This number is expected to double by the year 2025. This illness is characterised by an excess of sugar in the blood. Good blood sugar control is only possible if you have a clear understanding of your diabetes treatment. This leaflet is intended to help you. If you have questions, do not hesitate to ask your doctor, diabetes nurse or diabetes nutritionist.

The Diabetes Team

## WHAT IS DIABETES MELLITUS?

Our bodies use sugar, or glucose, as fuel. Sugar is therefore a source of energy for our bodies. It has to penetrate every cell in our bodies in order to be used as energy. Insulin allows sugar to penetrate our cells. It is a hormone usually made in sufficient amounts by the pancreas, a gland in the abdomen.

If you have diabetes, your body does not make enough insulin, or none at all, or your body cannot make adequate use of the insulin it makes. This means that sugar cannot sufficiently penetrate your body cells and cannot therefore be used as a source of energy. You will notice this, on the one hand, because the sugar level in your blood rises and, on the other hand, because you will feel tired and listless (lack of energy). Treatment consists of daily subcutaneous injections of insulin and measuring your blood sugar level by pricking your finger.

## YOUR TREATMENT: INSULIN ANALOGUES

Insulin analogues are the latest generation of insulins. They are also known as super-slow and super-rapid insulins.

### **Super-slow insulin**

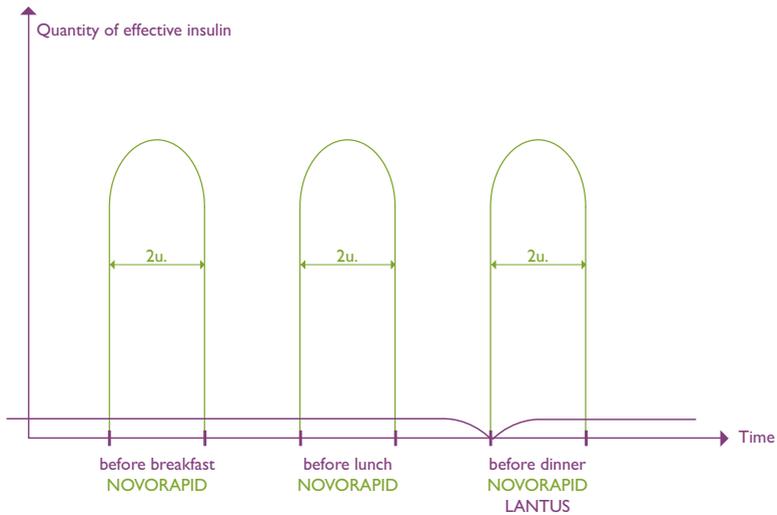
Brand name	Levemir® or Lantus®
Effective start	one to two hours after injection
Effective end	approx. 24 hours
When to inject	The super-slow insulin has to be injected at the same time each day. You can choose the time yourself, but it must be the same every day. It is best to choose a time during the evening, such as with your evening meal or before you go to bed.

### **Super-rapid insulin**

Brand name	Novorapid®, Humalog® and Apidra®
Effective start	Five minutes after injection
Effective end	approx. 2 hours after injection
When to inject	Super-rapid insulin always has to be injected before a meal. Since this insulin takes effect almost immediately after the injection, you have to eat immediately after injecting. If you miss a meal (no breakfast for example), you must not inject super-rapid insulin. If you have an extra meal, you must also give yourself an additional injection of super-rapid insulin.

### **Daily summary**

Before breakfast:	Novorapid or Humalog or Apidra
Before lunch:	Novorapid or Humalog or Apidra
Before dinner:	Novorapid or Humalog or Apidra
Set time:	Levemir or Lantus



## HOW MUCH INSULIN TO INJECT

You have to calculate the amount of super-rapid insulin you should inject before each meal. You can do this using the adjustment schedule below:

0 and 60:	- 2 U
60 and 80:	- 1 U
80 and 150:	basic
150 and 200:	+ 1 U
200 and 300:	+ 2 U
300 and 400:	+ 3 U
400 and 500:	+ 4 U

Do not adjust the slow-acting insulin!

**U = Unit**

Injecting basic insulin means that you inject the amount of super-rapid insulin prescribed by your doctor. When you are discharged from the hospital, the doctor will give you a basic insulin schedule.

### Example of basic insulin schedule (= doctor's prescription)

Before breakfast: 14 U Novorapid  
 Before lunch: 12 U Novorapid  
 Before dinner: 16 U Novorapid  
 Set time: 18 U Lantus

Before breakfast: 125 mg/dl → Basic = 14 U  
 Before lunch: 208 mg/dl → Basic = 12 U + 2 U (schedule) = 14 U  
 Before dinner: 68 mg/dl → Basic = 16 U - 1 U (schedule) = 15 U  
 Set time: 276 mg/dl → 18 U

**U = Unit**

The amount of super-slow insulin always remains the same. It is not therefore adjusted using the schedule.

## HOW TO INJECT INSULIN USING THE INSULIN PEN

The diabetes nurses give you two insulin pens. One is for the super-rapid insulin and the other is for the super-slow insulin. These pens can differ in how they are used. However, the principle of injecting remains the same:

1. Check that insulin is coming out of the pen: set to two units and spray over your hand. If no droplets of insulin appear, set to another two units and spray again. Repeat until insulin droplets appear;
2. Set to the dose (quantity) of insulin you have to inject.
3. Make a fold in your skin;
4. Insert the needle vertically into the fold of skin;
5. Inject the insulin;
6. Wait five seconds;
7. Slowly release the fold of skin and withdraw the needle.

## WHERE TO GIVE THE INJECTION

Always inject the super-rapid insulin into the abdomen and the super-slow insulin into the thigh.

Make sure that you do not always inject at exactly the same place. Inject to the left and right of the navel and inject into your left and right thighs.

## REPLACING THE NEEDLE

Use the needle on your insulin pen no more than four times. This means that you have to use a new needle every day. In the morning, put a new needle on your pen containing super-rapid insulin. After the last injection of super-rapid insulin (with your evening meal), move the needle to the pen containing super-slow insulin. Once you have injected the super-slow insulin, throw the needle away. After use, do not throw the needles into the dustbin; use a needle container. You can buy these needle containers from a pharmacy, from the Flemish Diabetes Association (VDV) or from your medical supplies provider. Full needle containers should be taken to the container bank or disposed of with domestic chemical waste.

You have to buy your needles from a pharmacy, the Flemish Diabetes Association or your medical supplies provider. A box of 100 needles costs approximately 20 euros; the standard length is eight millimetres.

## STORING INSULIN

It is best to keep supplies of insulin in the salad drawer of the refrigerator. The insulin pens should be stored at room temperature.

# MEASURING YOUR BLOOD SUGAR LEVEL

## WHY YOU SHOULD MEASURE YOUR BLOOD SUGAR

Insulin treatment attempts to achieve a normal blood sugar level. A normal blood sugar level implies a value of between 80 and 150 mg/dl. You should measure your blood sugar level before every meal so that you know straight away whether the sugar level in your blood is under control. This also allows you to calculate the correct amount of insulin. It is also important to measure your blood sugar before you go to bed.

## WHEN AND HOW OFTEN TO MEASURE

Measure your blood sugar four times per day, i.e. before every meal and before you go to sleep. Even if you inject super-slow insulin during the day, it is best to measure your blood sugar level before you go to bed.

One day per month you should also systematically measure your blood sugar level two hours after each meal. This allows you to re-evaluate the basic quantities of super-rapid insulin.

Record every blood sugar value in your diabetes diary. Also note down the quantity of insulin you have injected each time.

## HOW TO MEASURE YOUR BLOOD SUGAR

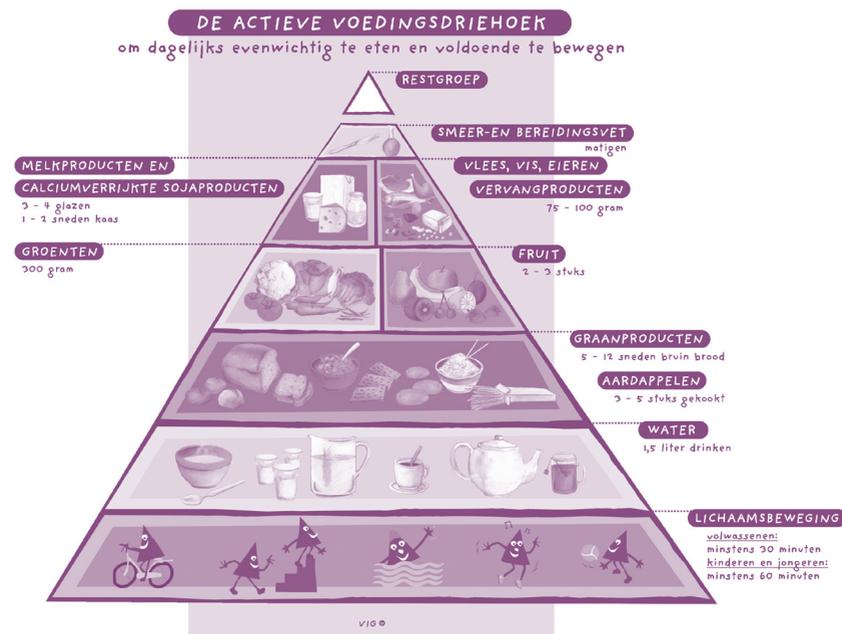
1. Wash your hands.
2. Prepare the meter; place the strip in the meter. Check the code number.
3. Prepare the lancet; replace the needle every day (in the morning). Attach the spring.
4. Place the lancet on the side of your fingertip.
5. Prick and then squeeze the blood to your fingertip. Rub from the base to the tip of your finger.
6. When you have a good drop of blood, let the strip suck it into the meter.
7. Wait a few seconds and read off the result.
8. Record the result in your diabetes diary.

# NUTRITION

Eat well and regularly. Follow the rules of the food triangle (see next page). Eat three main meals per day. Snacks such as fruit or yogurt are fine. If you have a fourth meal, you also have to give yourself a fourth injection of super-rapid insulin.

## Some general tips

- Eat at regular times and do not miss too many meals.
- Eat three meals per day with carbohydrates.
- Eat something from each layer of the food triangle at each meal (see next page).
- Respect the ratios of the food triangle.
- Use healthy fats such as olive oil, peanut oil, etc..
- Use salt in moderation.
- Maintain a healthy weight.
- Talk to your doctor, diabetes nurse or dietician about the use of alcohol.
- Take regular and adequate physical exercise. Physical exercise promotes energy use and makes your body more sensitive to insulin.
- Drink plenty. 1.5 litres of liquid is recommended every day.

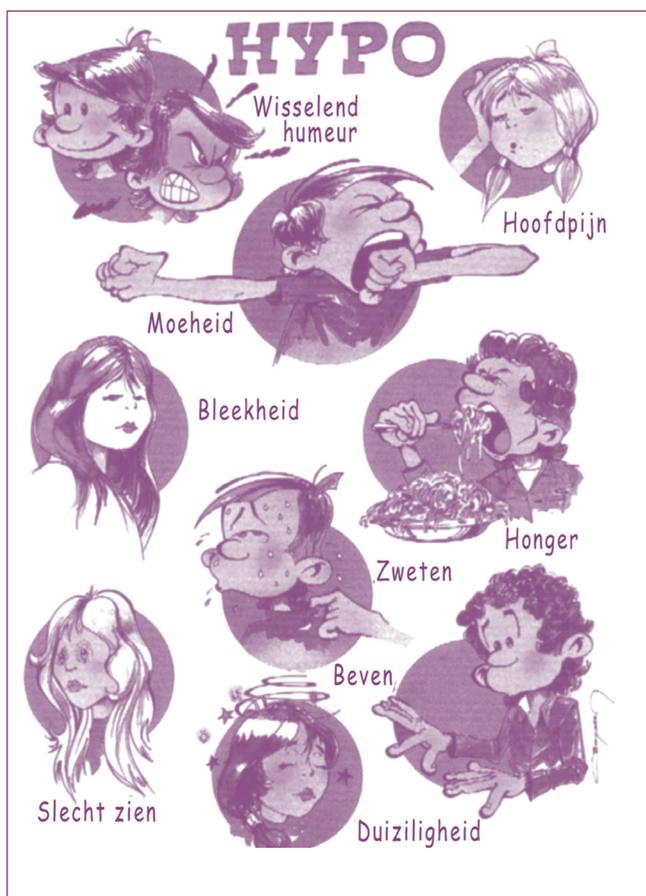


For further information about healthy eating and healthy snacks, see your dietician. Mieke Roelants, Conny Jansen and Sophie Houben are diabetes dieticians.

They are available every working day on 016 34 10 86 or 016 34 10 88.

# WHAT TO DO IF YOUR BLOOD SUGAR LEVEL IS TOO LOW

Insufficient sugar in the blood is also known as hypoglycaemia or hypo for short. This means a blood sugar level of below 60 mg/dl. You will not feel well. Possible symptoms of hypo include shivering, sweating, dizziness, hunger, poor vision, headache, paleness, etc..



Novonordisk

1. Take action immediately; do not wait if you think you are hypo.
2. If you feel well, measure your sugar level immediately, if possible.
3. If your sugar level is below 60 mg/dl, you must take some sugar immediately; either a glass of ordinary coca-cola (not diet) or two sugar lumps or four lumps of dextrose.
4. Wait ten to fifteen minutes.
5. Record the hypo and the time in your diabetes diary.

## WHAT TO DO IF YOUR BLOOD SUGAR LEVEL IS TOO HIGH

A one-off higher blood sugar value is no cause for panic. If you notice that your blood sugar values are regularly above 200 mg/dl, contact the diabetes nurse on 016 34 34 75.

## WHERE TO GET YOUR SUPPLIES

If you need insulin injections four times per day and measure your sugar regularly yourself, you are eligible for a refund of the supplies you need. This refund can be requested at this hospital or at a hospital closer to your home, which is a member of the diabetes convention. Ask your diabetes nurses for more information. The request will be dealt with by the diabetes nurse. We send you a form which you have to sign, date and return to the hospital as quickly as possible (stamped, addressed envelope enclosed). This request has to be made every year, which the diabetes nurses will handle.

In order to remain eligible for your refund, you must come to the hospital regularly for an appointment (every four to six months). You will be given enough supplies at each visit for the next four to six months. Make sure you always make a new appointment. If your insulin pen or meter is faulty, contact the diabetes nurses in the first instance.

### WHERE TO COLLECT YOUR SUPPLIES

Measuring blood sugar		Injecting insulin	
Meter	Diabetes team	Insulin pen(s)	Diabetes team
Strips	Diabetes team	Insulin	Pharmacy with doctor's prescription
Lancet (finger prick)	Diabetes team	Insulin pen needles	Buy yourself (pharmacy of VDV)
Lancet needles	Diabetes team	Diabetes diary	Diabetes team
batteries Meter	Buy yourself	Needle containers	Pharmacy, VDV, bandage suppliers, etc.

## WHAT YOU SHOULD BRING TO YOUR APPOINTMENT

- Diabetes diary!
- Meter
- Insulin pens
- List of medicines you are taking

## THE IMPORTANCE OF YOUR DIABETES TREATMENT

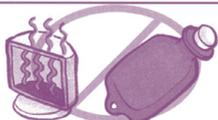
The aim of good blood sugar control is to prevent diabetes complications in the long term. If you carefully control your blood sugar, the risk of complications is low. Complications can be divided into three groups:

- Blood vessel disorders (heart, eyes, kidneys, legs, brain);
- Nerve disorders;
- Infections and foot problems.

Here we discuss how to prevent foot problems. Foot problems usually occur as a result of several factors: clotting problems, reduced sensitivity as a result of nerve problems and slower healing of wounds as a result of higher blood sugar values. If you have a wound on your foot, it is possible that you will not notice it straight away because you have less or no pain. The wound will also heal more slowly. Prevention is therefore better than cure. You can do this by taking some simple steps:

- Look at your feet everyday (including the soles);
- If you have any wounds, treat them immediately. If the wound does not improve after two days, contact your doctor or diabetes nurse. Do not wait!
- Wear good shoes (not too narrow);
- Remove calluses as soon as possible (preferably by pedicure);
- Do not cut your nails too short and cut them straight across. It is best to have a pedicure every six weeks;
- Rub moisturising cream on your feet every day before going to bed. Do not rub cream in between the toes.

If you have foot problems and/or wounds, contact the diabetes nurses immediately.

	GOED	FOUT
Voor koude voeten		
Om de voeten te reinigen		
Zitten		
Sokken dragen		
Schoenen kopen		

Novonordisk

## MORE INFORMATION

If you have any problems or questions, please contact the diabetes nurses, preferably on Monday or Tuesday afternoons, between 9 am and 4 pm, on 016 34 34 75.

If you have an urgent problem and you cannot reach the diabetes nurses, please contact your general practitioner or the endocrinology department, on 016 34 64 20.

If you have questions or problems regarding your nutrition, you can always contact the diabetes dieticians. They are available every working day between 9 am and 4 pm on 016 34 10 86 or 016 34 10 88.





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