

KEEPING SAFE WITH INSULIN THERAPY

➤ WHY IS THIS LEAFLET FOR YOU?

Insulin treatment improves the quality of life in many people and saves the lives of others. It is used to lower blood glucose levels. However, insulin management and prescribing errors are very common and can lead to patient harm. These are often as a result of not having:

- The right insulin
- The right dose
- The right time
- The right device
- The right way

This leaflet can help you to get the most out of your insulin treatment and keep **YOU** safe.

Sponsoring companies:

Abbott, BD, GlucoRx, Lilly Diabetes, Mylan, Neon Diagnostics, Novo Nordisk, Owen Mumford and Sanofi Diabetes.

➤ THE RIGHT PERSON

Everybody's insulin requirements differ. How much insulin and how many injections you need each day will depend on a number of factors including the type of diabetes you have, your lifestyle and meal-pattern, how long you have had diabetes and whether you also take tablets and other non insulin medications to control your blood glucose levels.

Whatever your insulin regimen is, it is important to know the name or names of your insulin, the doses that you have been advised to inject, and the type of insulin device you use. You can then be sure that you have been prescribed and issued with the correct treatment. Always carry your insulin safety card with you to confirm this information.

Insulin can cause hypoglycaemia (low blood glucose level or 'hypos'). Make sure you know the symptoms of a hypo and carry fast acting glucose and a starch snack with you at all times.

➤ THE RIGHT INSULIN

Over 30 different insulins are available in the UK so always check you have the correct one. Some work very rapidly, some very slowly. Some have similar names but very different actions. This table shows some insulin names that are often confused.

Humalog with	Humalog Mix 25 or Humalog Mix 50
Humulin S with	Humulin I or Humulin M3
Humalog with	Humulin I or Humulin S or Humulin M3
Novorapid with	Novomix 30
Levemir with	Lantus

Mixed insulins:

These are a mixture of rapid or short-acting insulin with a long-acting. They are usually given at breakfast and the evening meal time. The number after the name relates to the percentage of rapid/short-acting insulin in the mix (e.g. Insuman Comb 25, Humalog Mix 25, Novomix 30). They must be thoroughly re-suspended before each dose to ensure you inject the correct mixture.

There are also types of insulin mixed with GLP-I receptor agonists

- Xultophy (Tresiba insulin and liraglutide). **Do not use more than 50 dose steps a day**
- Soliqua 100/33 contains a combination of insulin Lantus and lixisenatide. **Do not use more than 60 units of Soliqua 100/33 each day.**

Different concentrations:

Until recently, all insulin was only available as 100 units per ml (u100). However, there are now a number of different concentrations of insulin:

200 units per ml (u200) is double the concentration of 100 units per ml

300 units per ml (u300) is 3 times the concentration of 100 units per ml



- ❗ Always check the name and strength of insulin that you have been given before you leave the pharmacy.
- ❗ Always carry your insulin safety card with you.
- ⊘ **Never use a syringe to withdraw insulin from a pre-filled pen device.**

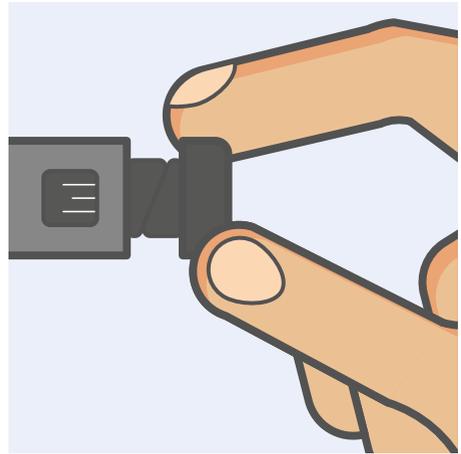
Biosimilar insulins:

These are manufactured copies of previously approved insulins. They are produced in the same way, have similar action to the original product, but are not identical. Biosimilar insulin has been seen to demonstrate the same safety profile and effectiveness as the original insulin. However, it cannot be used intermittently instead of the original insulin e.g using the original insulin one day and the biosimilar the next.

> THE RIGHT DOSE

No single dose fits all: how much you need depends on your weight, type of diabetes you have, the amount of carbohydrate food (sugar and starches) you eat, activity levels and many other factors. Your doctor or nurse will advise you how much to inject or you may have attended an education course where you have learned how to adjust your insulin appropriately.

Testing your glucose regularly will help you and your doctor or nurse know if you are taking the correct dose for you.



There is no maximum dose for insulin but too much causes weight gain and increases your risk of hypos.

Insulin should always be prescribed with a number followed by "units" (e.g. 20 units). If "units" is abbreviated to "u", the "u" can be mistaken for an "o" and you or somebody giving you the injection will give the wrong amount of insulin.

> THE RIGHT TIME

Some people need to take insulin with or just after food; others up to 30 minutes before food, and some at bedtime. Please check with your doctor or nurse when you should take yours.

If you are admitted to hospital and are well enough, ask to keep your insulin with you so you can continue to give your insulin at the right time. If you can't give or keep your own insulin, don't be afraid to ask staff when you need it. Many hospitals have key coded medication boxes, if your medication has to be locked away please ask staff if you could have access to one of these

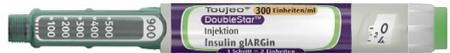
THE RIGHT DEVICE

If you use syringes, you should always check that it is an insulin syringe. These should only be used to withdraw insulin from insulin vials. They must never be used to draw insulin from cartridges or pre-filled pens. Syringes are available in 0.5 ml (50 units) measured in single unit increments and 1ml (100 units) in 2 unit increments.



Insulin is available in cartridges for re-useable pens. The cartridge is replaced when empty. Always use the pen provided by the same manufacturer of your insulin so the cartridge fits correctly. Always keep a spare pen in case of breakage.

! Be aware that with some devices one click may not represent 1 unit. For example with Novo Echo and Lilly HD devices one click is half a unit, whilst with the Sanofi DoubleSTAR device one click is 2 units.



! If you have poor vision your Dr or Nurse will need to check that you can use this device safely.

Pre-filled disposable insulin pens can be thrown away in household rubbish when empty, after the needle has been removed.

If you use an insulin pump, always keep cartridges and a pen, or disposable pens, in case of pump malfunction.

Needles for pens are available in several sizes. 4mm pen needles are suitable for everybody but some people choose to use 5 or 6 mm needles. Needles longer than 6mm can increase your risk of injecting into muscle which is painful and can cause hypos. Don't re-use needles as they quickly become damaged.



Make sure you dispose of needles in a 'sharps' bin according to local policy.

If a nurse or carer gives you your insulin, they should use safety needles or a safety insulin syringe to prevent accidental injuries to the giver of insulin.

! Keep plenty of supplies especially if you are going on holiday: never run out of insulin!

> THE RIGHT WAY

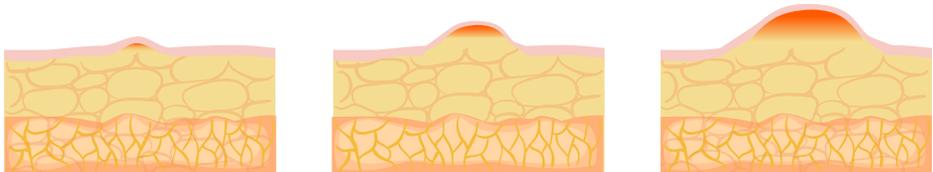
Insulin should be injected at a 90 degree angle. If you are using short needles, a skin-fold is not necessary unless you are very slim.

You can use the upper outer thighs, upper outer buttocks and abdomen as injection sites.

- ❗ Never re-use needles. Re-using needles can be associated with pain, discomfort and risk of lipohypertrophy
- ❗ Always use a new needle for each injection

Always use a rotation system to ensure you don't overuse your sites

Vary the places you inject into to avoid the development of fatty lumps (lipohypertrophy or "lipos"). Lipos prevent insulin from being absorbed correctly and can make it difficult to control your glucose levels.

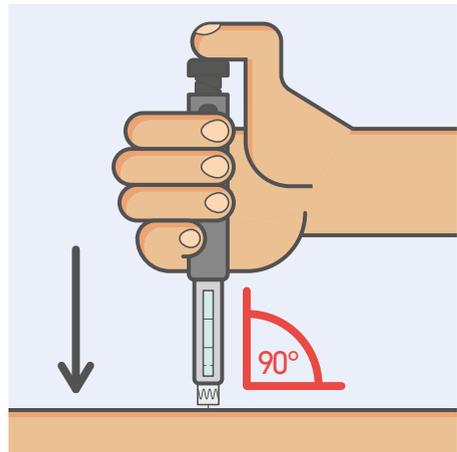


Your injection sites should be checked by your nurse as part of your annual diabetes review. You should also check your injection sites regularly to ensure lumpy areas are not forming. Avoid injecting into any lumpy areas

Always re-suspend insulin if it is a cloudy or mixed insulin by tipping and rolling the pen or vial 10 times **each** before every injection.

Store unused insulin in a refrigerator- it must not freeze. Insulin currently in use can be kept at room temperature for up to 28 days. Avoid direct sunlight or heat e.g. near radiators, fires or window sills.

Information about correct injection technique can be found at www.trend-uk.org - Injection Technique Matters Best Practice Guideline To Support Correct Injection Technique In Diabetes Care



> DRIVING AND INSULIN USERS

You must notify the DVLA if you are an insulin user.

You must test your blood glucose, no longer than 2 hours, before driving.

Test every 2 hours on long journeys.

If your blood glucose is less than 4 mmol/L, treat the hypo and do not drive for at least 45 minutes after you have recovered.

Your blood glucose must be higher than 5 mmol/L to drive. If between 4 and 5 mmol/L, have a starchy snack and wait until your blood glucose level has risen to above 5 mmol/L.

Always carry glucose, a starch snack and a glucose meter in the car. Test your blood glucose if you are involved in an accident to demonstrate hypoglycaemia was not a contributing factor.

If you feel hypo while driving, stop as soon as safely possible. Remove the ignition key to demonstrate you are not in charge of a moving vehicle. Get out of the driver's seat if safe to do so. Treat the hypo. Do not drive for at least 45 minutes after recovery.

If you are a Group 1 driver and have more than one severe hypo (i.e. needing help from another person) in a 12 month period, you will need to surrender your driving licence.

Advice for Group 2 drivers is much stricter. See the DVLA website for more information.

Interstitial glucose monitoring systems (also known as Flash Glucose Monitoring Systems and Real-Time Continuous Glucose Monitoring Systems) can now be used for monitoring glucose at times relevant to driving Group 1 vehicles (not Group 2). Users of these systems must also carry finger-prick capillary glucose testing equipment as there are times when a confirmatory finger prick blood glucose level is required. See the INF 294 leaflet on the DVLA website for further details.



> KEY POINTS:

- ❗ Know the name and dose of your insulin.
- ❗ Always check you have been given the correct insulin when you collect your supply from your pharmacist.
- ❗ Carry an insulin safety card at all times.
- ❗ Know the symptoms of hypos and always carry glucose and a starchy snack.
- ❗ Ensure you are using the correct injection technique for administering your insulin.



> USEFUL RESOURCES:

TREND-UK: www.trend-uk.org

Injection Technique Matters: www.injectiontechniquematters.org.uk

Diabetes UK: www.diabetes.org.uk

Driving and Vehicle Licensing Agency: www.gov.uk



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