

GUIDELINE FOR THE ADMINISTRATION OF INSULIN BY NURSING STAFF



TARGET AUDIENCE	All registered nursing staff who require to administer insulin. All staff involved in the use of insulin pen devices, or in the education of patients in the use of these devices.
PATIENT GROUP	Adults with diabetes who use insulin therapy.

SUMMARY OF GUIDELINE

When:

- Patient is unable to self-administer their injection.

How:

- Ensure the patient's insulin is available in vials or prefilled pen device.
- Check the name of the insulin and dose against the patient's insulin prescription chart.
- Check insulin correctly stored and its expiry date.
- Wash hands, put on gloves.
- Check patient's blood glucose level and record the result.
- Prepare the insulin syringe or pen device.
- Select the injection site.
- Raise the skin and insert the needle.
- Depress the insulin syringe or pen device and hold in place for a count of 10.
- Remove the needle and insulin syringe or device and dispose safely.
- Record the dose, time, batch number, discard date (28 days after opening) and site of injection on the chart and add your initials.
- If the patient is administered pre-meal analogue insulin i.e. rapid acting, the patient should eat immediately after insulin administration.

Remember:

- The insulin syringe or pen device must not be prepared and stored in advance of the procedure.
- Do not draw insulin from a pen cartridge using a needle or insulin syringe.
- Report to a supervisor any bleeding from the injection site, pain following administration or if insulin appears at the site of injection.
- Report any persistent issues with hypo or hyperglycaemia when blood glucose testing to the patient's Diabetes team.

Guideline for the Administration of Insulin by Nursing Staff

CLINICAL GUIDELINES SUMMARY

Within both the community and acute settings there are a group of patients who need their injections administered by Registered Nurses as they are incapable of self-injection due to a variety of reasons, including poor manual dexterity, lack of strength, mental ability. (See Appendix 1).

This guideline provides information and advice on the sub-cutaneous administration of insulin to reduce the risk of error in medicines administration and needlestick injury. This guideline also seeks to promote safe practice in the use of insulin PEN devices, which can be used when the traditional method of insulin syringe and vial is not appropriate.

It is recommended that, whenever possible, insulin must be administered using an insulin safety syringe and vial (*NHS Lanarkshire - Bloodborne Virus Exposure Prevention and Management Policy 2018*).

In the event that the medication prescribed is only available in a pen device (due to the type of insulin prescribed) the Registered Nurse must ensure they are proficient in the use of the pen and safety needle.

Responsibility for the procedure is with the Registered Nurse. They must ensure that they are competent in the following before undertaking the procedure:

- Understanding and interpreting an insulin prescription for administration by community nurses and record of administration of insulin chart.
- Drawing up the correct dose of insulin into an insulin syringe or correctly using a pen device.
- Knowledge of injection sites.
- Examination of injection sites for lipodystrophy (lumpy areas).
- Administering a subcutaneous injection.
- Safe disposal of sharps, immediately after use.
- The use of a blood glucose meter to monitor blood glucose and interpretation of the result.
- How to recognise and respond to hyper- or hypoglycaemia.
- Patient/carer communication strategies, with the outcome of increased patient/carer involvement and concordance in all aspects of Diabetes management and decision making.
- Record keeping which complies with the NHS Lanarkshire policies.

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PATIENT CRITERIA

Teaching self-administration of insulin for new Type 1s and Type 2s commencing insulin therapy within the hospital environment should be undertaken by appropriately trained staff who are fully aware of the working mechanisms of all insulin devices.

NB Being able to self-administer is an essential part of a patient's education and should be carried out under the supervision of trained staff prior to discharge.

Community patients who are experiencing difficulties in drawing up and administering their insulin on their own should be assessed by community nursing staff and, where appropriate, referred to the Diabetes Specialist Nurse for additional support and assessment. Any changes in the patient's diabetes management should be clearly documented and communicated effectively to all those involved in the care of that individual.

ADMINISTRATION OF INSULIN BY NURSING STAFF

Identification of Insulin

- Is the insulin available in vials? If yes, follow procedure for administration of insulin with insulin safety syringes.
- The following insulins are available in 10ml vials: Lantus, Humulin I, Humulin M3, Humulin S, Humalog Mix 25, Humalog 100units/ml, Insulatard, Lyumjev, Fiasp, Novorapid and Apidra.
- If the insulin is not available in vials, ensure that the insulin has been prescribed for use in the appropriate pre-loaded disposable pen.
- Where insulin is to be administered by a Registered Nurse the use of prefilled PEN devices is preferred for those patients. All have a similar mechanism and are easy to demonstrate and use.

NB Pre-meal analogue insulin is rapid acting and the person with Diabetes requires to eat immediately after insulin administration.

- **Never withdraw insulin from a cartridge or prefilled pen using a needle and insulin syringe. This contaminates the insulin and interferes with accurate dose determination using the PEN device.** (See Appendix 2).
- The insulin must never be drawn up in an insulin syringe or the pen dialled up and stored in advance of the procedure.

Equipment required

- U100 disposable insulin safety syringe
- Vial of insulin

OR

- Pre-loaded insulin device with appropriate safety needle²
- Sharps box
- Gloves
- Blood glucose meter

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Procedure

- Ensure prescription is complete, correct, legible and unambiguous prior to administration.
- Check the name of the insulin and dose against the insulin prescription chart in the patient's record.
- Confirm the identity of the patient prior to administering the insulin.
- Check the insulin has not already been administered by someone else.
- Wash hands and put on gloves.
- Check the blood glucose level according to NHS Lanarkshire guideline on blood glucose monitoring and record the result prior to administering the insulin.
- Check correct storage of insulin.
- Check expiry date.
- Prepare the insulin safety syringe or pen device (see below).
- Select injection site - remember to rotate injection sites, never use the same site for consecutive injections.
- Insulin should be injected into sub-cutaneous tissue or soft fat, not muscle. To avoid intramuscular injection, evidence suggests that raising the skin is best practice and, in some cases, use of a smaller needle will be recommended by the specialist clinician (see below).
- Continue to raise the skin and hold the insulin syringe in place for a count of 10 to ensure that the insulin disperses from the site of the injection.
- Remove the needle and insulin syringe and dispose as per safe disposal of sharps.
- Record the dose, timing, site of insulin injection and batch number on the chart and add your initials.

NB In the hospital environment, insulin should be checked by two registered nurses (or nurse and medical practitioner); as this is not possible within the community setting, extra care and vigilance must be practised by the Registered Nurse when administering insulin.

Preparing insulin syringe

- For isophane and pre-mixed insulin invert the vial of insulin backwards and forwards and roll gently between your hands approximately 20 times to ensure the insulin is well mixed. Do not shake.
- Take the insulin syringe and pull back the plunger to measure the amount of air equivalent to the amount of insulin to be drawn up. Expelling air into the vial prior to an injection creates a vacuum and makes it easier to draw out the insulin.
- With the vial standing upright insert the needle straight through the centre of the rubber cap of the insulin vial and push the plunger down.
- Turn the vial upside down. Make sure that the point of the needle inside the vial is well beneath the surface of the insulin to avoid unnecessary air bubbles.
- Pull back the plunger until you have measured slightly more than the required dose of insulin.
- Flick or tap any air bubbles to the top of the insulin syringe, then push the plunger back to the desired dose expelling the bubbles into the vial. Air bubbles are not dangerous if injected into the recommended subcutaneous injection sites. This procedure ensures an accurate dose of insulin. If air bubbles persist then expel all the insulin back into the vial and start again.
- Remove the needle from the vial and recheck the dose.

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Preparing preloaded pen device

- Attach a safety pen needle – these come in a range of sizes.²
- Inject into clean skin with clean hands. Alcohol wipes are not recommended. Alcohol is an astringent and can make the injection more painful as well as hardening the skin.
- If using cloudy insulin gently roll the pen ten times and invert the pen ten times. The liquid should look evenly mixed.
- Prime pen by dialling up 2 units. Point pen upwards and depress injector button.
- Ensure insulin is expelled from needle – repeat priming process if no insulin seen
- Turn the dose knob to the number of units to be administered.

SAFE DISPOSAL OF SHARPS

- Insulin syringe and needle – dispose directly into the sharps box to avoid needlestick injury.

NB If needlestick injury occurs take prompt action as per *NHS Lanarkshire's Bloodborne Virus Exposure Prevention and Management Policy 2018*.¹

<http://firstport2/staff-support/needlestick-injury/default.aspx>

STORAGE OF INSULIN

- Unopened insulin vials/pre-loaded pens should be stored in the main body of the fridge at 2-8C. If stored in this way the insulin remains useable up until its expiry date.
- Insulin in use should be stored at room temperature. Stored in this way, the insulin remains stable and useable for 1 month.

NB Write the discard date on vials i.e. one month from removing from the fridge.

- Partly used insulin pens should never be returned to the fridge to be reused. They must be discarded.
- In hospital, insulin pens in use are stored with the patient in their POD locker. Opened vials are usually stored in the fridge and annotated with one month expiry.

REFERENCES

1. Bloodborne Virus Exposure Prevention and Management Policy - MASTER COPY - 03.05.18.pdf
2. NHSL Joint Adult Formulary - Hypodermic Equipment
<https://nhslguidelines.scot.nhs.uk/medicines-guidance/joint-adult-formulary/chapter-6-endocrine-system/diagnostic-and-monitoring-agents-for-diabetes/hypodermic-equipment/>
3. Royal College of Nursing UK (2022) Starting Injectable Treatment in Adults Type 2

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APPENDIX 1

Administration of Insulin by Nursing Staff – a check-list

To determine whether a patient is unable to self-administer their injections, **consider the following:-**

- Is the patient able to independently and safely prepare the insulin?
 - Does the patient have any eyesight problems or manual dexterity problems which may impede the proposed system?
- Is the patient able to administer the correct dose of insulin?
 - Are there any factors which make the patient particularly vulnerable to dosing inaccuracies?
- Is the patient able to administer the insulin at the correct time?
 - Are there any factors which make the patient particularly vulnerable to timing inaccuracies?

(**NB** Insulin must never be drawn up in an insulin syringe or the pen dialled up and stored up in advance of the procedure.)

If any of the above is in doubt, then the Nurse should refer to / complete:

1. Administration of insulin by nursing staff guideline, March 2024
2. Administration of insulin by nursing staff risk assessment (*see Appendix 3*)

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APPENDIX 2

Lanarkshire guideline for high strength insulins and injectable diabetes therapies

Potential clinical risk if not administered correctly

The use of this range of insulins could potentially increase the number of medication errors – inappropriate dispensing, prescribing and administration.

Traditionally all insulins have been available as 100units/ml solutions. Non-standard concentrations of insulin are becoming increasingly available, including 200units/ml, 300units/ml (depending on brand of insulin).

There has also been the introduction of new terminology ‘dose steps’ for adjusting the insulin / GLP-1 injectable – combined treatment Xultophy uses ‘dose steps’ and not units.

It is the practice of drawing insulin from the prefilled pens that introduces a new risk to the process. Insulin syringes are 100unit/ml with increment marks for each 1 unit. Using the syringe to draw from the pen of a concentrated product could lead to the wrong number of units being administered, potentially leading to hypoglycaemia.

Never withdraw insulin from a cartridge or prefilled pen using a needle and insulin syringe. This contaminates the insulin and interferes with accurate dose determination using the PEN device.

High strength insulins are only available in prefilled pens. The pens are designed to ensure that the dose dialled up on the pen is the dose that will be administered. No adjustments or calculations needed. High strength insulin must only be administered directly from the pen device.

Key Points

- The insulin is prescribed / supplied / administered using the provided prefilled pen device
- Ensure insulin is prescribed correctly in Medicine kardex and Insulin chart; where different concentrations are available, then it will be necessary to specify the concentration on prescription
- NEVER use a syringe to withdraw insulin from the prefilled pen
- Part of routine checking of an insulin dose should also include checking that the concentration is correct
- If appropriate, show the patient the insulin to confirm this is the one they use

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High Strength, Fixed Combination and Biosimilar Insulin Products

Insulin is now available in different concentrations: 100units/ml, 200units/ml, 300units/ml

The concentrations available will depend on the brand of insulin used.

Also included in the table below are biosimilar and combination products.

Never withdraw insulin from a cartridge or prefilled pen using a needle and insulin syringe.

Key Feature	Brand	Active ingredient	Available concentrations	Device	Image
High strength insulin	Tresiba®	Insulin degludec	200units/ml 100units/ml	Flextouch Prefilled pen Also in cartridge for 100units/ml	
Standard strength insulin	Humalog®	Insulin lispro	100units/ml	Kwikpen Prefilled pen	
High strength insulin	Humalog®	Insulin lispro	200units/ml	Kwikpen Prefilled pen	
Standard strength insulin	Lantus®	Insulin glargine	100units/ml	Solostar Prefilled pen Also in vial	
High strength insulin	Toujeo®	Insulin glargine	300units/ml	Solostar Prefilled pen	
Biosimilar	Abasaglar®	Insulin glargine	100units/ml	Kwikpen Prefilled pen Also in cartridges	
Fixed combination	Xultophy®	Insulin degludec + liraglutide	100units/3.6mg/ml (prescribed as 'dose steps' as opposed to units)	Flextouch Prefilled pen	

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