

Pharmacological Management of Diabetes (Adults and Paediatrics) - Insulin Therapy

Insulin therapy for Type 1 diabetes in adults (NICE guideline, Published: 26 August 2015)

Insulin regimens:

- Offer multiple daily injection basal-bolus insulin regimens as the first choice regimen, rather than twice-daily mixed insulin regimens.
- Do not offer adults newly diagnosed with type 1 diabetes non-basal-bolus insulin regimens (that is, twice-daily mixed, basal only or bolus only).

Long-acting insulin (basal):

- Offer twice-daily insulin detemir (Levemir[®]) as basal insulin therapy.
- Alternative basal insulin therapy for adults with type 1 diabetes:
 - an existing insulin regimen being used by the person that is achieving their agreed targets
 - once-daily insulin glargine/ insulin glargine biosimilar or insulin detemir if twice-daily basal insulin injection is not acceptable to the person, or once-daily insulin glargine/insulin glargine biosimilar if insulin detemir is not tolerated.
- Consider other basal insulin regimens for adults with type 1 diabetes only if the regimens detailed above do not deliver agreed targets. When choosing an alternative insulin regimen, take account of the person's preferences and acquisition cost.

Rapid-acting insulin (bolus):

- Offer rapid-acting insulin analogues injected before meals (Apidra[®], Humalog[®] or NovoRapid[®]), rather than rapid-acting soluble human or animal insulins, for mealtime insulin replacement.
- Do not advise routine use of rapid-acting insulin analogues after meals for adults with type 1 diabetes.

Mixed insulin:

- Consider a twice-daily human mixed insulin regimen for adults with type 1 diabetes if a multiple daily injection basal-bolus insulin regimen is not possible and a twice-daily mixed insulin regimen is chosen.
- Consider a trial of a twice-daily analogue mixed insulin regimen if an adult using a twice-daily human mixed insulin regimen has hypoglycaemia that affects their quality of life.

Formulary Insulin Choices for Type 1 Diabetes - Human

Duration of action/type of insulin	Formulary choices	10mL vial available Yes / No	Name of pre-filled disposable injection	Name of non-disposable pen for 3ml cartridge	Comments/notes
Rapid-acting insulins: Recombinant human insulin analogue	Apidra® (insulin glulisine)	Yes	Apidra® SoloStar®	ClikSTAR®	The rapid-acting human insulin analogues have a faster onset and shorter duration of action than soluble insulin. They should be injected immediately before or, if necessary, shortly after a meal.
	Humalog® (insulin lispro)	Yes	Humalog® KwikPen	HumaPen®	
	NovoRapid® (insulin aspart)	Yes	NovoRapid® FlexPen®	NovoPen®	
Short-acting insulins: soluble insulin	Actrapid®	Yes	Not available	Not available	Injected 15 to 30 minutes before meals. For use in hospital setting only.
	Humulin S®	Yes	Not available	HumaPen®	
Intermediate-acting insulins: human isophane insulin (NPH)	Insuman® Basal (isophane insulin)	5mL vial	Insuman® Basal Solostar®	ClikSTAR®	Injected at bedtime or twice daily according to need.
Intermediate-acting insulins: biphasic (mixed) insulins	Insuman® Comb (15, 25, 50) (biphasic isophane insulin) First choice biphasic	Insuman® Comb 25 (5ml vial)	Insuman® Comb 25 SoloStar®	Insuman® Comb (15, 25, 50) for ClikSTAR®	Injected 30 minutes before meals. Commonly used in twice daily regimens.
	Humalog® Mix50 (biphasic insulin lispro-human analogue)	No	Humalog® Mix50 KwikPen	HumaPen®	Humalog® Mix50 should be reserved for insulin resistant type 2 diabetics requiring three times daily dosing.
	NovoMix® 30 (biphasic insulin aspart)	No	NovoMix® 30 FlexPen®	NovoPen®	For patients requiring a biphasic (mixed) insulin regimen rather than a basal-bolus insulin regimen.

Long-acting insulins: recombinant human insulin analogue	Lantus [®] (insulin glargine)	Yes	Lantus [®] SoloStar [®]	ClikSTAR [®]	Insulin glargine and insulin glargine biosimilar are given once daily. Abasaglar [®] (insulin glargine biosimilar) to be initiated for new patients when insulin glargine required. Specialist review and consideration of a switch from Lantus [®] (insulin glargine) to Abasaglar [®] (insulin glargine biosimilar) for stable patients.
	Abasaglar [®] (insulin glargine biosimilar)	No	Abasaglar [®] KwikPen	HumaPen [®]	
	Levemir [®] (insulin detemir)	No	Levemir [®] FlexPen [®]	NovoPen [®]	Insulin detemir is given once or twice daily.

Animal Insulin Preparations

Porcine and bovine insulin preparations are available for established patients or for patients for which human insulin is unsuitable

Insulin therapy for Type 2 diabetes:

- **Commence human isophane (NPH) insulin once or twice daily as first choice.**
- NICE CG87 on the management of type 2 diabetes recommends that when insulin therapy is required, human isophane (NPH) insulin (e.g. Insuman[®] Basal) is the preferred first-choice insulin. This is based on cost effectiveness and safety.
- For most people with type 2 diabetes, long-acting insulin analogues (insulin glargine and insulin detemir) offer no significant clinical advantage over NPH insulin, and are more costly. Insulin glargine and insulin detemir are equivalent to NPH (and to each other) in terms of glycaemic control as reflected in HbA_{1c} level, although may have a modest beneficial effect in terms of hypoglycaemia, especially at night.
- **Long-acting insulin analogues are not recommended for routine use in type 2 diabetes.**
- Long-acting insulin analogues should only be considered for those who fall into the following categories:
 - People who require assistance from a carer or healthcare professional to administer their insulin injections, and the use of a long-acting insulin analogue would reduce the frequency of visits from twice a day to once a day.
 - People whose lifestyle is significantly restricted by recurrent symptomatic hypoglycaemia on NPH.
 - People who would otherwise need twice daily NPH insulin in combination with oral antidiabetic drugs.
 - People who cannot use the device needed to inject NPH insulin, but who could administer their own insulin safely and accurately if a switch to a long-acting insulin analogue were made.

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Approved by: Diabetes Network, Medicines Management Committee

Review date: November 2017, or earlier as appropriate

- Clinicians should review and, where appropriate, revise prescribing of long-acting insulin analogues in type 2 diabetes to ensure use in line with NICE guidance.

Insulin therapy for Type 2 diabetes: Human isophane (NPH) insulin (Insuman[®] Basal) is the first choice insulin in the management of type 2 diabetes. Long-acting insulin analogues (insulin glargine and insulin detemir) offer no significant clinical advantage over NPH insulin in type 2 diabetes, and are more costly.

Duration of action/type of insulin	Formulary choices	10mL vial available Yes / No	Name of pre-filled disposable injection	Name of non-disposable pen for 3ml cartridge	Comments/notes
Intermediate-acting insulins: human isophane insulin (NPH)	Insuman [®] Basal (isophane insulin)	5mL vial	Insuman [®] Basal Solostar [®]	ClikSTAR [®]	Injected at bedtime or twice daily according to need.
	Humulin I (isophane insulin)	Yes	Humulin I KwikPen [®]	Humapen [®] Luxura	
	Insulatard (isophane insulin)	Yes	Insulatard InnoLet [®]	NovoPen [®]	

General advice:

- Type of insulin, device and needle gauge and length should be specified when prescribing. Care should be taken to write the brand name in full to avoid errors.
- NICE recommends that needles to use with pre-filled and reusable insulin pen injectors should be chosen with the lowest acquisition cost. Microdot Droplet[®] pen needles (available as 4mm, 6mm and 8mm) and Insupen[®] pen needles (available as 4mm/33G, 4mm/32G, 6mm/32G, 8mm/32G, 5mm/31G, 6mm/31G and 8mm/31G) are cost effective first line pen needles.
- All needles are for single use only. Please ensure that patients are educated about the safe disposal of needles via a sharps bin. Sharps bins (Sharpsafe 1 litre/Sharpsguard 1 litre) can be prescribed on FP10 prescription.
- The brands of insulin are available in a variety of vial, cartridge and pre-filled disposable pen presentations. Insulin is usually available in 3ml cartridges, 10ml vials and 3ml pre-filled disposable injection devices. Not all insulin cartridges fit all pens. Reusable pens are available on prescription.
- The term “units” should be used in all contexts. Abbreviations, such as ‘u’ or ‘IU’, should never be used (NPSA/2010/RRR013).
- Patients on insulin therapy should receive a patient information booklet and an Insulin Passport to help provide accurate identification of their current insulin products and provide essential information across healthcare sectors (NPSA/2011/PSA003).