

## Insulin analogues to human insulin for patients with type 2 diabetes

Human (NPH) insulin is recommended by NICE for initiation in all new patients with type 2 diabetes requiring insulin.<sup>1</sup> Usage of long acting insulin analogues has increased markedly over the last nine years despite this recommendation. The different types of insulin, regimens and devices present various advantages and disadvantages that can affect adherence, quality of life and glycaemic control.<sup>2</sup> NPH insulin is an intermediate acting insulin, and is also known as isophane insulin or isophane protamine insulin. NPH insulin contains protamine which prolongs the action of insulin.<sup>3</sup>

### Key recommendations

- New patients with type 2 diabetes requiring insulin should be prescribed human isophane (NPH) insulin first line.
- Patients with type 2 diabetes currently on a long acting insulin analogue, i.e. insulin detemir, insulin glargine or insulin degludec, to be audited and considered for a change to NPH insulin if it has not previously been tried and HbA1c not within target or two or more injections per day are being used, taking care to tailor any switch to the needs of the individual patient.
- The least costly NPH product, (vial, cartridge or disposable pen) suitable for individual patient, should be used.
- Long acting insulin analogues, insulin detemir or insulin glargine, should only be considered as an alternative to NPH for people in the following categories, those:
  - » Who require assistance from a carer or healthcare professional to administer insulin and in whom use of an analogue would reduce injections from twice to once daily.
  - » Whose lifestyle is significantly restricted by recurrent symptomatic hypoglycaemia.
  - » Who would otherwise need twice daily NPH insulin injections plus hypoglycaemic drugs.
  - » Who cannot use their device to inject NPH insulin.
- CCGs will need to make a local decision around the place in treatment of the ultra-long acting insulin analogue, insulin degludec, in type 2 diabetes considering the evidence alongside that for other basal insulins, taking into account the current NICE guidance that recommends the use of long acting insulin analogues in some limited circumstances. Individual patient factors and their experience of hypoglycaemia together with the higher cost of insulin degludec will need to be taken into account.
- Short acting human insulin should be used in preference to rapid acting insulin analogues. This includes biphasic products.

### Clinical evidence

Several insulin analogues have been developed. Rapid-acting insulin analogues were developed to mimic more closely the normal mealtime insulin response compared to regular insulin. The long acting insulin analogues – insulin detemir (Levemir®) and insulin glargine (Lantus®), and the ultra-long acting insulin degludec (Tresiba®) were developed to have more reproducible absorption and prolonged action, to achieve more predictable glycaemic control and fewer hypoglycaemic episodes.<sup>2,4</sup> The NICE,<sup>1</sup> Scottish Intercollegiate Guidelines Network (SIGN)<sup>5</sup> and the Drug & Therapeutics Bulletin<sup>2</sup> all recommend that NPH insulin should be used first in new patients with type 2 diabetes. Yet, nationally, spend on insulin analogues has increased dramatically over the last nine years and represents the largest increase compared to all the other medicines used in diabetes management.

### Costs and savings available

There is a significant difference in costs between insulin analogues and human insulin and between different devices, such as vials, cartridges and disposable pens.

Graph 1 (graphs are on the following page) illustrates the cost differences between the short acting insulins. Graph 2 illustrates the cost differences between the intermediate and long acting insulins. Graph 3 illustrates the cost differences between the biphasic insulin products.

Any changes in prescribing should be tailored to the individual needs of the patient. Guidance on undertaking an audit to compare current insulin prescribing against the recommendations outlined in the bulletin is given in the next section.

**Switching to less costly human insulin products in appropriate patients, could save up to £21.9 million annually across England on biphasic insulin products and approximately £55.4 million on long acting insulin products (ePACT Jan to Mar 2015).**

Additional resources available:



Bulletin



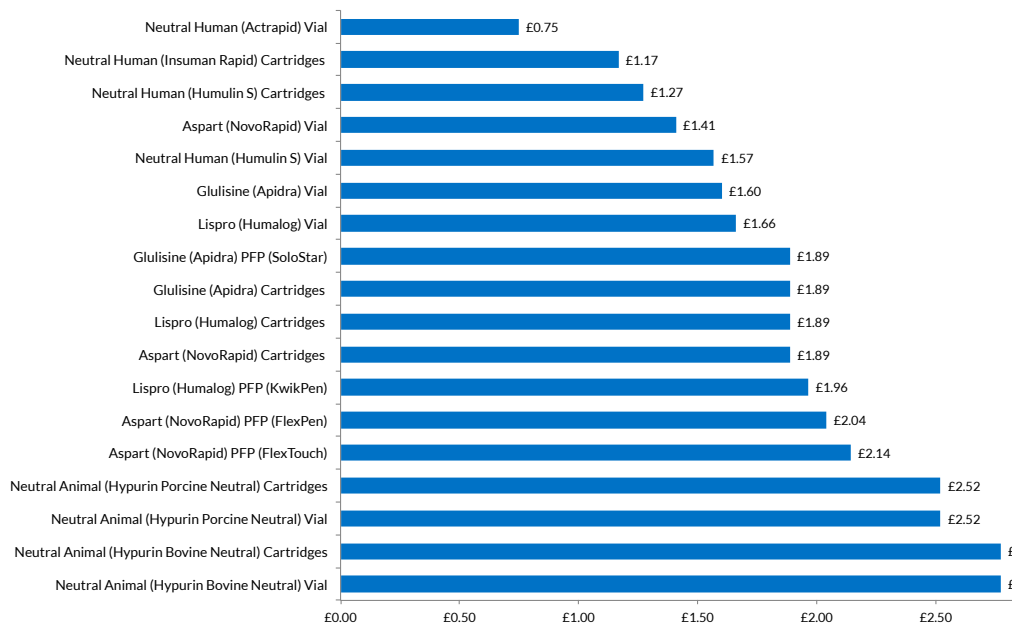
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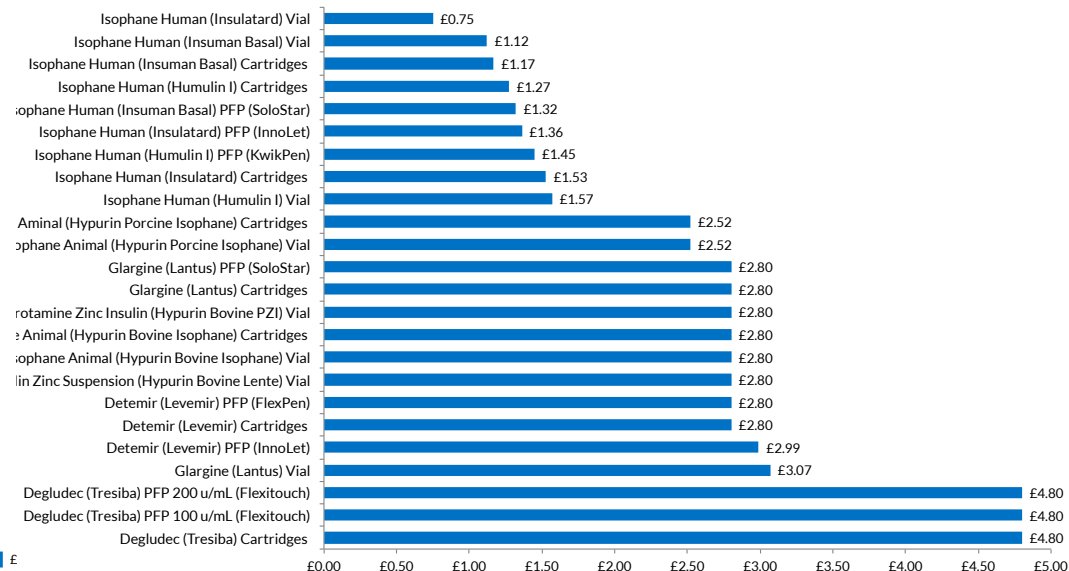
Audits, guides

<http://www.prescgipp.info/resources/viewcategory/219-insulin-analogues>

Graph 1: Short-acting insulins - Cost per 100 units of insulin

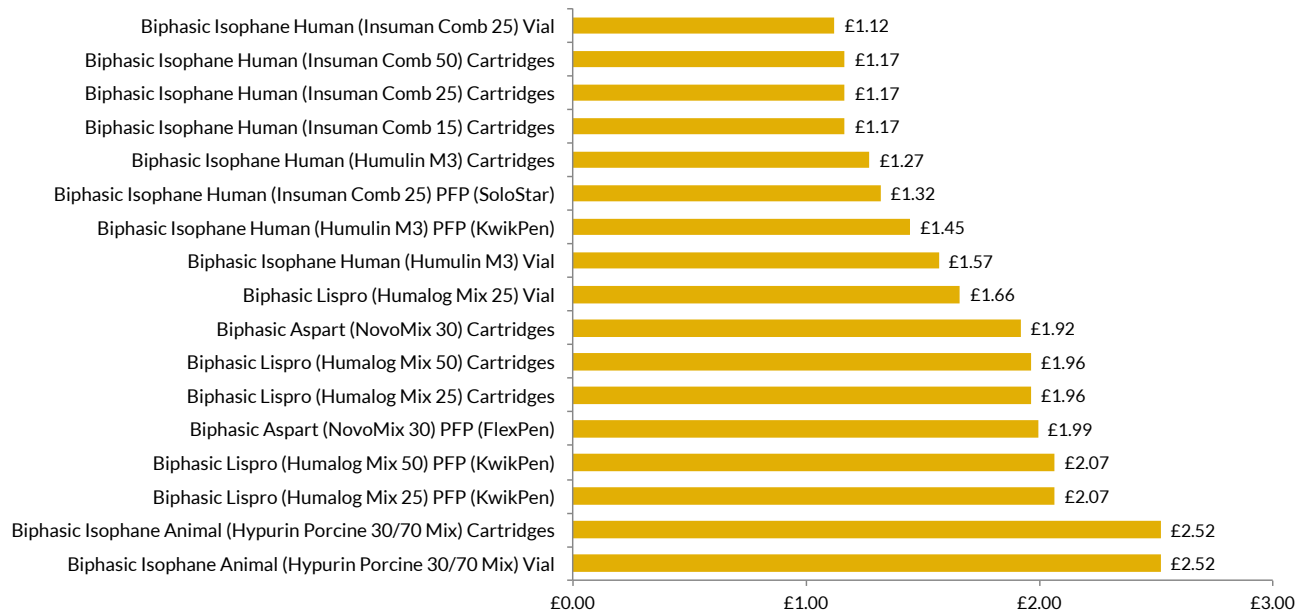


Graph 2: Long- and intermediate-acting insulins - Cost per 100 units of insulin



Larger versions of these charts are available in the full bulletin.

Graph 3: Biphasic insulins - Cost per 100 units of insulin



## References

1. NICE. Type 2 diabetes. The management of type 2 diabetes. NICE Clinical Guideline 87. Issued May 2009, Last modified July 2014. [www.nice.org.uk](http://www.nice.org.uk)
2. Which insulin, regimen and device in type 2 diabetes? Drug & Therapeutics Bulletin 2010; 48 (12): 134-8
3. Owens, DR. Insulin preparations with prolonged effect. Diabetes Technology & Therapeutics 2011; 13(S1): S5-S14
4. NHS Regional Drug and Therapeutics Centre. Evaluation report – The use of insulin degludec for diabetes mellitus. August 2012. <http://rdtc.nhs.uk/insulin-degludec-diabetes-mellitus>
5. SIGN. Management of diabetes: a national clinical guideline. No. 116, March 2010. <http://www.sign.ac.uk/guidelines/fulltext/116/index.html>