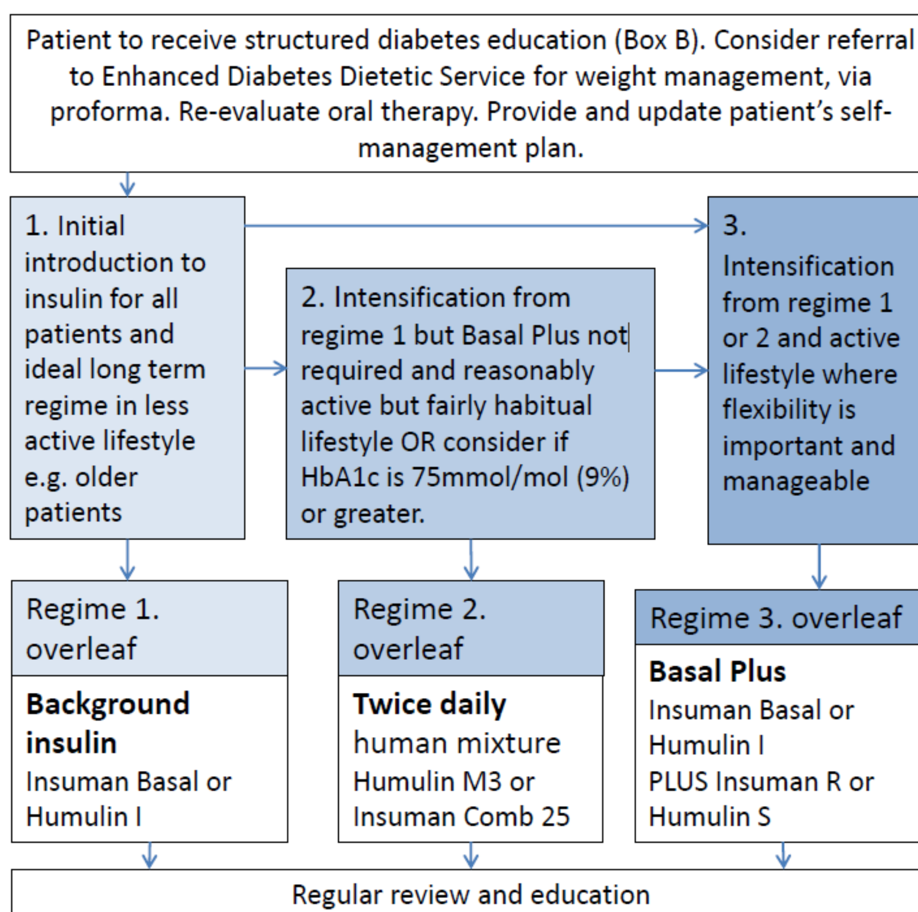
Insulin Initiation and Adjustment in Type 2 Diabetes
Primary Care Guideline

This updated guideline is for use by clinicians who have professional competence in insulin initiation and adjustment e.g. attendance at Oxfordshire Primary Care Diabetes Courses on insulin initiation and intensification (page 5).

Insulin initiation should be considered in line with NICE NG28 , for patients with type 2 diabetes, whose individual targets for glycaemic control are not achieved on optimum oral treatments.

NICE recommendations are to intensify treatment for patients with an HbA1c concentration greater than 58mmol/mol (7.5%); consider a range of options to achieve this. Prioritise insulin initiation for those patients at highest risk especially of microvascular complications over time, especially for younger patients with the highest HbA1c concentrations. **Individual treatment targets should be agreed** but ideally aim for HbA1c of 48-53mmol/mol (6.5-7%), **avoiding hypoglycaemia**. Rapid falls in HbA1c should be avoided, as this can lead to worsening of long-term microvascular and macrovascular complications. Aim to reduce over 6-12 months if a significant decrease is required.



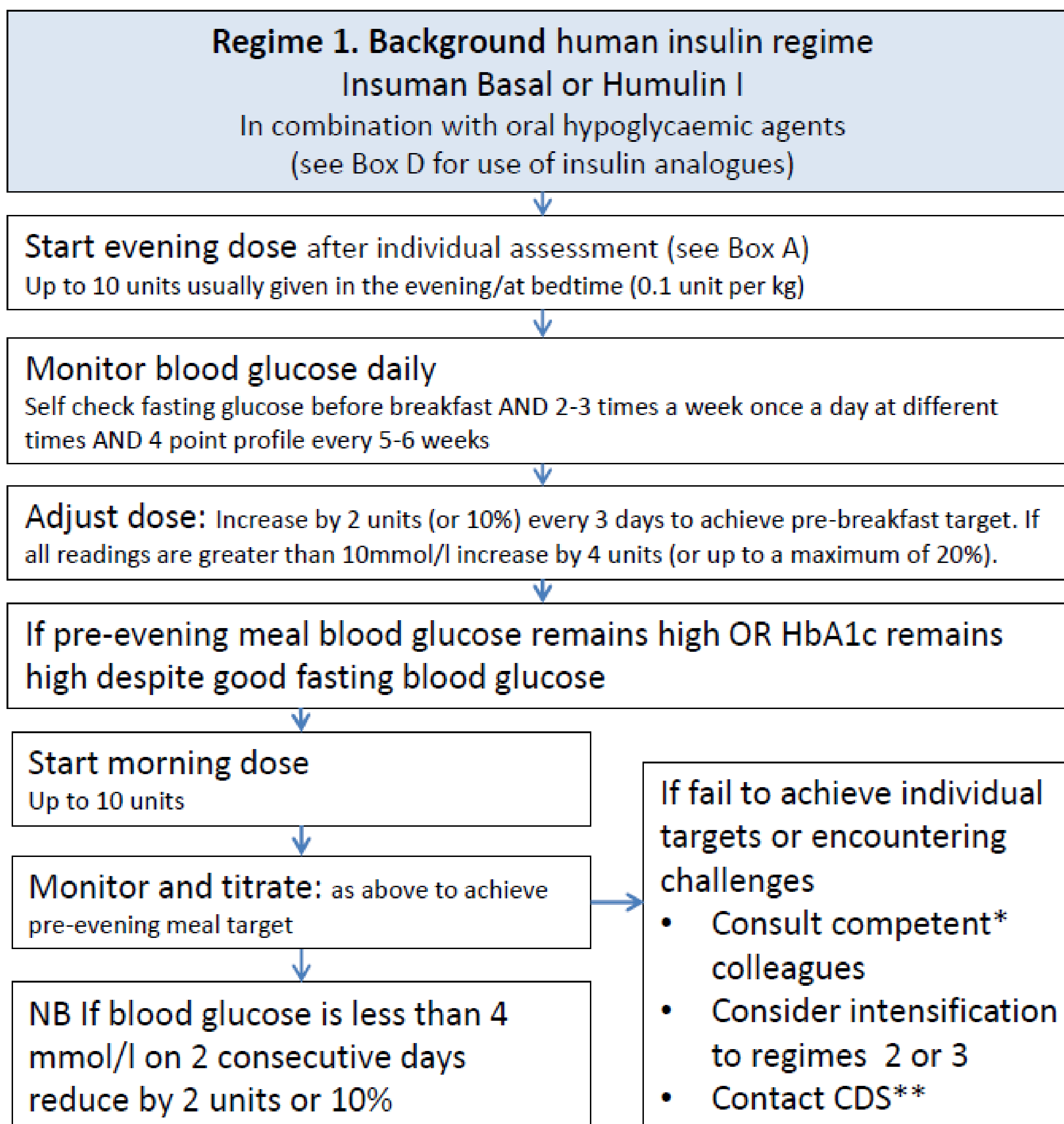
Patient self-management titration plans and education checklist examples are available.

Box A Individual targets for blood glucose should be agreed.

See page 5 for competencies

Box B Structured education

Structured patient education should be provided in line with NICE (NG28). Local adult education courses, Diabetes2gether and Diabetes4ward, are available.



Box C

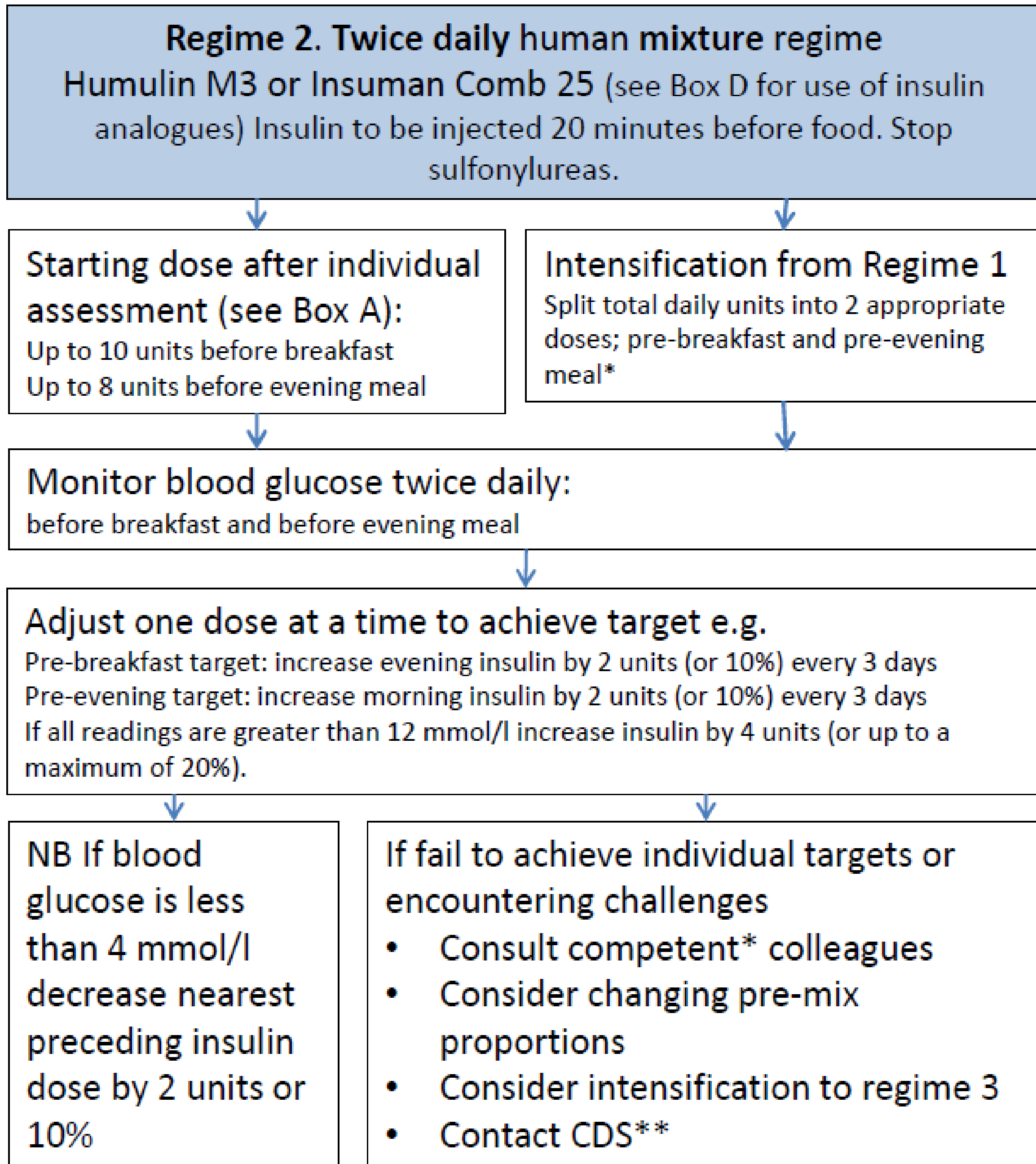
Hypoglycaemia: It is essential that the person starting insulin and their immediate family know what symptoms to expect, how to reduce the risks of hypos and how to treat them.

Hypoglycaemia is defined as blood glucose below 4 mmol/l. Too many hypos can lead to loss of hypo awareness. Examples of patient hypoglycaemia leaflets are available.

Sick day rules: Patients require education on 'sick day rules'.

*see page 5 for competencies

**Community Diabetes Service, tel: 01869 604089, email: diabetesdialogue@nhs.ne



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Regime 3. Basal Plus; Insuman Basal or Humulin I as background AND Insuman R or Humulin S as pre-meal bolus Stop sulfonylureas. (see Box D for use of insulin analogues)

Patient on Regime 1 requiring intensification

Starting bolus dose: 2 – 6 units 30minutes before meals.
Adjust basal insulin if appropriate

Patient on Regime 2 requiring intensification

Split total daily units*

Monitor blood glucose up to four times a day

Adjust bolus dose to achieve target
e.g. if the blood glucose reading is:

- High/low at lunch increase/decrease the breakfast insulin dose
- High/low at dinner increase/decrease the lunch insulin dose
- High/low at breakfast increase/decrease the dinner insulin dose

NB If blood glucose is less than 4 mmol/l on 2 consecutive days reduce by 2 units or 10%

If fail to achieve individual targets or encountering challenges

- Consult competent* colleagues
- Contact CDS**

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Health Care Professional Education and Competence

- For Primary Care Insulin Initiation and Intensification courses contact the Community Diabetes Service, Tel 01869 604089 or email diabetes.education@nhs.net
- HCP initiating and adjusting insulin should have competences as described by Skills for Health; improving blood glucose control, assessment of need to start insulin, starting insulin, continuing insulin and minimising hypoglycaemia risks.

Insulin Safety

Safety recommendations should be followed regarding prescribing, storage, patient and health professional education, and patient leaflet and insulin passport. Extra care is required for high strength and biosimilar insulins.

Prescribing

Insulins must always be prescribed clearly by brand, including presentation, strength and correct device with no abbreviations. Also prescribe:

- Pen needles (BD Viva)
- Blood glucose monitoring strips (GlucoRx Nexus or similar cost-effective strip, <£10 per 50)
- Lancets – sterile, single use.
- Sharps bin – Sharpsafe or Sharpsguard 1litre
- Re-usable pen if needed

Re-usable pens are expected to last between 2 to 3 years. Refer to table on page 7 for compatible pen choice.
A clinical tool is available to support appropriate self-monitoring of blood glucose.
Appropriate insulins for prescribing are listed on page 7. The first line choices are highlighted.
Patients may be considered for switching to first line options if current treatment requires review to improve glycaemic control, compliance or other patient/clinical factors.

Needle length and injection technique

The Forum for Injection Technique states that there is no clinical reason for recommending needles longer than 8mm in adults. The majority of patients will require 4 or5mm needles. The recommendations cover all aspects of injection technique including sites, correct use of devices/syringes, absorption rates, lipohypertrophy and site rotation. Correct technique is essential to ensure optimum benefit from insulin and prevention of complications. Useful educational tools and patient leaflets are available.

Not for primary care initiation

Tresiba (insulin degludec) treatment should only be initiated on recommendation from the diabetes specialist team (OCDEM or Community Diabetes Service). Degludec can be considered for type 1 or 2 patients who are having more than 2 hypoglycaemic events per week, or have had more than 1 diabetic ketoacidosis episode in the past 12 months, or require a more flexible dosing interval.

Toujeo (glargine 300units/ml) can be initiated on recommendation of the diabetes specialist team (OCDEM or Community Diabetes Service) for patients who are already on optimised complex regime, who have already tried other insulins (including degludec if patient meets criteria) and on a total long acting insulin dose of more than 80 units per day (or lower if they have very limited injections sites or require 3rd party administration).

Xultophy (Ideglira – degludec 100 units/ml and liraglutide 3.6mg/ml fixed combination) can be initiated by diabetes consultant only with criteria in GLP-1 receptor agonist guideline.

Box D

Human versus analogue insulins

The 2015 NICE, Key therapeutic topics document confirms that evidence shows that there is no difference in HbA1c lowering between long-acting insulin analogues and NPH (isophane) insulins (such as Humulin I or Insuman Basal). Insulin glargine and insulin detemir are both associated with reductions in the rates of any hypoglycaemia and of nocturnal hypoglycaemia, but not severe hypoglycaemia. ICERs for the analogues ranged from about £100,000 to £400,000 per quality-adjusted life year (QALY) gained in comparison to the £20,000 to £30,000 per QALY gained threshold usually considered by NICE. Long-acting insulin analogues do not appear to be cost-effective options when compared with NPH (isophane) insulin. A more recent study found that early use of basal insulin glargine had no effect on cardiovascular outcomes, and increased incidence of hypoglycaemia.

Abasaglar
A new biosimilar glargine insulin, Abasaglar, has been approved locally (November 2015) for initiating patients new to glargine. There may be some activity variation between glargine products and therefore switching must only be carried out within an appropriate management and monitoring protocol. Automatic switching during dispensing must not occur.

NICE NG28 exceptions for use of long acting insulin analogues instead of NPH insulins (Humulin I or Insuman Basal)

Consider using insulin detemir (Levemir) or insulin glargine (Abasaglar or Lantus) as an alternative to NPH insulin (i.e. Humulin I or Insuman basal), if:

- the person needs assistance from a carer or healthcare professional to inject insulin, and use of a long-acting insulin analogue would reduce the frequency of injections and visits from professional carers or health care professionals from twice to once daily, or
- the person's lifestyle is restricted by recurrent symptomatic hypoglycaemic episodes, or
- the person would otherwise need twice-daily NPH insulin injections in combination with oral glucose-lowering drugs.

Consider switching to insulin detemir (Levemir) or insulin glargine (Abasaglar or Lantus) from NPH insulin in people:

- who do not reach their target HbA1c because of significant hypoglycaemia, or
- who experience significant hypoglycaemia on NPH insulin irrespective of the level of HbA1c reached, or
- who cannot use the device needed to inject NPH insulin
- who need help from a carer or healthcare professional to administer insulin injections and for whom switching to a long-acting insulin analogue would reduce the number of daily injections and visits from professional carers or health care professionals .

Exceptions for use of rapid-acting analogue insulins in biphasic formulations

Use Humulin M3, Insuman Comb (25 or 15) or other mixed human insulin, **rather than** Novomix30, Humalog Mix 25 or other mixed analogue insulins unless:

- a person prefers, due to compelling clinical/lifestyle reasons, injecting insulin immediately before a meal, or
- hypoglycaemia is a problem, or
- blood glucose levels rise markedly after meals.

Short acting human insulins versus rapid-acting analogue insulins in Basal Plus regimes

Use **Insuman R or Humulin S or other human mealtime insulins**, rather than Novorapid, Humalog or other analogue mealtime insulins unless hypoglycaemia is problematic and bedtime snacks fail to prevent night hypos.

Intermediate & Long Acting Insulins			
		compatible with	Cost (C&D May 2015)
Human			
Humulin I	Prefilled KwikPen, vial, cartridges	Autopen Classic £16.96, HumaPen Savvio £27.01	5 x 3ml KwikPen prefilled pen £21.70, 5 x 3ml cartridges £19.08
Insuman basal	Prefilled SoloSTAR, vial, cartridges	Autopen 24 £16.71, ClikSTAR £25	5 x 3ml SoloSTAR prefilled pen £19.80, 5 x 3ml cartridges £17.50
Insulatard	Prefilled InnoLet doser		5 x 3ml InnoLet doser £20.40
Analogue			
Abasaglar(insulin glargine biosimilar)	Prefilled KwikPen, cartridges	Humapen Savvio £27.01	5 x 3ml KwikPen prefilled pen £35.28 5 x 3ml cartridges £35.28
Lantus (insulin glargine)	Prefilled SoloSTAR, vial, cartridges	Autopen 24 £16.71, ClikSTAR £25	5 x 3ml SoloSTAR pre filled pen £37.77, 5 x 3ml cartridges £37.77
Levemir (insulin detemir)	Prefilled FlexPen, Prefilled InnoLet Delivery Device, cartridges	NovoPen 4 & 5 £26.86	5 x 3ml FlexPen prefilled pen £42.00, 5 x 3ml InnoLet prefilled pen £44.85, 5 x 3ml Penfill cartridge £42.00

Biphasic insulins			
		Compatible with	Cost
Human			
Humulin M3	Prefilled KwikPen, vial, cartridges	Autopen Classic £16.72, Humapen Savvio £27.01	5 x 3ml KwikPen prefilled pen£21.70, 5 x 3ml cartridges £19.08
Insuman Comb 25	Prefilled SoloSTAR pen, cartridges	Autopen 24 £16.71, ClikSTAR £25	5 x 3ml SoloSTAR prefilled pen £19.80, 5 x 3ml cartridges £17.50
Analogue			
NovoMix 30	Prefilled FlexPen, cartridges	NovoPen 4 & 5 £26.86	5 x 3ml FlexPen prefilled pen £29.89, 5 x 3ml cartridge £28.79
Humalog Mix25 (& 50)	Prefilled KwikPen, cartridges, (vial)	Autopen Classic £16.96, HumaPen Savvio £27.01	5 x 3ml KwikPen prefilled pen£30.98, 5 x 3ml cartridges £29.46

Short Acting Human Insulins			
		Compatible with	Cost
Insuman R	cartridge	Autopen 24 £16.71, ClikSTAR £25	5 x 3ml cartridges £17.50
Humulin S	vial, cartridges	Autopen Classic £16.96, HumaPen Savvio £27.01	5 x 3ml cartridges £19.08

Rapid Acting Analogue Insulins			
		Compatible with	Cost
NovoRapid (aspart)	prefilled FlexPen, prefilled FlexTouch, vial, cartridges	NovoPen 4 & 5 £26.86	5 x 3ml FlexPen prefilled pen£30.60 5 x 3ml FlexTouch prefilled pen £32.13, 5 x 3ml penfill cartridges £28.31,
Apidra (lispro)	prefilled SoloSTAR, vial, cartridge	Autopen 24 £16.71, Clikstar £25	5 x 3ml SoloSTAR prefilled pen £28.30, 5 x 3ml cartridges £28.30
Humalog (Lispro)	Prefilled KwikPen, vial, cartridges	Autopen Classic £16.96, HumaPen Savvio £27.01	5 x 3ml KwikPen £29.46, 5 x 3ml cartridges £28.31

First line insulins