Algorithm for blood glucose lowering therapy in adults with type 2 diabetes

**Type 2 diabetes in adults: management**, NICE guideline NG28 (December 2015)

**Insulin-based treatment**
- When starting insulin, use a structured programme and continue metformin for people without contraindications or intolerance. Review the continued need for other blood glucose lowering therapies.
- Offer NPH insulin once or twice daily according to need.
- Consider starting both NPH and short-acting insulin either separately or as pre-mixed (biphasic) human insulin (particularly if HbA1c is >75 mmol/mol (9.0%) or higher).
- Consider, as an alternative to NPH insulin, using insulin glargine or glulisine if the person: needs assistance to inject insulin, lifestyle is restricted by recurrent symptomatic hypoglycaemic episodes or would otherwise need twice-daily NPH insulin in combination with oral blood glucose lowering drugs.
- Consider pre-mixed (biphasic) preparations that include short-acting insulin analogues, rather than pre-mixed (biphasic) preparations that include short-acting human insulin preparations, if: the person prefers injecting insulin immediately before a meal, hypoglycaemia is a problem or blood glucose levels rise markedly after meals.
- Only offer a GLP-1 mimetic in combination with insulin with specialist care advice and ongoing support from a consultant-led multidisciplinary team.
- Monitor people on insulin for the need to change the regimen.
- An SGLT-2i in combination with insulin with or without other antidiabetic drugs is an option.

### ADULT WITH TYPE 2 DIABETES WHO CAN TAKE METFORMIN

- **If HbA1c rises to 48 mmol/mol (6.5%) on lifestyle interventions:**
  - Offer standard-release metformin.
  - Support the person to aim for an HbA1c level of 48 mmol/mol (6.5%).

#### FIRST INTENSIFICATION

- **If HbA1c rises to 58 mmol/mol (7.5%):**
  - Consider triple therapy with:
    - metformin, a DPP-4i, and an SU
    - metformin, pioglitazone<sup>a</sup> and an SU
    - metformin, and an SGLT-2<sup>2</sup>
  - Support the person to aim for an HbA1c level of 53 mmol/mol (7.0%).

#### SECOND INTENSIFICATION

- **If HbA1c rises to 58 mmol/mol (7.5%):**
  - Consider:
    - triple therapy with:
      - metformin, a DPP-4i and an SU
      - metformin, pioglitazone<sup>a</sup> and an SU, and an SGLT-2<sup>2</sup>
      - insulin-based treatment
  - Support the person to aim for an HbA1c level of 53 mmol/mol (7.0%).

**If HbA1c is not tolerated, consider a trial of modified-release metformin**

- **If standard-release metformin is not tolerated, consider:**
  - Offer extended-release metformin.

**If triple therapy is not effective:**

- Consider:
  - A DPP-4i, a GLP-1 receptor agonist, and an SU
  - A DPP-4i and an SU
  - A GLP-1 receptor agonist and an SU
  - Support the person to aim for an HbA1c level of 53 mmol/mol (7.0%).

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**METFORMIN CONTRAINDICATED OR NOT TOLERATED**

- **If HbA1c rises to 48 mmol/mol (6.5%) on lifestyle interventions:**
  - Consider one of the following:
    - a DPP-4i, pioglitazone<sup>a</sup> or an SU
    - Support the person to aim for an HbA1c level of 48 mmol/mol (6.5%) for people on a DPP-4i or pioglitazone or 53 mmol/mol (7.0%) for people on an SU

#### FIRST INTENSIFICATION

- **If HbA1c rises to 58 mmol/mol (7.5%):**
  - Consider dual therapy with:
    - a DPP-4i and a GLP-1 receptor agonist
    - a DPP-4i and an SU
    - pioglitazone<sup>a</sup> and an SU
  - Support the person to aim for an HbA1c level of 53 mmol/mol (7.0%).

#### SECOND INTENSIFICATION

- **If HbA1c rises to 58 mmol/mol (7.5%):**
  - Consider insulin-based treatment.
  - Support the person to aim for an HbA1c level of 53 mmol/mol (7.0%).

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**Abbreviations:**
- DPP-4i: Dipeptidyl peptidase 4 inhibitor
- GLP-1 mimetic: Glucagon-like peptide-1 mimetic
- SGLT-2i: Sodium–glucose cotransporter 2 inhibitors
- SU: Sulfonylurea.
- Recommendations that cover DPP-4 inhibitors, GLP-1 mimetics and sulfonylureas refer to these drugs as insulin-sensitising and/or antihyperglycaemic agents.

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