Brief guide to the management of type 2 diabetes in primary care (2020)

Set individualised glycaemic targets

- Most patients should have an **HbA1c target < 53 mmol/mol** but relax in elderly or high risk of hypoglycaemia.
- Young patients with Type 2 Diabetes need tight control
  - HbA1c should be measured every 3 months until target is reached + then at least 6-12 monthly
  - **NB:** Patients not reaching targets should have stepwise increases in their management
- Multiple agents (including lifestyle management) may need to be started at once to meet glycaemic targets
- Patients on sulphonylureas and/or insulins need to monitor their glucose levels as outlined below
- A diabetes annual review is required for every patient to ensure treatment meets their ongoing needs

Lifestyle management

- Paramount at all stages + involve community dietitians/green prescription if able aiming for weight loss
- Current recommended exercise intake is > 150 mins per week split into at least 3 sessions

Oral Medication

Metformin

- First-line agent and should be used in all patients if tolerated → average ↓ HbA1c by 16.5 mmol/mol
- Start at 250 mg od or bd + up titrate weekly to 2 – 2.5 grams per day or maximal tolerated dose
  - Patients can usually self-titrate if adequate explanation regarding tolerance + side effects
- Reduce doses in renal impairment + contraindicated in renal, liver or heart failure

Vildagliptin

- Second-line agent and available in combination with metformin 850 mg + 1000 mg tablets
- Start at 50 mg daily + up titrate to 50 mg twice daily if tolerated → will likely ↓ HbA1c by 5 – 10 mmol/mol
- Safe at doses of 50 mg daily in ESRF, but do not use in gastroparesis, previous pancreatitis or end-stage CHF

Pioglitazone

- Third-line agent + safe in combination with all other hypoglycaemic agents including insulin --> ↓ HbA1c ~ 15 mmol/mol.
- Start at 15 mg daily + up titrate by 15 mg daily per month as required to maximum 45 mg daily
- Should not be used in oedematous conditions (heart, renal or liver failure or macular oedema), if high risk for osteoporosis (including postmenopausal women), or if history of bladder cancer. Can cause weight gain.

Sulfonylureas

- 3rd – 4th line agent as may cause weight gain + hypoglycaemia → maximum ↓ HbA1c approx. 16 mmol/mol
- Start at glipizide 2.5 mg **or** gliclazide 40 mg 15 mins before largest meal (glibenclamide should no longer be used)
- Need to monitor glucose levels before + 2 hours after meals
  - If glucose levels ↑ by ≥ 2 mmol/L → double dose weekly until max. glipizide 10 mg or gliclazide160 mg at 1 meal
  - If glucose levels ↓ by ≥ 2 mmol/L → may need to decrease doses as required
- If required, add in dose at breakfast or dinner to a maximum of glipizide 10 mg bd **or** gliclazide 160 mg bd
- Need to reduce doses with declining renal function + temporarily stop when reduced oral intake/GI illness
- Should not be used in type 1 diabetes or severe insulin deficiency (incl. type 2 diabetes) → need prandial insulin instead

SGLT2 inhibitors + GLP1 agonists

- These agents are not funded yet, but are 2nd-3rd line agents after metformin worldwide due to benefits in reducing cardiovascular + renal disease over and above glycaemic control, and lead to weight loss without hypoglycaemia
- Current available options include:
  - Dapagliflozin (SGLT2 inhibitor) – 5 - 10 mg daily (costs ~ $85 per month); N.B.- tablets only available in 10mg
  - Exenatide ER (GLP1 agonist) – start at 2 mg s/c weekly (costs ~ $270 per month)

Insulin therapy for type 2 diabetes

Basal insulin

- **Required for all patients who have not met glycaemic targets despite maximal oral therapy or have insulin deficiency** (e.g. polyuria, polydipsia, weight loss, HbA1c > 90 mmol/mol) **at any stage** (including diagnosis)
- Start at weight-based dosing of glargine insulin (Lantus) or isophane insulin (Protaphane or Humullin N) with administration once daily at night (isophane insulin may need to be increased to BD dosing and needs to be gently mixed before use)
    - **BMI < 18 kg/m² or end stage renal/liver disease or very elderly** → 0.1 units/kg of body weight
    - **BMI 18 – 25 kg/m²** → 0.2 units/kg of body weight
    - **BMI > 30 kg/m²** → 0.3 units/kg of body weight
- Increase by 10% every 5-7 days until fasting glucose levels 6 – 8 mmol/L **or** doses reach 0.5 units/kg of body weight
- **NB** Once doses > 0.5 units/kg of body weight → do some paired blood glucose testing at mealtimes and consider adding prandial insulin rather than increasing basal insulin further. However, for some patients an increase in basal insulin may be required.
- Continue lifestyle management + all other hypoglycaemic agents
- Consider switching to insulin glargine (Lantus) if problems with nocturnal hypoglycaemia on isophane insulin

Prandial insulin

Required if not reached target HbA1c despite fasting glucose levels < 8 mmol/L and/or basal insulin doses of 0.5 units/kg of body weight

- Stop sulfonylurea at meals with prandial insulin but continue lifestyle management + other hypoglycaemic agents
    - Can continue sulfonylureas at meals where no prandial insulin is given
- Start at **largest meal** with administration of rapid-acting insulin (Apidra, Humalog or NovoRapid,) immediately before the meal (basal plus one)

Fixed doses

- Easier to start than carbohydrate counting, but more difficult to titrate if varied diet
- Starting dose is 10% of daily dose of basal insulin with maximum starting dose of 10 units per meal
- Patients will require a stable carbohydrate intake – referral to a community dietitian is important

Carbohydrate counting (gold standard)

- Allows patients to match insulin doses to carbohydrate intake
- Starting insulin: carbohydrate **(I:C)** ratio at each meal = 400/daily dose of basal insulin
- E.g. If on 50 units of isophane nocte → starting I:C ratio = 400/50 = 8. Therefore, start at 1 unit per 8 g of carbohydrate
- Works well in motivated patients who can understand math - referral to community dietitians is important

Need to monitor glucose levels before + 2 hours after meals

- If glucose levels consistently ↑ by ≥ 2 mmol/L after meals → ↑ dose by 2 units **or** ↓ I:C ratio by 1 g every 3 days
- If glucose levels consistently ↓ by ≥ 2 mmol/L after meals → ↓ dose by 2 units **or** ↑ I:C ratio by 1 g every 3 days

Further intensification

Need to add in prandial insulin at other meals if HbA1c above target and/or glucose levels ↑ by ≥ 2 mmol/L at other meals (Basal plus two or Basal bolus)

- **NB** Fixed doses of prandial insulin and I:C ratios may be different at different meals
- **NB** In most insulin deficient patients, the approximate balance is 50% basal insulin and 50% prandial insulin

Correction doses

A correctional dose can be added to the prandial dose to correct premeal hyperglycaemia. This dose is given together just before the patient eats

- Use 1 unit for every **X** mmol > 8 mmol/L based on the total daily dose (TDD) of both basal and prandial insulin
    - TDD ≤ **25 units** per day → correction doses 1 unit for every **4** mmol > 8 mmol/L
    - TDD **26 – 40** units per day → correction doses 1 unit for every **3** mmol > 8 mmol/L
    - TDD **41 – 75** units per day → correction doses 1 unit for every **2** mmol > 8 mmol/L
    - TDD **≥ 76** units per day → correction doses 1 unit for every **1** mmol > 8 mmol/L

Premixed insulin

Alternative to prandial insulin to reduce the number of injections per day, but need to ensure eating regular meals

- **NB** Premixed insulin must be given with a meal + the cartridge/ pen/vial needs to be gently mixed before use
- Can start with NovoMix 30 or Humalog Mix 25 at doses dependent on current basal insulin
    - If dose of basal insulin ≤ 30 units per day → switch to premix insulin at the same dose as the basal insulin given before the largest meal
    - If dose of basal insulin > 30 units per day → split total dose with 50% at breakfast + 50% at dinner
- If insulin naïve → work out weight-based starting dose of basal insulin + switch to premixed insulin as above; however always be guided by current blood glucose levels when determining the spilt
- If glucose levels rising by > 2mmol/L with meals + no hypoglycaemia can ↑ dose by 10% every 5 – 7 days