Type 2 diabetes in adults: choosing medicines

Factors to take into account when choosing, reviewing and changing medicines

Prescribing guidance

Rescue therapy

For symptomatic hyperglycaemia, consider insulin or a sulfonylurea and review when blood glucose control has been achieved.

Diet and lifestyle advice

At each point reinforce advice about diet and lifestyle.

Choosing treatments

Base the choice of medicine on:

- the person's individual clinical circumstances, for example comorbidities, contraindications, weight, and risks from polypharmacy
- the person's individual preferences and needs
- the effectiveness of the drug treatments in terms of metabolic response and cardiovascular and renal protection
- safety (see MHRA guidance, the BNF and individual SPCs) and tolerability of the drug treatment
- monitoring requirements
- the licensed indications or combinations available
- cost (if 2 drugs in the same class are appropriate, choose the option with the lowest acquisition cost)

Reviewing and changing treatments

At each point, think about and discuss the following with the person:

- stopping medicines that are not tolerated
- stopping medicines that have had no impact on glycaemic control or weight, unless there is an additional clinical benefit, such as cardiovascular or renal protection, from continued treatment
- how to optimise their current treatment regimen before thinking about changing treatments, taking into account factors such as:
  - adverse effects
  - adherence to existing medicines
  - the need to revisit advice about diet and lifestyle
  - prescribed doses and formulations
- whether switching rather than adding drugs could be effective

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How to choose first-line medicines

NICE National Institute for Health and Care Excellence

Rescue therapy

For symptomatic hyperglycaemia, consider insulin or a sulfonylurea and review when blood glucose control has been achieved.

First-line treatment — Assess HbA1c, cardiovascular risk and kidney function

For information on using SGLT2 inhibitors for people with type 2 diabetes and chronic kidney disease see the section on diabetic kidney disease in the guideline.

Not at high CVD risk

Offer
- Metformin
- Or if GI disturbance
- Metformin MR

Consider
- DPP-4 inhibitor ('gliptin') or
- Pioglitazone or
- Sulfonylurea

An SGLT2 inhibitor ('flozin') for some people:
- TA 390 Canagliflozin
- TA 390 Dapagliflozin
- TA 390 Empagliflozin
- TA 572 Ertugliflozin

If metformin contraindicated

Chronic heart failure or established atherosclerotic CVD

Offer
- Metformin
- or if GI disturbance
- Metformin MR
- and as soon as metfomin tolerability is confirmed, offer
- SGLT2 inhibitor ('flozin') with proven cardiovascular benefit

Start metformin alone to assess tolerability before adding an SGLT2 inhibitor

High risk of CVD
QRISK2 of 10% or higher

Offer
- Metformin
- or if GI disturbance
- Metformin MR
- and as soon as metfomin tolerability is confirmed, consider
- SGLT2 inhibitor ('flozin') with proven cardiovascular benefit

Offer
- SGLT2 inhibitor alone

If metformin contraindicated

Consider
- SGLT2 inhibitor alone

If metformin contraindicated

Person's HbA1c not controlled below individually agreed threshold, or the person develops CVD or a high risk of CVD

See treatment options if further interventions are needed

NICE technology appraisals recommend SGLT2 inhibitors as monotherapy options in people:
- who cannot have metformin
- for whom diet and exercise alone do not provide adequate glycaemic control.

The SGLT2 inhibitors are recommended only if a dipeptidyl peptidase-4 (DPP-4) inhibitor would otherwise be prescribed and a sulfonylurea or pioglitazone is not appropriate.

In February 2022, using ertugliflozin to reduce cardiovascular risk when blood glucose is well controlled was off label. See NICE's information on prescribing medicines.

Established atherosclerotic CVD includes coronary heart disease, acute coronary syndrome, previous myocardial infarction, stable angina, prior coronary or other revascularisation, cerebrovascular disease (ischaemic stroke and transient ischaemic attack) and peripheral arterial disease.

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How to choose further medicines

NICE National Institute for Health and Care Excellence

Rescue therapy

For symptomatic hyperglycaemia, consider insulin or a sulfonylurea and review when blood glucose control has been achieved.

Treatment options if further interventions are needed

At any point

HBA1c not controlled below individually agreed threshold

Switching or adding treatments

Consider:

- DPP-4 inhibitor or Pioglitazone
- or Sulfonylurea

SGLT2 inhibitors may also be an option in dual therapy:

- TA 315 Canagliflozin
- TA 288 Dapagliflozin
- TA 336 Empagliflozin
- TA 572 Ertugliflozin

Or in triple therapy:

- TA 315 Canagliflozin
- TA 418 Dapagliflozin
- TA 336 Empagliflozin
- TA 583 Ertugliflozin

At any point

Cardiovascular risk or status change

If the person has or develops chronic heart failure or established atherosclerotic CVD

Switching or adding treatments

Offer

An SGLT2 inhibitor (if not already prescribed)

If the person has or develops a high risk of CVD (QRISK2 of 10% or higher)

Switching or adding treatments

Consider

An SGLT2 inhibitor (if not already prescribed)

Established atherosclerotic CVD includes coronary heart disease, acute coronary syndrome, previous myocardial infarction, stable angina, prior coronary or other revascularisation, cerebrovascular disease (ischaemic stroke and transient ischaemic attack) and peripheral arterial disease.

At each point follow the prescribing guidance.
Switch or add treatments from different drug classes up to triple therapy (dual therapy if metformin is contraindicated).
In February 2022, using ertugliflozin to reduce cardiovascular risk when blood glucose is well controlled was off label. See NICE's information on prescribing medicines.

Insulin therapy

When dual therapy has not continued to control HbA1c to below the person's individually agreed threshold, also consider insulin-based therapy (with or without other drugs).

- TA 288 Dapagliflozin
- TA 336 Empagliflozin
- TA 315 Canagliflozin

GLP-1 mimetic treatments

If triple therapy with metformin and 2 other oral drugs is not effective, not tolerated or contraindicated, consider triple therapy by switching one drug for a GLP-1 mimetic for adults with type 2 diabetes who:

- have a body mass index (BMI) of 35 kg/m^2 or higher (adjust accordingly for people from Black, Asian and other minority ethnic groups) and specific psychological or other medical problems associated with obesity **or**
- have a BMI lower than 35 kg/m^2 **and**:
  - for whom insulin therapy would have significant occupational implications **or**
  - weight loss would benefit other significant obesity related comorbidities.

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Summary of first-line medicines

NICE National Institute for Health and Care Excellence

Medicine	Options and BNF link	Contraindications	Effect on weight	Hypoglycaemia risk	Renal impairment	Hepatic impairment
DPP-4 inhibitor ('gliptins')	Alogliptin Linagliptin Saxagliptin Sitagliptin Vildagliptin	Ketoacidosis (not for linagliptin and saxagliptin)	None	Low	Dose reduction or caution (not for linagliptin)	Dose reduction or caution or avoid (not for linagliptin and sitagliptin)
Metformin	Metformin	Acute metabolic acidosis	None	Low	Dose reduction or avoid. Check the BNF monograph for eGFR thresholds	Withdraw if tissue hypoxia likely
Pioglitazone	Pioglitazone	History of heart failure, previous or active bladder cancer, uninvestigated macroscopic haematuria	Gain	Low	No warnings	Avoid
SGLT2 inhibitor ('flozins')	Canagliflozin Dapagliflozin Empagliflozin Ertugliflozin	Ketoacidosis	Loss	Low	Dose reduction or caution or avoid. Check the BNF monographs for eGFR thresholds	Caution or avoid. Check the BNF monographs for severity
Sulfonylurea	Gliclazide Glimepiride Glipizide Tolbutamide	All sulfonylureas: ketoacidosis Gliclazide and tolbutamide: avoid where possible in acute porphyrias	Gain	Moderate High in older people	Dose reduction or caution or avoid. Check the BNF monographs for eGFR thresholds	Caution or avoid. Check the BNF monographs for severity

When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

This information is a summary of the recommendations, please consult the guideline for the full recommendations. All supplementary information is taken from the BNF or the SPCs.

In February 2022, using ertugliflozin to reduce cardiovascular risk when blood glucose is well controlled was off label. See NICE's information on prescribing medicines.

See summaries of product characteristics (SPCs), British national formulary (BNF) or the Medicines and Healthcare products Regulatory Agency (MHRA) for up-to-date information.

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Summary of medicines for further treatment

NICE National Institute for Health and Care Excellence

Medicine	Options and BNF link	Form	Contraindications	Effect on weight	Hypoglycaemia risk	Renal impairment	Hepatic impairment
DPP-4 inhibitor ('gliptins')	Alogliptin Linagliptin Saxagliptin Sitagliptin Vildagliptin	Tablet	Ketoacidosis (not for linagliptin and saxagliptin)	None	Low	Dose reduction or caution (not for linagliptin)	Caution or avoid (not for linagliptin and sitagliptin)
GLP-1	Dulaglutide Exenatide Liraglutide Lixisenatide Semaglutide	Tablet or injection	Ketoacidosis (not for dulaglutide) Severe gastro-intestinal disease (not for liraglutide and semaglutide) Liraglutide: diabetic gastroparesis, inflammatory bowel disease	Loss	Low	Dose reduction or caution or avoid (not for dulaglutide, liraglutide or semaglutide) Check the BNF monographs for eGFR thresholds	Caution or avoid (not for dulaglutide, exenatide, and lixisenatide) Check the BNF monographs for severity
Insulin	Insulin treatment summary See BNF monographs	Injection	None	Gain	High	Dose reduction	Dose reduction
Pioglitazone	Pioglitazone	Tablet	History of heart failure, previous or active bladder cancer, uninvestigated macroscopic haematuria	Gain	Low	No warnings	Avoid
SGLT2 inhibitor ('flozins')	Canagliflozin Dapagliflozin Empagliflozin Ertugliflozin	Tablet	Ketoacidosis	Loss	Low	Dose reduction or caution or avoid. Check the BNF monographs for eGFR thresholds	Caution or avoid Check the BNF monographs for severity
Sulfonylurea	Gliclazide Glimepiride Glipizide Tolbutamide	Tablet	All sulfonylureas: ketoacidosis Gliclazide and tolbutamide: avoid where possible in acute porphyrias	Gain	Moderate High in older people	Dose reduction or caution or avoid. Check the BNF monographs for eGFR thresholds	Caution or avoid Check the BNF monographs for severity

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