NICE National Institute for Health and Care Excellence

NICE guideline

Type 2 diabetes in adults: management

NICE guideline
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Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. 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.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the Yellow Card Scheme.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

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This guideline replaces CG87, TA203, TA248, CG66, ESNM20, ESNM26 and ESNM59.

This guideline is partially replaced by NG136.

This guideline is the basis of QS209.

Using this guideline

People have the right to be involved in discussions and make informed decisions about their care, as described in NICE's information on making decisions about your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

Healthcare professionals should follow our general guidelines for people delivering care:

- Patient experience in adult NHS services
- Shared decision making
- Medicines adherence
- Medicines optimisation
- Multimorbidity
- Decision making and mental capacity.

Read this guideline alongside the NHS Type 2 diabetes Path to Remission Programme.

Individualised care

1.1 Tailoring care to a person's needs

1.1.1 Adopt an individualised approach to diabetes care that is tailored to the needs and circumstances of adults with type 2 diabetes, taking into account their personal preferences, comorbidities and risks from polypharmacy, and their likelihood of benefiting from long-term interventions. Such an approach is especially important in the context of multimorbidity. See also NICE's guidelines on assessing and managing multimorbidity and on medicines optimisation. **[2015, amended 2026]**

1.1.2 Reassess the person's needs and circumstances at each review and think about whether to stop any medicines that are not effective. **[2015]**

1.1.3 Take into account any disabilities, including visual impairment, when planning and delivering care for adults with type 2 diabetes. It is particularly important to choose the technology that best supports a person's diabetes care. **[2015, amended 2026]**

1.1.4 For discussions about overweight and obesity, see NICE's guideline on overweight and obesity management. In particular, see:

- the section on general principles of care
- the section on classifying overweight and obesity in adults
- recommendation 1.11.3 on addressing the drivers of overweight and obesity. **[2026]**

1.1.5 For further guidance on collaborative care, blood glucose management and insulin use for people with diabetes and an eating disorder, see the section on diabetes in NICE's guideline on eating disorders. **[2026]**

Education

1.2 Structured education programmes

1.2.1 Offer structured education to adults with type 2 diabetes and their family members or carers (as appropriate) at the time of diagnosis, with annual reinforcement and review. Explain to people that structured education is an integral part of diabetes care. **[2009]**

1.2.2 Ensure that any structured education programme for adults with type 2 diabetes:

- is evidence-based, and suits the needs of the person
- has specific aims and learning objectives, and supports the person and their family members and carers to develop attitudes, beliefs, knowledge and skills to self-manage diabetes
- has a structured curriculum that is theory driven, evidence-based and resource-effective, has supporting materials and is written down
- is delivered by trained educators who:
  - have an understanding of educational theory appropriate to the age and needs of the person
  - are trained and competent to deliver the principles and content of the programme
- is quality assured, and reviewed by trained, competent, independent assessors who measure it against criteria that ensure consistency
- has outcomes that are audited regularly. **[2015]**

1.2.3 Ensure that education programmes for adults with type 2 diabetes provide the necessary resources to support the educators, and that educators are properly trained and given time to develop and maintain their skills. **[2009]**

1.2.4 Offer adults with type 2 diabetes group education programmes as the preferred option. Provide an alternative of equal standard for people who are unable or prefer not to take part in group education. **[2009]**

1.2.5 Ensure that education programmes for adults with type 2 diabetes meet the cultural, linguistic, cognitive and literacy needs of people in the local area. **[2009]**

1.2.6 Ensure that all members of the diabetes healthcare team are familiar with the education programmes available locally for adults with type 2 diabetes, and that these programmes are integrated with the rest of the care pathway. **[2009]**

1.2.7 Ensure that adults with type 2 diabetes and their family members and carers (as appropriate) have the opportunity to contribute to the design and provision of local education programmes for adults with type 2 diabetes. **[2009]**

Dietary advice and interventions

1.3 Dietary advice

1.3.1 Provide individualised and ongoing nutritional advice from a healthcare professional with specific expertise and competencies in nutrition. **[2009]**

1.3.2 Provide dietary advice in a form sensitive to the person's needs, culture and beliefs, being sensitive to their willingness to change and the effects on their quality of life. **[2009]**

1.3.3 Encourage adults with type 2 diabetes to follow the same healthy eating advice as the general population, which includes:

- eating high-fibre, low-glycaemic-index sources of carbohydrate, such as fruit, vegetables, wholegrains and pulses
- choosing low-fat dairy products
- eating oily fish
- controlling their intake of saturated and trans fatty acids. **[2009]**

1.3.4 For recommendations on low-energy and very-low-energy diets for the management of type 2 diabetes, follow the:

- NHS Type 2 diabetes Path to Remission Programme
- NICE guideline on overweight and obesity management. **[2026]**

1.3.5 Integrate dietary advice with a personalised diabetes management plan, including other aspects of healthy living such as increasing physical activity and losing weight (see the NHS Better Health website). **[2009, amended 2026]**

1.3.6 Individualise recommendations for carbohydrate and alcohol intake, and meal patterns. Make reducing the risk of hypoglycaemia a particular aim for people using insulin or an insulin secretagogue. **[2009]**

1.3.7 Advise adults with type 2 diabetes that they can substitute a limited amount of sucrose-containing foods for other carbohydrates in the meal plan but should take care to avoid excess energy intake. **[2009]**

1.3.8 Discourage adults with type 2 diabetes from using foods marketed specifically for people with diabetes. **[2009]**

1.3.9 When adults with type 2 diabetes are admitted as inpatients to hospital or any other care setting, implement a meal planning system that provides consistency in the carbohydrate content of meals and snacks. **[2009]**

1.3.10 For recommendations on wellbeing advice, see NICE's guidelines on overweight and obesity management, physical activity: brief advice for adults in primary care, and tobacco. **[2015, amended 2026]**

1.4 Bariatric surgery

1.4.1 For recommendations on bariatric surgery for people with recent-onset type 2 diabetes, see the section on surgical interventions in NICE's guideline on overweight and obesity management. **[2015]**

Blood glucose management

1.5 HbA1c measurement and targets

Measurement

1.5.1 Measure HbA1c levels in adults with type 2 diabetes every:

- 3 to 6 months (tailored to individual needs) until HbA1c is stable on unchanging therapy
- 6 months once the HbA1c level and blood glucose lowering therapy are stable. **[2015]**

1.5.2 Measure HbA1c using methods calibrated according to International Federation of Clinical Chemistry (IFCC) standardisation. **[2015]**

1.5.3 If HbA1c monitoring is invalid because of disturbed erythrocyte turnover or abnormal haemoglobin type, estimate trends in blood glucose control using one of the following:

- quality-controlled plasma glucose profiles
- total glycated haemoglobin estimation (if abnormal haemoglobins)
- fructosamine estimation. **[2015]**

1.5.4 Investigate unexplained discrepancies between HbA1c and other glucose measurements. Seek advice from a team with specialist expertise in diabetes or clinical biochemistry. **[2015]**

Targets

NICE has produced a patient decision aid on agreeing HbA1c targets, which also covers factors to weigh up when discussing HbA1c targets with patients.

1.5.5 Discuss and agree an individual HbA1c target with adults with type 2 diabetes (see recommendations 1.5.6 to 1.5.10). Encourage them to reach their target and maintain it, unless any resulting adverse effects (including hypoglycaemia), or their efforts to achieve their target impair their quality of life. Think about using the NICE patient decision aid on weighing up HbA1c targets to support these discussions. **[2015, amended 2022]**

1.5.6 Offer advice on healthy living, and medicines, to support adults with type 2 diabetes to reach and maintain their HbA1c target (see the sections on dietary advice, bariatric surgery, and person-centred medicines, and the NHS Better Health website). For more information about supporting adherence, see NICE's guideline on medicines adherence. **[2015, amended 2026]**

1.5.7 For adults whose type 2 diabetes is managed either by healthy living and diet, or healthy living and diet combined with an initial medication regimen that is not associated with hypoglycaemia (see the section on initial medicines), support them to aim for an HbA1c level of 48 mmol/mol (6.5%). For adults on a medicine associated with hypoglycaemia, support them to aim for an HbA1c level of 53 mmol/mol (7.0%). **[2015, amended 2026]**

1.5.8 In adults with type 2 diabetes, if HbA1c levels are not adequately controlled by the initial medication regimen and rise to 58 mmol/mol (7.5%) or higher:

- reinforce advice about diet, healthy living and adherence to medicines and
- support the person to aim for an HbA1c level of 53 mmol/mol (7.0%) and
- intensify medicines. **[2015, amended 2026]**

1.5.9 Consider relaxing the target HbA1c level (see recommendations 1.5.7 and 1.5.8 and NICE's patient decision aid on type 2 diabetes: agreeing someone's blood glucose (HbA1c) target) on a case-by-case basis and in discussion with adults with type 2 diabetes, with particular consideration for people who are older or frailer, if:

- they are unlikely to achieve longer-term risk-reduction benefits, for example, people with a reduced life expectancy
- tight blood glucose control would put them at high risk if they developed

hypoglycaemia, for example, if they are at risk of falling, they have impaired awareness of hypoglycaemia, or they drive or operate machinery as part of their job

- intensive management would not be appropriate, for example if they have significant comorbidities. **[2015, amended 2022]**

1.5.10 If adults with type 2 diabetes reach an HbA1c level that is lower than their target and they are not experiencing hypoglycaemia, encourage them to maintain it. Be aware that there are other possible reasons for a low HbA1c level, for example deteriorating renal function or sudden weight loss. **[2015]**

1.5.11 For guidance on HbA1c targets in pregnancy, see NICE's guideline on diabetes in pregnancy. **[2015]**

1.6 Self-monitoring of capillary blood glucose

These recommendations relate to self-monitoring by capillary blood glucose monitoring.

1.6.1 Take the Driver and Vehicle Licensing Agency (DVLA)'s Assessing fitness to drive: a guide for medical professionals into account when offering self-monitoring of capillary blood glucose levels for adults with type 2 diabetes. **[2015, amended 2022]**

1.6.2 Do not routinely offer self-monitoring of capillary blood glucose levels for adults with type 2 diabetes unless:

- the person is on insulin or
- there is evidence of hypoglycaemic episodes or
- the person is on oral medication that may increase their risk of hypoglycaemia while driving or operating machinery or
- they are pregnant or are planning to become pregnant (see NICE's guideline on diabetes in pregnancy). **[2015, amended 2022]**

1.6.3 Consider short-term self-monitoring of capillary blood glucose levels in adults

with type 2 diabetes, reviewing treatment as necessary:

- when starting treatment with oral or intravenous corticosteroids or
- to confirm suspected hypoglycaemia. **[2015, amended 2022]**

1.6.4 Be aware that adults with type 2 diabetes who have acute intercurrent illness are at risk of worsening hyperglycaemia. Review treatment as necessary. **[2015]**

1.6.5 If adults with type 2 diabetes are self-monitoring their capillary blood glucose levels, carry out a structured assessment at least annually. The assessment should include:

- the person's self-monitoring skills
- the quality and frequency of testing
- checking that the person knows how to interpret the blood glucose results and what action to take
- the impact on the person's quality of life
- the continued benefit to the person
- the equipment used. **[2015, amended 2022]**

1.7 Continuous glucose monitoring

1.7.1 Offer intermittently scanned continuous glucose monitoring (isCGM, commonly referred to as 'flash') to adults with type 2 diabetes on multiple daily insulin injections if any of the following apply:

- they have recurrent hypoglycaemia or severe hypoglycaemia
- they have impaired hypoglycaemia awareness
- they have a condition or disability (including a learning disability or cognitive impairment) that means they cannot self-monitor their blood glucose by capillary blood glucose monitoring but could use an isCGM device (or have it

scanned for them)

- they would otherwise be advised to self-measure at least 8 times a day.

  For guidance on continuous glucose monitoring (CGM) in pregnancy, see NICE's guideline on diabetes in pregnancy. **[2022]**

1.7.2 Offer isCGM to adults with insulin-treated type 2 diabetes who would otherwise need help from a care worker or healthcare professional to monitor their blood glucose. **[2022]**

1.7.3 Consider real-time continuous glucose monitoring (rtCGM) as an alternative to isCGM for adults with insulin-treated type 2 diabetes if it is available for the same or lower cost. **[2022]**

1.7.4 CGM should be provided by a team with expertise in its use, as part of supporting people to self-manage their diabetes. **[2022]**

1.7.5 Advise adults with type 2 diabetes who are using CGM that they will still need to take capillary blood glucose measurements (although they can do this less often). Explain that is because:

- they will need to use capillary blood glucose measurements to check the accuracy of their CGM device
- they will need capillary blood glucose monitoring as a back-up (for example when their blood glucose levels are changing quickly or if the device stops working).

  Provide them with enough test strips to take capillary blood glucose measurements as needed. **[2022]**

1.7.6 If a person is offered rtCGM or isCGM but cannot or does not want to use any of these devices, offer capillary blood glucose monitoring. **[2022]**

1.7.7 Ensure CGM is part of the education provided to adults with type 2 diabetes who are using it (see the section on education). **[2022]**

1.7.8 Monitor and review the person's use of CGM as part of reviewing their diabetes

care plan (see the section on individualised care). **[2022]**

1.7.9 If there are concerns about the way a person is using the CGM device:

- ask if they are having problems using their device
- look at ways to address any problems and concerns to improve their use of the device, including further education and emotional and psychological support. **[2022]**

1.7.10 Commissioners, providers and healthcare professionals should address inequalities in CGM access and uptake by:

- monitoring who is using CGM
- identifying groups who are eligible but who have a lower uptake
- making plans to engage with these groups to encourage them to use CGM. **[2022]**

Why the committee made these recommendations

The committee discussed how continuous glucose monitoring (CGM) could potentially be useful for many people with type 2 diabetes. They were aware of examples from current practice in which adults who have insulin-treated type 2 diabetes and use intermittently scanned CGM (isCGM) have had good outcomes. Because of the additional cost associated with CGM and the large number of adults with type 2 diabetes, the committee used both the evidence and their clinical experience to decide who would gain the most benefit from using CGM.

There was evidence that isCGM was cost effective for adults with type 2 diabetes using insulin, but no evidence for populations not using insulin, so the committee agreed to restrict their recommendations to adults using insulin.

People who have recurrent or severe hypoglycaemic events were identified as one of the groups likely to benefit most from isCGM, because hypoglycaemic events were considered to be one of the most important and concerning outcomes for adults with type 2 diabetes who are using insulin. The committee decided that the number of hypoglycaemic events was a more effective indicator of someone who would benefit from isCGM than specific HbA1c target values, because target values can vary between people. The evidence also indicated minimal effects of isCGM on HbA1c values.

The committee agreed that people with impaired hypoglycaemic awareness would also benefit from isCGM. However, they did not recommend specific methods for assessing impaired hypoglycaemic awareness. This is because validated methods for assessing impaired hypoglycaemic awareness in people with type 2 diabetes (such as the GOLD or Clarke scores) are not always available in primary care.

People who use insulin and have a condition or disability that restricts their ability to self-monitor blood glucose levels should also be offered isCGM. This is because having access to isCGM means they will no longer have to rely on others to monitor their diabetes, potentially increasing their independence.

People who need help from a care worker or other healthcare professional to administer their insulin injections should also be offered isCGM, even if they only use

once-daily insulin injections. isCGM will help care workers to record a person's blood glucose levels quickly. And for people who have multiple home care visits per day, blood glucose levels can be recorded at each visit. This will help them to adjust their insulin levels to reduce the risk of hypoglycaemic events between home visits. It may also reduce the number of hospital admissions for this group.

The committee discussed how short-term use of isCGM may still be useful for some people. It may help people to understand when they have hypoglycaemic episodes, which would help them to develop a more effective treatment plan.

There was no evidence that rtCGM was cost effective for people with type 2 diabetes, so the committee agreed it could not be recommended for all adults with type 2 diabetes (whether or not they used insulin). They noted, however, that prices of rtCGM have reduced over the past few years, and if this continues to happen there may come a time when it is no more expensive than isCGM. At this point, rtCGM would be an appropriate alternative for people who meet the criteria for isCGM.

The committee did not make a recommendation on using specific devices because CGM technologies are changing very quickly and this recommendation would soon be out of date. Local healthcare services are better placed to assess which devices are evidence-based and suitable for use at any given time.

The committee discussed how self-monitoring of blood glucose should still take place, albeit less frequently, even when a person is using CGM. The ability to self-monitor blood glucose levels allows people to ensure the accuracy of the CGM device. The committee also recommended keeping capillary blood glucose monitoring as a back-up for situations such as when the technology fails.

The committee decided to highlight that CGM should be provided by a team who have expertise in its use. To ensure that CGM is effective, healthcare professionals need to have the skills to interpret and communicate the data effectively. As well as healthcare professionals having a clear understanding of CGM, it is also crucial that people with type 2 diabetes who are using CGM have education about the technology. This will increase the likelihood that people will scan and report the results frequently, allowing people to understand and manage their diabetes effectively.

Although many people will choose CGM if offered, there are some people who either cannot be offered it or do not want to use it. Because it is still important for these people to monitor their blood glucose levels, the committee made a recommendation to reinforce the importance of offering capillary blood glucose monitoring instead.

The committee did not make a recommendation on how long CGM should be used because there was no evidence on this, and they did not want to stop people accessing CGM for short periods if they and their healthcare professional thought they could benefit from this. Using CGM for a short period of time may help some people to understand when they have hypoglycaemic episodes, thereby helping them to develop a more effective treatment plan.

Despite the positive recommendations on CGM, the committee were concerned that existing health inequalities may still lead to lower uptake of CGM in some groups of people. To address this, the committee made a recommendation outlining actions for commissioners, providers and healthcare professionals.

The committee highlighted the importance of routinely reviewing a person's use of CGM. This will establish whether it is providing clinical benefits and whether the monitor is being used correctly. Making people aware that their use of CGM will be continually reviewed is important so they know it is not a guaranteed long-term option.

The committee also made a recommendation for research on using routinely collected real-world data to assess the effectiveness and cost effectiveness of CGM. They agreed that this has the potential to show the direct effects of the technology used by people with type 2 diabetes instead of interpreting it through the results of clinical trials. Increased monitoring of routine healthcare data including registries and audits would ensure that findings from a broader population are captured.

Full details of the evidence and the committee's discussion are in evidence review C: continuous glucose monitoring in adults with type 2 diabetes.

How the recommendations might affect practice

The recommendations are likely to increase the number of adults with type 2 diabetes who are offered CGM, particularly those who have issues with hypoglycaemia. This will have associated cost implications:

- It may save the NHS time, because healthcare professionals do not have to meet people who are using CGM as often as people who use capillary blood glucose monitoring.
- There should be fewer hypoglycaemic events to manage.

The committee did not expect a significant resource impact related to education and monitoring for the CGM devices.

1.8 Hyperglycaemia

1.8.1 If an adult with type 2 diabetes has symptoms of hyperglycaemia, consider insulin (see the section on insulin-based treatments) or a sulfonylurea, and review treatment when blood glucose is within the targets set for the person. **[2015]**

Person-centred medicine

Recommendations in this section that cover dipeptidyl peptidase-4 (DPP-4) inhibitors, glucagonlike peptide-1 (GLP-1) receptor agonists, sulfonylureas and sodium–glucose cotransporter-2 (SGLT-2) inhibitors refer to each of these groups of medicines at class level.

For GLP-1 receptor agonists, at the time of publication (February 2026) this only includes liraglutide, dulaglutide, and semaglutide. For subcutaneous semaglutide (Ozempic), this only includes doses up to 1 mg once a week.

1.9 Involving people in medicine discussions

NICE has produced a visual summary that provides an overview of the recommendations and additional information to support medicine choice up to the point at which a person starts insulin-based treatment.

1.9.1 Discuss dietary advice and other aspects of healthy living, such as increasing physical activity, alongside medicines to support adults with type 2 diabetes with their personalised diabetes management plan. For more information on how to achieve this see the:

- NHS Type 2 diabetes Path to Remission Programme
- NICE guideline on overweight and obesity management
- NHS Better Health website. **[2026]**

1.9.2 Discuss the benefits and risks of each medicine treatment option with adults with type 2 diabetes and support them to make an informed decision about their treatment. Take into account the:

- effect of each medicine on HbA1c and weight
- effectiveness of each medicine at preventing and managing cardiovascular

and renal conditions

- factors that might prevent the person from following a specific treatment option (for example, pioglitazone is contraindicated for people with heart failure)
- cost: when more than 1 medicine from the same drug class are equally suitable for the person, use the least expensive. **[2015, amended 2026]**

  See also NICE's guideline on shared decision making and the section on safety of medicines for diabetes before and during pregnancy in NICE's guideline on diabetes in pregnancy.

1.9.3 If a person has more than one comorbidity (for example, atherosclerotic cardiovascular disease and obesity), make a shared decision with them about which comorbidity to prioritise when choosing medicines. Take into account:

- medicines required for cardiovascular and renal protection (for example, subcutaneous semaglutide for people with atherosclerotic cardiovascular disease)
- medicines that are contraindicated (for example, metformin for people with chronic kidney disease and an eGFR of less than 30 mL/min/1.73 m^2)
- any other medicines they are taking and at what dose, particularly if the person has frailty (see recommendations for people with frailty in the initial medicines section).

  See also the recommendations on individualised care and NICE's guideline on multimorbidity. **[2026]**

1.9.4 When discussing GLP-1 receptor agonists and tirzepatide with women, trans men and non-binary people of childbearing potential, tell them:

- what Medicines and Healthcare products Regulatory Agency (MHRA) guidance on GLP-1 medicines for weight loss and diabetes says about the use of GLP-1 receptor agonists and tirzepatide in pregnancy and breastfeeding
- weight loss may improve fertility

- effective contraception must be used while taking the medicine
- that if they want to become pregnant, they should continue to use contraception for a period after stopping the medication (see MHRA guidance on GLP-1 medicines for weight loss and diabetes for specific length of time). **[2026]**

1.9.5 Use non-judgemental language in all medication discussions to support people with starting and adhering to treatment. For guidance on this, see NHS England's guide to language and diabetes **[2026]**

Why the committee made these recommendations

Continuing care is critical to ensuring good outcomes for people with type 2 diabetes. Therefore, the committee made a recommendation about advice on healthy living, including physical activity, losing weight, quitting smoking and drinking less alcohol. It also includes a link to the NHS Path to Remission programme, which is of great importance. While the committee did not find any evidence of using medicines to support remission, considering how to use medicines alongside the programme to support remission is key to preventing long-term adverse events.

The committee agreed that discussing the effects of each medicine ahead of time was important. They agreed the discussion should include the effectiveness of the medicine on glycaemic and cardiometabolic response, whether it has cardiovascular and renal protection benefits and any adverse effects or other problems that someone could experience and that could be a barrier to adherence. The committee agreed that working together in this way would help to promote concordance and improve long-term adherence, leading to better outcomes.

Guidance was agreed for when people have more than one comorbidity. For most people, initial therapy should consist of an SGLT-2 inhibitor combined with modified-release metformin, although metformin alone may be used when frailty makes SGLT-2 inhibitors unsuitable. People with chronic kidney disease require kidney-specific prescribing adjustments, which may involve dose changes, choosing SGLT-2 inhibitors licensed for renal impairment or substituting metformin with a DPP-4 inhibitor if appropriate. Early treatment with GLP-1 receptor agonists may be appropriate for those at high cardiovascular or renal risk, with subcutaneous semaglutide (Ozempic), up to 1 mg once a week, recommended for people with atherosclerotic cardiovascular disease. Any GLP-1 receptor agonist or tirzepatide can be considered for early onset type 2 diabetes, with tirzepatide being considered for the glycaemic benefits.

The committee noted that there is a particular risk for women, trans men and non-binary people of childbearing potential in this group who take GLP-1 receptor agonists or tirzepatide. The committee agreed that the effects of such a medicine can lead to improved fertility. MHRA guidance on GLP-1 medicines recommends that GLP-1 receptor agonists and tirzepatide should not be taken during pregnancy and

breastfeeding because there is not enough safety data to know whether doing this can cause harm. It also recommended that all people of childbearing potential should take steps to ensure they do not become pregnant while taking a GLP-1 receptor agonist or tirzepatide and for a duration after taking it (this duration depends on the specific medicine the person takes). The committee noted this was particularly important for people with early onset type 2 diabetes because of their age and this guideline's recommendations to consider GLP-1 receptor agonists or tirzepatide for this group.

The language healthcare professionals use can have an impact. People with type 2 diabetes can experience a lot of stigma in discussions about medications, even when healthcare professionals are not doing this intentionally. People can also struggle with stereotypes about diabetes and weight. This can lead to them feeling blame, shame and guilt, which can have a significant impact on their wellbeing. Stigma and stereotypes can also make it difficult for people to start or continue taking medication. The committee's experience was that this is quite common. So, it's important that particular efforts are being made to get the words right in conversations about medication. More guidance on communication for healthcare professionals can be found in NHS England's guide to language and diabetes.

Full details of the evidence and the committee's discussion are in

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

Improvements in long-term adherence lead to better outcomes. They are more likely if medicine options are discussed with the person using non-judgemental language. The person should feel involved in decisions made regarding their cardiometabolic targets and comorbidities.

1.10 Sick day rules

1.10.1 Give clear sick day rules in each person's individualised treatment plan. Depending on the person's needs and the medicines they are taking, these rules may need to specify:

- whether medicine should change (and how) if the person is unwell or is having surgery
- whether any medicines should be stopped if there is a risk of dehydration, vomiting and diarrhoea (relevant for metformin, SGLT-2 inhibitors)
- how to adjust insulin doses
- how to restart medication after recovery. **[2026]**

  Follow the MHRA's safety advice on monitoring ketones during SGLT-2 inhibitor treatment interruption.

Why the committee made this recommendation

Sick day rules are common in diabetes care, but in the committee's experience there are inconsistencies in practice. In particular, the committee have seen issues with people having medications stopped but not started again. The recommendation will improve consistency and quality of care in this area.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendation might affect practice

Including sick day rules in people's treatment plans may help avoid delays in providing the right medication and treating any underlying illness. This may reduce the chance of adverse events or shorten hospital stays (or avoid the need for a stay altogether), which would reduce costs.

1.11 Assessing risk before starting medicines

1.11.1 Assess the person's current cardiovascular and renal status, and risk of developing cardiovascular disease in the future. **[2022, amended 2026]**

1.11.2 If frailty is a concern, assess for it before starting medicines.

See the recommendations on how to assess frailty in NICE's guideline on clinically assessing and managing multimorbidity. **[2026]**

Why the committee made these recommendations

Assessing cardiovascular status

The committee agreed it was important to assess people's cardiovascular status and risk to help determine which treatments are suitable for them. The definition they used for the established cardiovascular disease groups (adults with type 2 diabetes and chronic heart failure or established atherosclerotic cardiovascular disease) reflects the people included in all the clinical trials and modelled as a subgroup in the economic model.

Assessing frailty

Adverse treatment effects and polypharmacy are a particular concern for people with frailty. The committee did not review the evidence on specific criteria that should trigger a frailty assessment, so healthcare professionals will need to use clinical judgement for this.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

Assessing for cardiovascular risk and frailty before initiating medicines may reduce the need for additional appointments further down the treatment pathway for:

- cardiovascular and renal comorbidities or
- concerns regarding frailty and adverse events.

This is because it will ensure that a person takes medicines most suited to their personal situation from the start.

1.12 Addressing inequalities in use of SGLT-2 inhibitors

1.12.1 Commissioners, providers and healthcare professionals should address inequalities in SGLT-2 inhibitor access and uptake by:

- monitoring who is using SGLT-2 inhibitors
- identifying groups who are eligible but who have a lower uptake
- making plans to engage with these groups to encourage them to use SGLT-2 inhibitors. **[2026]**

Why the committee made this recommendation

Analysis showed that, for people with type 2 diabetes who are eligible to receive SGLT-2 inhibitors, the uptake was low considering it was recommended by NICE since 2022. This was associated with age, gender, ethnicity and areas of deprivation. To address this issue, the committee made a recommendation outlining actions for commissioners, providers and healthcare professionals to identify those who are eligible to receive SGLT-2 inhibitors but who are currently not taking them, and to encourage them to do so. Achieving higher and more equal uptake of SGLT-2 inhibitors will mean that people living in the most deprived areas will experience greater net benefits.

This, combined with the recommendation for research to assess how prescribing and access to SGLT-2 inhibitors can be improved for people with type 2 diabetes from the most deprived groups, may help to address health inequalities.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendation might affect practice

The recommendation will encourage the assessment of SGLT-2 inhibitor uptake in different groups of people to ensure universal access to treatment. This would increase the number of people taking SGLT-2 inhibitors and help to address health inequalities. This may require additional resources to make interventions to support people in more deprived areas. However, this is more likely to reduce poor outcomes in the long term by supporting people who are more likely to experience adverse health outcomes.

Initial medicines

See the visual summary for an overview of the recommendations and additional information to support medicine choice up to the point at which a person starts insulin-based treatment.

Recommendations in this section that cover dipeptidyl peptidase-4 (DPP-4) inhibitors, glucagonlike peptide-1 (GLP-1) receptor agonists, sulfonylureas and sodium–glucose cotransporter-2 (SGLT-2) inhibitors refer to each of these groups of medicines at class level.

For GLP-1 receptor agonists, at the time of publication (February 2026) this only includes liraglutide, dulaglutide, and semaglutide. For subcutaneous semaglutide (Ozempic), this only includes doses up to 1 mg once a week.

SGLT-2 inhibitors and GLP-1 receptor agonists are recommended as much for their cardiovascular and renal benefits as for their glycaemic benefits (unless otherwise specified).

Healthcare professionals should also refer to the summary of product characteristics for individual medicines for contraindications and precautions to take in pregnancy and breastfeeding and for women, trans men and non-binary people of childbearing potential.

1.13 People with type 2 diabetes and no relevant comorbidities

1.13.1 For adults with type 2 diabetes and no relevant comorbidity, offer:

- modified-release metformin, and
- an SGLT-2 inhibitor. **[2026]**

1.13.2 If metformin is contraindicated or not tolerated, offer monotherapy with an

SGLT-2 inhibitor. **[2026]**

Why the committee made these recommendations

Metformin and SGLT-2 inhibitors

There is good evidence that managing type 2 diabetes should aim to improve health holistically (in particular, cardiovascular and renal protection), rather than just aim to meet HbA1c targets.

The evidence on antidiabetic therapies covered a diverse patient group, including, in varying proportions, people:

- with multiple cardiovascular risk factors
- with atherosclerotic cardiovascular disease, heart failure or chronic kidney disease
- who likely had a lower cardiovascular risk.

The committee agreed that this population likely reflected the population that will be seen most often in general practice.

Overall, network and pairwise meta-analyses comparing antidiabetic therapies showed that treatment combining metformin with an SGLT-2-inhibitor was more clinically effective at reducing HbA1c, weight and cardiovascular events than:

- any other therapy combining metformin with 1 other medicine, and
- metformin alone.

Cardiovascular events covered by the evidence included cardiovascular mortality, myocardial infarction, non-fatal stroke and hospitalisation for heart failure.

The evidence also showed that canagliflozin and dapagliflozin reduced the risk of end-stage renal failure.

Benefits outweigh the risk of adverse events

The committee weighed the greater likelihood of cardiovascular and renal benefits

against the risk of volume depletion and genital mycotic infections. The evidence found that, in people taking metformin combined with an SGLT-2 inhibitor, compared with those who did not take an SGLT-2 inhibitor, there were reductions in the number of:

- deaths from cardiovascular disease
- heart attack or stroke 3-item MACE
- hospitalisation for heart failure.

The evidence found, for example, that:

- 123 out of 1,000 people who did not take an SGLT-2 inhibitor had a major adverse cardiovascular event, known as a 3-item MACE event, over 3 years (that is, a non-fatal myocardial infarction, non-fatal stroke or death from a cardiovascular cause), compared with 107 to 115 people out of 1,000 people who were taking an SGLT-2 inhibitor for 3 years
- 54 out of 1,000 people who did not take an SGLT-2 inhibitor were hospitalised with heart failure over 3 years, compared with 26 to 40 people out of 1,000 people who were taking an SGLT-2 inhibitor for 3 years.

These clinically important reductions were weighed against the chance that:

- between 10 and 100 in 1,000 people would experience genital infections
- 1 in 1,000 or fewer people would experience rarer events like diabetic ketoacidosis or Fournier's gangrene or other severe infections.

Given this, the committee agreed that, for most people, the benefits outweighed the risks. They agreed that the risk of volume depletion is manageable, and that it would be uncommon for it to lead to diabetic ketoacidosis. They agreed that these risks should be discussed with the person ahead of starting treatment.

Wider access to SGLT-2 inhibitors is likely to reduce health inequalities

The committee also agreed that providing SGLT-2 inhibitors and metformin as a part of standard therapy for most people with type 2 diabetes could reduce inequality.

Evidence indicated that interventions to reduce socioeconomic inequalities, including health inequalities, often include actions that address the population or health system level which requires limited voluntary behaviour change on the part of an individual person. Evidence shows that SGLT-2 inhibitors provide net health benefits for people with type 2 diabetes living in the most deprived areas. The committee agreed that this is an important reason for ensuring universal access to SGLT-2 inhibitors.

Choosing a specific medicine

For the 2026 update, the committee was aware of the large reduction in price of dapagliflozin because generic versions were becoming available. They did not make a recommendation for dapagliflozin, acknowledging that other medicines in the same class were as effective and may become cheaper in the future. However, they support its use while it is the least expensive of the SGLT-2 inhibitors that may be suitable, because it is likely to reduce the cost of implementing the recommendation without negatively affecting quality of care.

People with a relatively lower risk of cardiovascular disease

People with type 2 diabetes have a higher risk of cardiovascular disease than people with the same health-related characteristics and no diabetes. The committee acknowledged that people with type 2 diabetes have an inherent increased lifetime risk of cardiovascular disease before accounting for any other cardiovascular risk factors that are more commonly associated with the condition, such as hypertension and dyslipidaemia. Therefore, in the absence of direct evidence, the committee agreed that even people with a relatively lower cardiovascular risk should be offered an SGLT-2 inhibitor and metformin, because it is important to reduce this risk, including for those without comorbidities or other cardiovascular risk factors. They also noted that, compared with groups who have a higher risk of cardiovascular disease, including people with early onset type 2 diabetes, the population that these recommendations cover is small. This population includes people likely to be 41 to 59 years old, who have no cardiovascular risk factors other than type 2 diabetes (who would otherwise be identified to have a QRISK score below 10%).

Because of their age, they may share similarities with people with early onset type 2 diabetes, for whom earlier intensive treatment is recommended.

Conclusion

Taking the evidence into account, the committee agreed that combining metformin with an SGLT-2 inhibitor is the most clinically effective therapy option, and that this should be the standard initial treatment for people with no relevant comorbidities.

Modified compared to standard-release metformin

There was limited evidence comparing standard-release and modified-release metformin for people with type 2 diabetes and no relevant comorbidities, and the committee agreed that there are benefits to recommending modified-release metformin first. This is because, when compared with standard-release metformin, modified-release metformin:

- has similar clinical effectiveness on HbA1c and weight reduction
- has similar safety results for hypoglycaemia
- is associated, in evidence outside of the protocol for the review, with reductions in gastrointestinal adverse events
- is likely to be better adhered to, and the committee was aware of the downstream costs of non-adherence (for example, cardiovascular and renal adverse events, further appointments and investigations), and
- can fluctuate in price but, in December 2025, cost less than standard-release metformin.

The committee noted that standard-release metformin may be preferable for people with difficulty swallowing because unlike modified-release metformin, it can be crushed and is available in a liquid form. This may be appropriate for people with dementia or with learning disabilities in whom dysphagia is more common. The committee did not make a recommendation about this because they were aware that NEWT guidelines provide further information to support decision making for people with swallowing difficulties.

The committee agreed that this should be addressed in a conversation between the person and the healthcare professional when prescribing the medication.

GLP-1 receptor agonists and tirzepatide

GLP-1 receptor agonists and tirzepatide were not found to be or did not have evidence for clinical or cost effectiveness for this population, so were not recommended.

Medicines for people who cannot take metformin

The evidence showed that SGLT-2 inhibitors reduced cardiovascular events compared with placebo when metformin is the background therapy. The committee agreed that even though the evidence was limited for people with no relevant comorbidities, this benefit would also be seen in people for whom metformin is contraindicated. Therefore, because the committee wanted people with type 2 diabetes to continue to gain the cardiovascular benefits seen in the evidence, they recommended monotherapy with an SGLT-2 inhibitor when metformin is contraindicated.

Recommendation for research

The committee reviewed real-world evidence that SGLT-2 inhibitors are under-prescribed, particularly to women and older people, people from some ethnic backgrounds, and people who have experienced higher levels of deprivation when sex and age are accounted for. They agreed that further research is needed to understand the reasons behind this so made a recommendation for research on improving access to SGLT-2 inhibitors.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

Metformin

The recommendations may lead to a change in current practice but should not lead to a significant cost or resource impact. The price of modified-release metformin can fluctuate but, in December 2025, was lower than the cost of standard-release metformin.

SGLT-2 inhibitors

SGLT-2 inhibitors were recommended by NICE in 2022 for:

- all people with chronic heart failure
- all people with atherosclerotic cardiovascular disease
- some people at high risk of developing cardiovascular disease.

Recommendations for SGLT-2 inhibitors for people with chronic kidney disease were previously made through different guidance but are not expected to reflect a significant change in practice.

However, real-world evidence (2026) shows that SGLT-2 inhibitors are under-prescribed throughout the UK. The 2026 recommendations may increase the number of people who are offered SGLT-2 inhibitors, which will increase prescribing costs. But broader access to SGLT-2 inhibitors may also result in long-term medicine costs being partially offset by fewer people needing treatment for atherosclerotic cardiovascular disease.

Based on these recommendations, people at lower risk of developing cardiovascular disease, who previously would not have had access to SGLT-2 inhibitors, can now access them. The committee did not believe this to be a large group and so the impact of this is likely to be minimal.

Number of appointments related to these medicines

The recommendations may lead to an increase in the number of appointments required to optimise the medications being added. However, this can be managed and may lead to reductions in the long term because:

- SGLT-2 inhibitors can be prescribed at the same time as metformin, with a plan for starting medicines sequentially
- the cardiovascular and renal benefits of SGLT-2 inhibitors will reduce the number of appointments needed to treat atherosclerotic cardiovascular disease, established heart failure and chronic kidney disease.

1.14 People with heart failure (with any ejection fraction, unless specified)

1.14.1 For adults with type 2 diabetes and heart failure offer:

- modified-release metformin, and
- an SGLT-2 inhibitor. **[2026]**

1.14.2 If metformin is contraindicated or not tolerated, offer monotherapy with an SGLT-2 inhibitor. **[2026]**

Why the committee made these recommendations

Metformin and SGLT-2 inhibitors

There is a significant body of evidence showing that type 2 diabetes management should aim at holistic health improvements (in particular, cardiovascular and renal protection), rather than just HbA1c targets.

Overall, network and pairwise meta-analyses comparing antidiabetic therapies showed that therapy combining metformin with an SGLT-2 inhibitor was more clinically effective at reducing HbA1c, weight and cardiovascular events than:

- any other therapy combining metformin with 1 other medicine, and
- metformin alone.

Cardiovascular events covered included cardiovascular mortality, myocardial infarction, non-fatal stroke and hospitalisation for heart failure. Evidence showed that canagliflozin and dapagliflozin also reduced the risk of end-stage renal failure.

The committee agreed that therapy combining metformin with an SGLT-2 inhibitor is the most clinically effective option for people with heart failure and recommended this as the standard initial treatment.

There was limited evidence for people with type 2 diabetes and heart failure. However, for people with type 2 diabetes who are at high risk of developing cardiovascular disease, there was strong evidence that SGLT-2 inhibitors reduced the number of hospitalisations due to heart failure.

During the 2026 update of the guideline, the committee was aware of the large reduction in price of dapagliflozin because generic versions of the medicine were becoming available. They did not make a recommendation for this specific medicine, acknowledging that other medicines in the same class were as effective and may become cheaper in the future. However, they support its use while it is the least expensive of the SGLT-2 inhibitors that may be suitable, because it is likely to reduce the cost of implementing the recommendation without impacting the quality of care for most people with type 2 diabetes.

Modified compared to standard-release metformin

There was limited evidence comparing standard-release and modified-release metformin. On weighing up the evidence, the committee agreed that there were benefits to recommending modified-release metformin first. This was because, when compared with standard-release metformin, modified-release metformin:

- has similar clinical effectiveness on HbA1c and weight reduction
- has similar safety results for hypoglycaemia
- was associated, in evidence outside of the protocol for the review, with reductions in gastrointestinal adverse events
- is likely to be better adhered to, and the committee was aware of the downstream costs of non-adherence (for example, cardiovascular and renal adverse events, further appointments and investigations)
- can fluctuate in price but, in December 2025, cost less than standard-release metformin.

The committee noted that standard-release metformin can be preferable for people with difficulty swallowing because it can be crushed and is available in a liquid form while modified-release metformin cannot. This may be more useful for some people with dementia and some people with learning disabilities in whom dysphagia is more common. The committee did not make a recommendation about this because they were aware that NEWT guidelines provide further information to support decision making for people with swallowing difficulties.

The committee agreed that this should be addressed in a conversation between the person and the healthcare professional when prescribing the medication.

Medicines for people who cannot take metformin

The trial evidence showed that SGLT-2 inhibitors reduced cardiovascular events compared with placebo when metformin was the background therapy. The committee agreed that this benefit of using SGLT-2 inhibitors would also be seen in people with contraindications to metformin, even though the evidence was limited for this group.

Therefore, as the committee wanted people with type 2 diabetes to continue to gain the cardiovascular benefits seen in the evidence, they recommended that when people have a contraindication to metformin, they should have monotherapy with an SGLT-2 inhibitor.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

Metformin

The recommendations about the use of metformin may lead to a change in current practice but should not lead to a significant cost or resource impact. The price of modified-release metformin can fluctuate but, in December 2025, was lower than the cost of standard-release metformin.

SGLT-2 inhibitors

SGLT-2 inhibitors were recommended by NICE in 2022. They were recommended for:

- all people with chronic heart failure
- some people at high risk of developing cardiovascular disease.

However, real-world evidence shows that SGLT-2 inhibitors are under-prescribed throughout the UK. The recommendations may increase the number of people who are offered SGLT-2 inhibitors, which will increase prescribing costs. But the long-term medicine cost associated with broader access to SGLT-2 inhibitors may be partially offset if it results in fewer people needing treatment for atherosclerotic cardiovascular disease or hospitalisation for heart failure.

Number of appointments related to these medicines

The recommendations may lead to an increase in the number of appointments required to optimise the medications being added. The committee believes this can be managed and will lead to reductions long term because:

- SGLT-2 inhibitors can be prescribed at the same time as metformin, with a plan for starting medicines sequentially
- the cardiovascular and renal benefits of SGLT-2 inhibitors will reduce the number of appointments needed to treat atherosclerotic cardiovascular disease, established heart failure and chronic kidney disease.

1.15 People with atherosclerotic cardiovascular disease

1.15.1 For adults with type 2 diabetes and atherosclerotic cardiovascular disease, offer:

- modified-release metformin, and
- an SGLT-2 inhibitor, and
- subcutaneous semaglutide (Ozempic), up to 1 mg once a week, for its cardiovascular, renal and glycaemic benefits. **[2026]**

1.15.2 If metformin is contraindicated or not tolerated, offer:

- an SGLT-2 inhibitor, and
- subcutaneous semaglutide (Ozempic), up to 1 mg once a week, for its cardiovascular, renal and glycaemic benefits. **[2026]**

Why the committee made these recommendations

Metformin and SGLT-2 inhibitors

There is a significant body of evidence showing that type 2 diabetes management should aim at holistic health improvements (in particular, cardiovascular and renal protection), rather than just HbA1c targets.

Overall, network and pairwise meta-analyses comparing antidiabetic therapies showed that therapy combining metformin with an SGLT-2 inhibitor was more clinically effective at reducing HbA1c, weight and cardiovascular events than:

- any other therapy combining metformin with 1 other medicine, and
- metformin alone.

Cardiovascular events covered included cardiovascular mortality, myocardial infarction, non-fatal stroke and hospitalisation for heart failure. Evidence showed that canagliflozin and dapagliflozin reduced the risk of end-stage renal failure.

The committee agreed that therapy combining metformin with an SGLT-2 inhibitor is the most clinically effective option for people with atherosclerotic cardiovascular disease and recommended this as the standard initial treatment.

Data on health inequalities showed that people living in the most deprived areas experience the greatest benefits for their health from SGLT-2 inhibitors. The committee believe this is an important reason for ensuring universal access to SGLT-2 inhibitors.

During the 2026 update of the guideline, the committee was aware of the large reduction in price of dapagliflozin because generic versions of the medicine were becoming available. They did not make a recommendation for this specific medicine, acknowledging that other medicines in the same class were as effective and may become cheaper in the future. However, they support its use while it is the least expensive of the SGLT-2 inhibitors that may be suitable, because it is likely to reduce the cost of implementing the recommendation without impacting the quality of care for most people with type 2 diabetes.

Modified compared to standard-release metformin

There was limited evidence comparing standard-release and modified-release metformin. On weighing up the evidence, the committee agreed that there were benefits to recommending modified-release metformin first. This was because, when compared with standard-release metformin, modified-release metformin:

- has similar clinical effectiveness on HbA1c and weight reduction
- has similar safety results for hypoglycaemia
- was associated, in evidence outside of the protocol for the review, with reductions in gastrointestinal adverse events
- is likely to be better adhered to, and the committee was aware the downstream costs of non-adherence (for example: cardiovascular and renal adverse events, further appointments and investigations)
- can fluctuate in price but, in December 2025, cost less than standard-release metformin.

The committee noted that standard-release metformin can be preferable for people with difficulty swallowing because it can be crushed and is available in a liquid form while modified-release metformin cannot. This may be more useful for some people with dementia and some people with learning disabilities in whom dysphagia is more common. The committee did not make a recommendation about this because they were aware that the NEWT guidelines provide further information to support decision making for people with swallowing difficulties.

The committee agreed that this should be addressed in a conversation between the person and the healthcare professional when prescribing the medication.

Medicines for people who cannot take metformin

The trial evidence showed that SGLT-2 inhibitors reduced cardiovascular events compared with placebo when metformin was the background therapy. The committee agreed that this benefit of using SGLT-2 inhibitors would also be seen in people with contraindications to metformin, even though the evidence was limited for this group.

Therefore, as the committee wanted people with type 2 diabetes to continue to gain the cardiovascular benefits seen in the evidence, they recommended that when people have a contraindication to metformin, they should have monotherapy with an SGLT-2 inhibitor.

Subcutaneous semaglutide

Evidence showed that subcutaneous semaglutide (Ozempic) was the most cost-effective GLP-1 receptor agonist. This evidence was based on clinical benefits identified in a population that included a large proportion of people with atherosclerotic cardiovascular disease but also some people who did not have atherosclerotic cardiovascular disease but were at high risk of it (because they had type 2 diabetes). Evidence was only identified for doses up to 1 mg of subcutaneous semaglutide once a week. The committee agreed that evidence from this mixed population indirectly applied because of the large proportion of people in the group who did have atherosclerotic cardiovascular disease.

Subcutaneous semaglutide (Ozempic), up to 1 mg once a week, also had the best clinical results. Evidence showed that it made a clinically important reduction to the person's:

- risk of major adverse cardiovascular events and
- HbA1c and
- weight.

The results for these outcomes were precise, which means that there is very little uncertainty about them. Other GLP-1 receptor agonists did not achieve this. Liraglutide was cost effective in a sensitivity analysis taking into account projected price reductions after the generic version became available. But the committee agreed that it was not sufficiently clinically effective to justify adding it to the recommendation. In addition, evidence was not available to the committee to evaluate tirzepatide for this population at this time. As a result, the committee agreed to specifically recommend subcutaneous semaglutide (Ozempic), up to 1 mg once a week, rather than any other GLP-1 receptor agonist or tirzepatide.

The committee noted that there are potential serious side effects with GLP-1 receptor

agonists and tirzepatide, and a potential for misuse. However, they did not make a recommendation on monitoring because it is covered by MHRA drug safety updates. See MHRA guidance on GLP-1 receptor agonists: reminder of the potential side effects and to be aware of the potential for misuse, GLP-1 receptor agonists and dual GLP-1/GIP receptor agonists: strengthened warnings on acute pancreatitis, including necrotising and fatal cases and semaglutide (Wegovy, Ozempic and Rybelsus): risk of non-arteritic anterior ischemic optic neuropathy (NAION) for more details.

The committee made the decision to recommend this medicine in combination with metformin and an SGLT-2 inhibitor based on:

- evidence they had from a pooled analysis
- their own clinical experience.

The evidence in the pooled network meta-analysis came from a review that looked at the cost and clinical effectiveness of adding subsequent therapies to previous treatment. It showed clinical benefits from GLP-1 receptor agonists, but most studies in the evidence review did not give separate results based on the number or type of other treatments received. A small number of studies specifically included triple therapy combining GLP-1 receptor agonists, SGLT-2 inhibitors and metformin. When compared in health economic evaluation, adding subcutaneous semaglutide to an SGLT-2 inhibitor and metformin was cost effective.

The evidence for combination therapy with metformin and SGLT-2 inhibitors showed that the cardiovascular benefits came from the SGLT-2 inhibitors alone. This was clear because people receiving metformin and placebo did not get the same benefits. When compared with placebo in clinical trials, GLP-1 receptor agonists, including semaglutide also showed cardiovascular benefits, regardless of other treatment received. Because of this, the committee agreed that people with atherosclerotic cardiovascular disease should receive therapy combining an SGLT-2 inhibitor and subcutaneous semaglutide if metformin is contraindicated or not tolerated.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

Metformin

The recommendations about the use of metformin may lead to a change in current practice but should not lead to a significant cost or resource impact. The price of modified-release metformin can fluctuate but, in December 2025, was lower than the cost of standard-release metformin.

SGLT-2 inhibitors were recommended by NICE in 2022. They were recommended for:

- all people with atherosclerotic cardiovascular disease
- some people at high risk of developing cardiovascular disease.

However, real-world evidence shows that SGLT-2 inhibitors are under-prescribed throughout the UK. The recommendations may increase the number of people who are offered SGLT-2 inhibitors, which will increase prescribing costs. But broader access to SGLT-2 inhibitors may also result in long-term medicine costs being partially offset by fewer people needing treatment for atherosclerotic cardiovascular disease.

Subcutaneous semaglutide

Subcutaneous semaglutide is a GLP-1 receptor agonist. GLP-1 receptor agonists were previously reserved for later treatment phases. Recommending subcutaneous semaglutide (Ozempic), up to 1 mg once a week, for some people as part of initial therapy will increase costs. Taking subcutaneous semaglutide will mean that DPP-4 inhibitor use will reduce. Early intervention could lead to weight loss as a beneficial side effect that may result in better long-term prognoses. If maintained, this will reduce needs for both long-term treatment and later stage treatments (such as insulin).

Number of appointments related to these medicines

The recommendations may lead to an increase in the number of appointments

required to optimise the medications being added. The committee believes this can be managed and will lead to reductions in the long term because:

- SGLT-2 inhibitors can be prescribed at the same time as metformin, with a plan for starting medicines sequentially
- the cardiovascular and renal benefits of SGLT-2 inhibitors will reduce the number of appointments needed to treat atherosclerotic cardiovascular disease, established heart failure and chronic kidney disease
- the cardiovascular benefits of subcutaneous semaglutide will reduce the number of appointments needed to treat atherosclerotic cardiovascular disease and established heart failure.

1.16 People with early onset type 2 diabetes

1.16.1 For adults with early onset type 2 diabetes, offer modified-release metformin and an SGLT-2 inhibitor, and consider adding either:

- a GLP-1 receptor agonist for its cardiovascular, renal and glycaemic benefits or
- tirzepatide for its glycaemic benefits. **[2026]**

1.16.2 If metformin is contraindicated or not tolerated, offer an SGLT-2 inhibitor and consider adding either:

- a GLP-1 receptor agonist for its cardiovascular, renal and glycaemic benefits or
- tirzepatide for its glycaemic benefits. **[2026]**

Why the committee made these recommendations

Metformin and SGLT-2 inhibitors

There is good evidence that managing type 2 diabetes should aim to improve health holistically (in particular, cardiovascular and renal protection), rather than just HbA1c. Based on their experience, the committee agreed that people with early onset type 2 diabetes:

- have a very high lifetime risk of cardiovascular and renal complications, and of dying from them, and
- are more likely to be living with obesity.

Early intensive treatment can provide benefits by preventing these future negative outcomes.

Though there were no clinical trials focusing solely on people with early onset diabetes, there was good evidence in the wider population of people with type 2 diabetes, which the committee agreed could be extrapolated to people with early onset type 2 diabetes. It showed that:

- both SGLT-2 inhibitors and GLP-1 receptor agonists reduce the risk of cardiovascular events (cardiovascular mortality, myocardial infarctions, non-fatal strokes and hospitalisation for heart failure) and of developing end-stage renal disease
- SGLT-2 inhibitors, GLP-1 receptor agonists and tirzepatide reduce HbA1c, and lead to weight loss as a beneficial side effect.

The committee agreed that the benefits could be increased with long-term use.

The health economic evidence for this population was highly uncertain. The committee concluded that this was because:

- there were no clinical trials focusing solely on early onset diabetes,
- the trial informing the model only included a small number of people with early

onset type 2 diabetes, and

- the short time horizon for evaluating treatment benefits may have underestimated long-term advantages for this group.

Data on health inequalities showed that people living in the most deprived areas experience the greatest health benefits from SGLT-2 inhibitors. The committee agreed that this is an important reason for ensuring universal access to SGLT-2 inhibitors.

During the 2026 update of the guideline, the committee was aware of the large reduction in price of dapagliflozin because generic versions of the medicine were becoming available. They did not make a recommendation for this specific medicine, acknowledging that other medicines in the same class were as effective and may become cheaper in the future. However, they support its use while it is the least expensive of the SGLT-2 inhibitors that may be suitable, because it is likely to reduce the cost of implementing the recommendation without impacting the quality of care for most people with type 2 diabetes.

Modified-release compared to standard-release metformin

There was limited evidence comparing standard-release and modified-release metformin, and the committee agreed that there are benefits to recommending modified-release metformin first. This is because, when compared with standard-release metformin, modified-release metformin:

- has similar clinical effectiveness on HbA1c and weight reduction
- has similar safety results for hypoglycaemia
- is associated, in evidence outside of the protocol for the review, with reductions in gastrointestinal adverse events
- is likely to be better adhered to, and the committee was aware of the downstream costs of non-adherence (for example, cardiovascular and renal adverse events, further appointments and investigations), and
- can fluctuate in price but, in December 2025, cost less than standard-release metformin.

The committee noted that standard-release metformin may be preferable for people with difficulty swallowing because unlike modified-release metformin, it can be crushed and is available in a liquid form. This may be appropriate for people with dementia or learning disabilities in whom dysphagia is more common. The committee did not make a recommendation about this because they were aware that the NEWT guidelines provide further information to support decision making for people with swallowing difficulties.

The committee agreed that this should be addressed in a conversation between the person and the healthcare professional when prescribing the medication.

GLP-1 receptor agonists and tirzepatide

The committee recommended combining a GLP-1 agonist or tirzepatide with metformin and an SGLT-2 inhibitor based on evidence from a pooled network meta-analysis and their clinical experience.

The evidence in the pooled network meta-analysis used in the health economic modelling came from a review of people at higher risk of developing cardiovascular disease or people with existing atherosclerotic cardiovascular disease adding subsequent therapies to previous treatment. It showed benefits from GLP-1 receptor agonists, but most studies did not give separate results based on the number or type of other treatments received. A small number of studies included triple therapy combining GLP-1 receptor agonists, SGLT-2 inhibitors and metformin. When compared in health economic evaluation, adding most GLP-1 receptor agonists was not cost effective, while adding liraglutide to an SGLT-2 inhibitor and metformin reported an incremental cost-effectiveness ratio (ICER) approaching £20,000 per quality-adjusted life year (QALY) gained. Tirzepatide was not analysed for this population.

The evidence for combination therapy with metformin and SGLT-2 inhibitors showed that the cardiovascular benefits came from the SGLT-2 inhibitors alone. This was clear because the people receiving metformin and placebo did not get the same benefits. When compared with placebo in clinical trials, GLP-1 receptor agonists also showed cardiovascular benefits regardless of other treatment received. The evidence evaluated for tirzepatide did not show cardiovascular benefits, which leaves some uncertainty about its use for this purpose. However, the committee acknowledged the benefits in reducing HbA1c and weight, and how this could lead to beneficial

cardiovascular outcomes in the long term.

The committee agreed that GLP-1 receptor agonists and tirzepatide should be considered in addition to metformin and SGLT-2 inhibitors, given the:

- relatively small size of this group
- health inequalities that this group would face if they did not receive treatment early, and
- challenges in identifying appropriate data.

The committee also made a recommendation for research on treatments for people with early onset diabetes.

The committee noted potential serious side effects with GLP-1 receptor agonists and tirzepatide, and a potential for misuse. However, they did not make a recommendation for monitoring because it is covered by MHRA drug safety updates. See MHRA guidance on GLP-1 receptor agonists: reminder of the potential side effects and to be aware of the potential for misuse, GLP-1 receptor agonists and dual GLP-1/GIP receptor agonists: strengthened warnings on acute pancreatitis, including necrotising and fatal cases and semaglutide (Wegovy, Ozempic and Rybelsus): risk of non-arteritic anterior ischemic optic neuropathy (NAION) for more details.

Medicines for people who cannot take metformin

The evidence showed that SGLT-2 inhibitors reduce cardiovascular events compared with placebo when metformin is the background therapy. The committee agreed that even though the evidence was limited for this group, this benefit would also be seen in people for whom metformin is contraindicated. Therefore, given that the committee wanted people with type 2 diabetes to continue to gain the cardiovascular benefits seen in the evidence, they recommended monotherapy with an SGLT-2 inhibitor when metformin is contraindicated.

They agreed that people with early onset diabetes should receive an SGLT-2 inhibitor, and that adding a GLP-1 receptor agonist or tirzepatide could be considered if metformin is contraindicated or not tolerated.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

Metformin

The recommendations may lead to a change in current practice but should not lead to a significant cost or resource impact. The price of modified-release metformin can fluctuate but, in December 2025, was lower than the cost of standard-release metformin.

SGLT-2 inhibitors

SGLT-2 inhibitors were recommended by NICE in 2022 for some people at high risk of developing cardiovascular disease.

However, real-world evidence shows that SGLT-2 inhibitors are under-prescribed throughout the UK. The recommendations may increase the number of people who are offered SGLT-2 inhibitors, which will increase prescribing costs. But broader access to SGLT-2 inhibitors may also result in long-term medicine costs being partially offset by fewer people needing treatment for atherosclerotic cardiovascular disease, especially in this population, when taking a long-term perspective.

GLP-1 receptor agonists and tirzepatide

GLP-1 receptor agonists and tirzepatide were previously reserved for later treatment phases. Recommending these for some people as part of initial therapy will increase costs. Increased GLP-1 receptor agonists or tirzepatide use will reduce DPP-4 inhibitor use. Early intervention could lead to weight loss as a beneficial side effect that may result in better long-term prognoses. If maintained, this will reduce needs for both long-term treatment and later stage treatments (such as insulin).

Number of appointments related to these medicines

The recommendations may lead to an increase in the number of appointments required to optimise the medications being added. However, this can be managed and may lead to reductions in the long term because:

- SGLT-2 inhibitors can be prescribed at the same time as metformin, with a plan for starting medicines sequentially
- the cardiovascular and renal benefits of SGLT-2 inhibitors will reduce the number of appointments needed to treat atherosclerotic cardiovascular disease, established heart failure and chronic kidney disease
- the cardiovascular benefits of GLP-1 receptor agonists will reduce the number of appointments needed to treat atherosclerotic cardiovascular disease and established heart failure.

1.17 People living with obesity

1.17.1 For adults with type 2 diabetes who are living with obesity, offer:

- modified-release metformin and
- an SGLT-2 inhibitor.

For a definition of obesity, see the section on classifying overweight and obesity in adults in NICE's guideline on overweight and obesity management. **[2026]**

1.17.2 If metformin is contraindicated or not tolerated, offer monotherapy with an SGLT-2 inhibitor. **[2026]**

Why the committee made these recommendations

The evidence comparing antidiabetic therapies for people with no relevant comorbidities included people living with obesity. However, in most studies it was not possible to separate out this group from the larger study population and identify specific effects for people living with obesity. Given the limitations of the evidence, the committee recommended the same medicines for this group as for other people with type 2 diabetes and no other specific comorbidities.

The committee recommended these therapies for people living with obesity because of their glycaemic reduction properties, and cardiovascular and renal benefits. Weight reduction may be a side effect of some medicines (including GLP-1 receptor agonists and tirzepatide, SGLT-2 inhibitors, and metformin), which may be important to the person with type 2 diabetes and their healthcare professionals. However, if weight reduction is the primary aim of the treatment, the committee agreed that healthcare professionals should follow NICE's guideline on overweight and obesity management instead of this guideline.

For the wider population, therapy with metformin and an SGLT-2 inhibitor was more clinically effective at reducing HbA1c, weight and cardiovascular events than:

- any other therapy combining metformin with 1 other medicine, and
- metformin alone.

Cardiovascular events covered included cardiovascular mortality, myocardial infarction, non-fatal stroke and hospitalisation for heart failure. Evidence showed that canagliflozin and dapagliflozin reduced the risk of end-stage renal failure.

The committee agreed that therapy combining metformin with an SGLT-2 inhibitor is the most clinically effective option for people living with obesity and recommended this as the standard initial treatment.

SGLT-2 inhibitors were cost effective for people living with obesity. Data on health inequalities also showed that people living in the most deprived areas experience the greatest benefits for their health from SGLT-2 inhibitors. The committee believe this is an important reason for ensuring universal access to SGLT-2 inhibitors.

During the 2026 update of the guideline, the committee was aware of the large reduction in price of dapagliflozin because generic versions of the medicine were becoming available. They did not make a recommendation for this specific medicine, acknowledging that other medicines in the same class were as effective and may become cheaper in the future. However, they support its use while it is the least expensive of the SGLT-2 inhibitors that may be suitable, because it is likely to reduce the cost of implementing the recommendation without impacting the quality of care for most people with type 2 diabetes.

GLP-1 receptor agonists were not cost effective in the health economic modelling for this population. Compared to people with early onset type 2 diabetes, the lifetime risk of cardiovascular disease is lower. Bearing in mind the cardiovascular protection already being provided by SGLT-2 inhibitors and metformin, GLP-1 receptor agonists and tirzepatide were not recommended as initial medicines and were instead recommended as treatment options if further medicines are needed.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

Metformin

The recommendations about the use of metformin may lead to a change in current practice but should not lead to a significant cost or resource impact. The price of modified-release metformin can fluctuate but, in December 2025, was lower than the cost of standard-release metformin.

SGLT-2 inhibitors

SGLT-2 inhibitors were recommended by NICE in 2022. They were recommended for some people at high risk of developing cardiovascular disease.

However, real-world evidence shows that SGLT-2 inhibitors are under-prescribed throughout the UK. The recommendations may increase the number of people who are offered SGLT-2 inhibitors, which will increase prescribing costs. But broader access to SGLT-2 inhibitors may also result in long-term medicine costs being partially offset by fewer people needing treatment for atherosclerotic cardiovascular disease.

Number of appointments related to these medicines

The recommendations may lead to an increase in the number of appointments required to optimise the medications being added. The committee believes this can be managed and will lead to reductions in the long term because:

- SGLT-2 inhibitors can be prescribed at the same time as metformin, with a plan for starting medicines sequentially
- the cardiovascular and renal benefits of SGLT-2 inhibitors will reduce the number of appointments needed to treat atherosclerotic cardiovascular disease, established heart failure and chronic kidney disease.

1.18 People with chronic kidney disease

Medicines vary in their contraindications and precautions for use in people with renal impairment. See NICE's information on prescribing medicines and refer to the summary of product characteristics for individual products.

1.18.1 For adults with type 2 diabetes and an estimated glomerular filtration rate (eGFR) above 30 ml/min/1.73 m^2:

- Offer modified-release metformin and an SGLT-2 inhibitor.
- If metformin is contraindicated or not tolerated, offer monotherapy with an SGLT-2 inhibitor. **[2026]**

1.18.2 For adults with type 2 diabetes and an eGFR of 20 ml/min/1.73 m^2 and up to 30 ml/min/1.73 m^2, offer:

- either dapagliflozin or empagliflozin and
- a DPP-4 inhibitor. **[2026]**

1.18.3 For adults with type 2 diabetes and an eGFR below 20 ml/min/1.73 m^2, consider a DPP-4 inhibitor. **[2026]**

1.18.4 If a DPP-4 inhibitor is contraindicated, not tolerated or not effective, consider:

- pioglitazone or
- an insulin-based treatment. **[2026]**

1.18.5 For guidance on managing other aspects of kidney disease in adults with type 2 diabetes, see NICE's guideline on chronic kidney disease. **[2015]**

Why the committee made these recommendations

eGFR above 30 ml/min/1.73 m^2

Little evidence was identified specifically for people with chronic kidney disease. However, the committee agreed that people with an eGFR above 30 ml/min/1.73 m^2 should see the same benefits from diabetes medicines as people without chronic kidney disease. In the health economic analysis, metformin and SGLT-2 inhibitors were less costly and more effective than other medicines. The committee noted that while the cardiovascular and renal protection provided by SGLT-2 inhibitors are retained at eGFR values below 45 ml/min/1.73 m^2, the glycaemic benefits may reduce. Glycaemic benefits can come from metformin, but there may be a need to add further therapy to provide these. Options for this are provided in the section on treatment options if further medicines are needed.

Data on health inequalities showed that people living in the most deprived areas experience the greatest benefits for their health from SGLT-2 inhibitors. The committee believe this is an important reason for ensuring universal access to SGLT-2 inhibitors.

The committee examined evidence from the FLOW trial. While the trial identified clinically important benefits in terms of renal protection and glycaemia, subcutaneous semaglutide was not cost effective in the economic model. Therefore, the committee did not recommend semaglutide, any other GLP-1 receptor agonists or tirzepatide for this population.

eGFR above 20 ml/min/1.73 m^2 and up to 30 ml/min/1.73 m^2

People with an eGFR below 30 ml/min/1.73 m^2 cannot take metformin. However, the committee agreed that people with an eGFR above 20 ml/min/1.73 m^2 could still be offered an SGLT-2 inhibitor to reduce the risk of end-stage renal events and cardiovascular events (including cardiovascular mortality, myocardial infarctions, non-fatal strokes and hospitalisations for heart failure) from type 2 diabetes. The committee recommended dapagliflozin and empagliflozin because these are the 2 SGLT-2 inhibitors that are licensed for use in this population. The committee noted that while the cardiovascular and renal protection provided by SGLT-2 inhibitors are

retained at eGFR values below 30 ml/min/1.73 m^2, the glycaemic benefits may reduce or be absent. Therefore, adding a DPP-4 inhibitor was recommended, because it is effective at reducing HbA1c and relatively safe for people with an eGFR between 20 ml/min/1.73 m^2 and 30 ml/min/1.73 m^2.

Data on health inequalities showed that people living in the most deprived areas experience the greatest benefits for their health from SGLT-2 inhibitors. The committee believe this is an important reason for ensuring universal access to SGLT-2 inhibitors.

eGFR below 20 ml/min/1.73 m^2

DPP-4 inhibitors are effective at reducing HbA1c and have fewer adverse effects than other comparable options. If DPP-4 inhibitors are contraindicated, not tolerated or not effective for people with an eGFR below 20 ml/min/1.73 m^2, then in the committee's experience the best option is either pioglitazone or an insulin-based treatment. The committee acknowledged that a sulfonylurea could increase the risk of hypoglycaemia as renal impairment increases, so would not be a good option for this group. Pioglitazone might worsen cardiovascular outcomes and should be avoided for people with heart failure.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

Metformin

The recommendations about the use of metformin may lead to a change in current practice but should not lead to a significant cost or resource impact. The price of modified-release metformin can fluctuate but, in December 2025, was lower than the cost of standard-release metformin.

SGLT-2 inhibitors

The recommendations about the use of SGLT-2 inhibitors should not lead to a change in current practice.

DPP-4 inhibitors, pioglitazone and insulin

The recommendation about the use of DPP-4 inhibitors, pioglitazone and insulin should not reflect a change in current practice.

1.19 People with frailty

1.19.1 For adults with type 2 diabetes and frailty:

- Offer modified-release metformin.
- Only offer an SGLT2 inhibitor if the person's level of frailty does not place them at risk of adverse events from such a medicine (for example, volume depletion or hypotension). **[2026]**

1.19.2 If metformin is contraindicated or not tolerated, assess whether their level of frailty places the person at risk of adverse events from SGLT-2 inhibitors:

- if it does not, consider monotherapy with a SGLT-2 inhibitor
- if it does, consider monotherapy with a DPP-4 inhibitor. **[2026]**

1.19.3 Consider reviewing the person's overall diabetes treatment plan to ensure that they are taking the smallest effective number of medications, at the lowest effective dosage.

For further guidance on making a treatment plan for people with frailty (including when associated with multimorbidity), see NICE's guidelines on clinically assessing and managing multimorbidity, medicines optimisation and shared decision making. **[2026]**

Why the committee made these recommendations

Because of concerns about adverse effects and polypharmacy, the committee agreed that SGLT-2 inhibitors may not be appropriate for some people with frailty and type 2 diabetes.

There was no specific evidence for people with frailty, so the committee could not recommend a particular method of assessment or cutoff for prescribing SGLT-2 inhibitors. The decision would need to be made based on clinical judgement, taking into account the needs of each person.

The committee recommended medicines for this group based on:

- their own expertise
- common medicine contraindications in this group
- their knowledge of which medicines were likely to have the most manageable side effects.

The committee did not recommend GLP-1 receptor agonists and tirzepatide for people with frailty. However, they agreed that there is no additional safety risk for this population. Therefore, if a person has a relevant indication and frailty, they can still be offered a GLP-1 receptor agonists or tirzepatide.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

Metformin

The recommendations about the use of metformin may lead to a change in current practice but should not lead to a significant cost or resource impact. The price of modified-release metformin can fluctuate but, in December 2025, was lower than the cost of standard-release metformin.

DPP-4 inhibitors

The recommendations about the use of DPP-4 inhibitors should not reflect a change in current practice.

How to introduce medicines

Recommendations in this section that cover dipeptidyl peptidase-4 (DPP-4) inhibitors, glucagonlike peptide-1 (GLP-1) receptor agonists, sulfonylureas and sodium–glucose cotransporter-2 (SGLT-2) inhibitors refer to each of these groups of medicines at class level.

For GLP-1 receptor agonists, at the time of publication (February 2026) this only includes liraglutide, dulaglutide, and semaglutide. For subcutaneous semaglutide (Ozempic), this only includes doses up to 1 mg once a week.

1.20 Introducing medicines in a stepwise manner

1.20.1 Introduce medicines in a stepwise manner, checking for tolerability and effectiveness of each medicine. **[2015]**

1.20.2 When an adult with type 2 diabetes starts initial therapy with metformin and one or more other medicines:

- introduce the medicines one at a time, starting with metformin and checking tolerability
- if using an SGLT-2 inhibitor, start this as soon as metformin is at the maximum tolerated dose
- if using a GLP-1 receptor agonist or tirzepatide, start this as soon as the SGLT-2 inhibitor is at the maximum tolerated dose.

  For guidance on how to prevent any negative impact on the person's eyes from starting blood glucose lowering treatment, see the section on effects of a rapid reduction in HbA1c in NICE's guideline on diabetic retinopathy. **[2022, amended 2026]**

1.21 Preventing diabetic ketoacidosis when taking SGLT-2 inhibitors

1.21.1 Before starting an SGLT-2 inhibitor, check whether the person may be at increased risk of diabetic ketoacidosis (DKA), for example if they:

- have had a previous episode of DKA
- are unwell with intercurrent illness
- are at risk of dehydration or volume depletion
- are following a very low carbohydrate or ketogenic diet. **[2022, updated 2026]**

1.21.2 Address modifiable risks of DKA before starting an SGLT-2 inhibitor. For example, people who are following a very low carbohydrate or ketogenic diet may need to delay treatment until they have changed their diet. **[2022]**

1.21.3 Advise adults with type 2 diabetes who are taking an SGLT-2 inhibitor that a very low carbohydrate or ketogenic diet would increase their risk of DKA and so:

- they should speak with their healthcare professional before starting such a diet, and
- their SGLT-2 inhibitor treatment may need to be suspended for the duration of the diet. **[2022]**

Why the committee made these recommendations

When starting first-line therapy with metformin and other medicines, the committee noted the importance of introducing the medicines sequentially. This enables any side effects and intolerances from the first medicine to be identified before the second is introduced. In line with current practice, the committee recommended starting with metformin and then adding the SGLT-2 inhibitor without delay once metformin tolerability at the highest achievable dose is established, to avoid people remaining on metformin alone for prolonged periods.

The committee agreed that sudden reductions in HbA1c can increase the risk of diabetic retinopathy and ischaemic maculopathy, especially with GLP-1 receptor agonists and tirzepatide. Given this safety concern, they highlighted relevant recommendations in NICE's guideline on diabetic retinopathy for further guidance for anyone starting these medicines.

Preventing diabetic ketoacidosis when taking SGLT-2 inhibitors

The committee noted some particularly important safety considerations to take into account before an adult with type 2 diabetes starts on an SGLT-2 inhibitor. In the committee's experience there have been multiple instances of avoidable diabetes ketoacidosis (DKA) resulting in hospital admission. The committee highlighted some factors that might put someone at higher risk of DKA, but the list is not intended to be exhaustive. Addressing modifiable risk factors before starting an SGLT-2 inhibitor could reduce the risk of DKA and make the medicine safer for the person with type 2 diabetes. The committee agreed that taking these factors into account was more important than providing a specific HbA1c threshold from which to avoid prescribing SGLT-2 inhibitors.

The committee was aware that adults with type 2 diabetes who are living with overweight or obesity may wish to try a ketogenic diet to reverse or reduce the severity of their diabetes or induce remission. However, the committee agreed, based on their experience, that there may be an increased risk of DKA associated with SGLT-2 inhibitors and such diets. It is important to tell people about these risks and to advise them to discuss any planned change to a very low carbohydrate or ketogenic diet with their healthcare professional first.

Full details of the evidence and the committee's discussion are in evidence review B: pharmacological therapies with cardiovascular and other benefits in people with type 2 diabetes.

How the recommendations might affect practice

The recommendations are not expected to significantly increase consultation time or be a change in practice because these should already form part of the prescribing process. Checking that the person is not at increased risk of DKA when they are prescribed an SGLT-2 inhibitor should help reduce the number of people who experience DKA and thereby reduce unnecessary hospital admissions.

Reviewing medicines

Recommendations in this section that cover dipeptidyl peptidase-4 (DPP-4) inhibitors, glucagonlike peptide-1 (GLP-1) receptor agonists, sulfonylureas and sodium–glucose cotransporter-2 (SGLT-2) inhibitors refer to each of these groups of medicines at class level.

For GLP-1 receptor agonists, at the time of publication (February 2026) this only includes liraglutide, dulaglutide, and semaglutide. For subcutaneous semaglutide (Ozempic), this only includes doses up to 1 mg once a week.

1.22 Principles

1.22.1 When reviewing treatments, make a shared decision about changes with the person with type 2 diabetes. See the recommendations on involving people in medicine discussions. **[2022, amended 2026]**

1.22.2 Optimise their current treatment regimen before changing treatments, taking into account factors such as:

- adverse effects
- prescribed doses and formulations
- adherence to, and management of existing medicines
- the need to revisit advice about diet and healthy living.

See also the recommendations on individualised care. **[2022, amended 2026]**

1.22.3 If response to medicines suggests that type 2 diabetes might not be the correct diagnosis, see the recommendations on initial diagnosis and revisiting initial diagnosis in NICE's guideline on managing type 1 diabetes. **[2026]**

1.23 Reviewing metformin

1.23.1 For adults with type 2 diabetes who are already taking standard-release metformin:

- continue with this treatment or
- switch to modified-release metformin if standard-release metformin is not tolerated or if this is the person's preference. **[2026]**

Why the committee made this recommendation

The committee agreed that, when changes to treatment are being considered, it is important to review existing treatment options first. Stopping medications that have not worked, for example, in controlling blood glucose, and optimising current treatments may remove the need to prescribe additional medicines. In particular, there might be factors, such as problems with adherence or adverse effects, that might make existing treatments less effective or ineffective. Addressing these might mean that adding a new medicine is unnecessary.

In the committee's experience, some people have their medications stopped after they reach their glycaemic targets. This can lead to their HbA1c levels and weight rising again. Often, it would be better for the person to keep taking medications that have helped them reach their individualised glycaemic targets, to prevent future problems. There was no evidence on which groups would most benefit from this, so the decision would need to be based on clinical judgement and the preferences of the person with type 2 diabetes.

SGLT-2 inhibitors are a good treatment option for most people and provide cardiovascular and renal protection that cannot be measured by tests. Therefore, the committee agreed that these should be continued even if they do not help the person reach their individualised glycaemic targets.

However, the committee acknowledged that the decision is more complicated for GLP-1 receptor agonists and tirzepatide. For people with atherosclerotic cardiovascular disease or early onset type 2 diabetes, GLP-1 receptor agonists and SGLT-2 inhibitors are being used to prevent cardiovascular events. For these groups, continuing GLP-1 receptor agonists can provide benefits even if they do not help the person reach their glycaemic targets. For people who do not have atherosclerotic cardiovascular disease or early onset type 2 diabetes, GLP-1 receptor agonists and tirzepatide are being used to reach individualised glycaemic targets, so they should be treated like any other medication and stopped if they are not effective for this purpose.

The list of factors to think about as part of optimisation is not exhaustive but includes those that the committee thought were particularly important. The committee agreed

that it is important to revisit advice about diet and healthy living. This is because part of this discussion is to ensure the person is supported with both non-pharmacological and pharmacological interventions to improve their current health and prognosis.

The committee agreed that there are cases where treatment with certain medicines highlights diagnostic uncertainty (for example: absence of response to treatments other than insulin, sudden unexpected weight loss). Therefore, the committee highlighted guidance regarding type 1 diabetes and revisiting other diagnoses.

People already on standard-release metformin

There was no evidence identified in the review to show that modified-release metformin was more effective than standard-release metformin, and no evidence that it would be more cost effective for people for whom it works. However, the committee agreed that, in their clinical experience, people can experience fewer gastrointestinal adverse events with modified-release metformin compared to standard-release metformin. Additionally, a person may want to reduce the number of times they take metformin each day. Therefore, the option of switching from standard-release to modified-release metformin should be available.

Not combining a DPP-4 inhibitor and a GLP-1 agonist

Based on their own experience, the committee agreed that combining a GLP-1 receptor agonist or tirzepatide and a DPP-4 inhibitor would not add value. The 2 medicines have a similar mechanism of action, as they act on different parts of the GLP-1 pathway. Because of this, it is unlikely that combining the medications provides any additional effect and so it is unlikely to be clinically or cost effective.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendation might affect practice

The recommendations will lead to people taking SGLT-2 inhibitors and GLP-1 receptor agonists or tirzepatide for longer. This will initially increase costs. However, the long-term protective benefits of these medicines will reduce the need to treat future cardiovascular and renal problems, which will lead to cost savings. Otherwise, the recommendations are not expected to change current practice significantly.

The 2022 recommendations about reviewing medicines are not expected to be a change in practice or to need substantial additional resources because these conversations should already take place.

1.24 Reviewing other medicines

1.24.1 If the person has reached their individualised glycaemic target and weight target (as defined in the section on discussing results and referral in NICE's guideline on overweight and obesity), consider continuing any medicines that have contributed to this. **[2026]**

1.24.2 Consider continuing SGLT-2 inhibitors for their cardiovascular or renal benefits, even if they do not help the person reach their individualised glycaemic targets. **[2026]**

1.24.3 Stop GLP-1 receptor agonists or tirzepatide if the person becomes underweight (BMI under 18.5 kg/m^2). **[2026]**

1.24.4 Stop GLP-1 receptor agonists or tirzepatide if they do not help the person reach their individualised glycaemic targets and they are not being taken for their cardiovascular benefits. **[2026]**

1.24.5 Take into account adverse effects from combining medicines (for example hypoglycaemia). **[2022, amended 2026]**

1.24.6 Do not offer both a GLP-1 receptor agonist or tirzepatide and a DPP-4 inhibitor together to treat type 2 diabetes. **[2026]**

Why the committee made these recommendations

The committee agreed that, when changes to treatment are being considered, it is important to review existing treatment options first. Stopping medications that have not worked, for example, in controlling blood glucose, and optimising current treatments may remove the need to prescribe additional medicines. In particular, there might be factors, such as problems with adherence or adverse effects, that might make existing treatments less effective or ineffective. Addressing these might mean that adding a new medicine is unnecessary.

In the committee's experience, some people have their medications stopped after they reach their glycaemic targets. This can lead to their HbA1c levels and weight rising again. Often, it would be better for the person to keep taking medications that have helped them reach their individualised glycaemic targets, to prevent future problems. There was no evidence on which groups would most benefit from this, so the decision would need to be based on clinical judgement and the preferences of the person with type 2 diabetes.

SGLT-2 inhibitors are a good treatment option for most people and provide cardiovascular and renal protection that cannot be measured by tests. Therefore, the committee agreed that these should be continued even if they do not help the person reach their individualised glycaemic targets.

However, the committee acknowledged that the decision is more complicated for GLP-1 receptor agonists and tirzepatide. For people with atherosclerotic cardiovascular disease or early onset type 2 diabetes, GLP-1 receptor agonists and SGLT-2 inhibitors are being used to prevent cardiovascular events. For these groups, continuing GLP-1 receptor agonists can provide benefits even if they do not help the person reach their glycaemic targets. For people who do not have atherosclerotic cardiovascular disease or early onset type 2 diabetes, GLP-1 receptor agonists and tirzepatide are being used to reach individualised glycaemic targets, so they should be treated like any other medication and stopped if they are not effective for this purpose.

The list of factors to think about as part of optimisation is not exhaustive but includes those that the committee thought were particularly important. The committee agreed

that it is important to revisit advice about diet and healthy living. This is because part of this discussion is to ensure the person is supported with both non-pharmacological and pharmacological interventions to improve their current health and prognosis.

The committee agreed that there are cases where treatment with certain medicines highlights diagnostic uncertainty (for example: absence of response to treatments other than insulin, sudden unexpected weight loss). Therefore, the committee highlighted guidance regarding type 1 diabetes and revisiting other diagnoses.

People already on standard-release metformin

There was no evidence identified in the review to show that modified-release metformin was more effective than standard-release metformin, and no evidence that it would be more cost effective for people for whom it works. However, the committee agreed that, in their clinical experience, people can experience fewer gastrointestinal adverse events with modified-release metformin compared to standard-release metformin. Additionally, a person may want to reduce the number of times they take metformin each day. Therefore, the option of switching from standard-release to modified-release metformin should be available.

Not combining a DPP-4 inhibitor and a GLP-1 agonist

Based on their own experience, the committee agreed that combining a GLP-1 receptor agonist or tirzepatide and a DPP-4 inhibitor would not add value. The 2 medicines have a similar mechanism of action, as they act on different parts of the GLP-1 pathway. Because of this, it is unlikely that combining the medications provides any additional effect and so it is unlikely to be clinically or cost effective.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

The recommendations will lead to people taking SGLT-2 inhibitors and GLP-1 receptor agonists or tirzepatide for longer. This will initially increase costs. However, the long-term protective benefits of these medicines will reduce the need to treat future cardiovascular and renal problems, which will lead to cost savings. Otherwise, the recommendations are not expected to change current practice significantly.

The 2022 recommendations about reviewing medicines are not expected to be a change in practice or to need substantial additional resources because these conversations should already take place.

Further medication

See the visual summary for an overview of the recommendations and additional information to support medicine choice up to the point at which a person starts insulin-based treatment.

Recommendations in this section that cover dipeptidyl peptidase-4 (DPP-4) inhibitors, glucagonlike peptide-1 (GLP-1) receptor agonists, sulfonylureas and sodium–glucose cotransporter-2 (SGLT-2) inhibitors refer to each of these groups of medicines at class level.

For GLP-1 receptor agonists, at the time of publication (February 2026) this only includes liraglutide, dulaglutide, and semaglutide. For subcutaneous semaglutide (Ozempic), this only includes doses up to 1 mg once a week.

SGLT-2 inhibitors and GLP-1 receptor agonists are recommended as much for their cardiovascular and renal benefits as for their glycaemic benefits (unless otherwise specified).

Healthcare professionals should also refer to the summary of product characteristics for individual medicines for contraindications and precautions to take in pregnancy and breastfeeding and for women, trans men and non-binary people of childbearing potential.

1.25 People with type 2 diabetes and no relevant comorbidity

1.25.1 For adults with type 2 diabetes and no relevant comorbidity who need further medicines to reach their individualised glycaemic targets:

- offer to add a DPP-4 inhibitor to their current treatment
- if this is contraindicated, not tolerated or is not effective, offer to add:

- a sulfonylurea or
- pioglitazone or
- an insulin-based treatment (see the section on insulin-based treatments). **[2026]**

Why the committee made this recommendation

Most of the evidence used an additive strategy (where additional treatment was provided) rather than a switching strategy (where 1 treatment was stopped and another was started). This appeared to provide effective results. The committee agreed that this is likely to be effective for most people.

DPP-4 inhibitors

Evidence was available for individual population groups: people with heart failure, chronic kidney disease and at higher risk of developing cardiovascular disease. The evidence for all groups showed similar results; that DPP-4 inhibitors were effective at reducing HbA1c and relatively safe. Based on the evidence, and their own experience, the committee recommended that a DPP-4 inhibitor should be the first choice for people who need further medicines. DPP-4 inhibitors all have similar clinical efficacy, and no particular medicine was more cost effective than the others.

Sulfonylureas or pioglitazone

If a DPP-4 inhibitor is not effective or tolerated, a sulfonylurea or pioglitazone should be considered. The evidence showed that both reduced HbA1c. However, there was also limited evidence, indicating that they both had a potential for adverse effects:

- sulfonylureas might increase hypoglycaemic events and weight gain
- pioglitazone might worsen cardiovascular outcomes and should be avoided for people with heart failure.

The committee acknowledged that pioglitazone increases the risk of fractures and weight gain, as stated in the BNF. As with each medicine listed in this section, they agreed that healthcare professionals should consider the benefits and risks of each treatment when deciding if a treatment is appropriate, on a case-by-case basis. This information should be discussed with the person with diabetes so that they and their healthcare professional can come to an informed decision together about their treatment plan.

Insulin-based treatments

Evidence showed that insulin-based treatments are less effective than most other antidiabetic therapies at reducing harm from adverse events because it can increase the risk of hypoglycaemic events and weight gain. There are 2 main scenarios when insulin is an effective treatment:

- managing acute hyperglycaemia
- managing long-term worsening hyperglycaemia that does not respond to other treatments.

However, in the committee's experience, insulin may also be a good option for people who cannot tolerate more effective medicines. Therefore, they recommended insulin alongside other options for people who cannot tolerate DPP-4 inhibitors.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendation might affect practice

These recommendations are likely to be a change from current practice, with wider access to therapies with more recent evidence of clinical and cost effectiveness.

The recommendations on DPP-4 inhibitors, sulfonylureas, pioglitazone and insulin do not reflect a significant change in current practice and are unlikely to increase resource use. DPP-4 inhibitors vary in price, but the default assumption is that services will use the medicine with the lowest acquisition cost (in the absence of patient-specific factors).

1.26 People with heart failure (any ejection fraction unless specified)

1.26.1 For adults with type 2 diabetes and heart failure who need further medicines to reach their individualised glycaemic targets:

- offer to add a DPP-4 inhibitor to their current treatment
- if this is contraindicated, not tolerated or not effective, offer to add:
  - a sulfonylurea or
  - an insulin-based treatment (see the section on insulin-based treatments). **[2026]**

Why the committee made this recommendation

DPP-4 inhibitors

Evidence was available for individual population groups: people with heart failure, chronic kidney disease and at higher risk of developing cardiovascular disease. The evidence for all groups showed similar results, that DPP-4 inhibitors were effective at reducing HbA1c and relatively safe. Based on this evidence, and their own clinical and lived experience, the committee recommended that a DPP-4 inhibitor should be the first choice for people with heart failure who need further medicines. DPP-4 inhibitors all have similar clinical efficacy, and no particular medicine was more cost effective than the others.

Sulfonylureas

Sulfonylureas are recommended for people who need further treatment because the evidence showed that they reduced HbA1c based on the evidence for people at high risk of cardiovascular disease. However, there was also limited evidence indicating that they had a potential for adverse effects, given that sulfonylureas and insulin-based therapies might increase hypoglycaemic events and weight gain. Healthcare professionals are advised to consider this when choosing treatments.

Insulin-based treatments

Evidence showed that insulin-based treatments are less effective than most other antidiabetic therapies at reducing harm from adverse events because it can increase the risk of hypoglycaemic events and weight gain. There are 2 main scenarios for which insulin is an effective treatment:

- managing acute hyperglycaemia
- managing long-term worsening hyperglycaemia that does not respond to other treatments.

However, in the committee's experience, insulin may also be a good option for people who cannot tolerate other medicines. Therefore, they recommended insulin alongside sulfonylureas for people who need further medicines to reach their individualised

glycaemic targets.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

These recommendations are likely to be a change from current practice, with wider access to therapies with more recent evidence of clinical and cost effectiveness.

Sulfonylureas and insulin

The recommendations on sulfonylureas and insulin do not reflect a significant change in current practice and are unlikely to increase resource use. The use of more intensive earlier treatment may lead to a reduction in the use of insulin, which may offset costs in the long term.

1.27 People with atherosclerotic cardiovascular disease

1.27.1 If an adult with type 2 diabetes develops atherosclerotic cardiovascular disease after starting initial treatment, offer to add subcutaneous semaglutide (Ozempic), up to 1 mg once a week, to their current treatment, for its cardiovascular and renal benefits. **[2026]**

1.27.2 For adults with type 2 diabetes and atherosclerotic cardiovascular disease who need further medicines to reach their individualised glycaemic targets, offer to add to their current treatment:

- a sulfonylurea or

- pioglitazone or
- an insulin-based treatment (see the section on insulin-based treatments). **[2026]**

Why the committee made these recommendations

Subcutaneous semaglutide

Subcutaneous semaglutide (Ozempic), up to 1 mg once a week, was recommended for people who develop atherosclerotic cardiovascular disease after starting initial treatment because evidence showed that this medicine:

- reduces the risk of cardiovascular events
- helps with weight loss as a side effect
- is cost effective.

The evidence showed subcutaneous semaglutide (Ozempic), up to 1 mg once a week, was the most cost effective and clinically effective GLP-1 receptor agonist in terms of cardiovascular and renal protection, and weight reduction.

Sulfonylureas and pioglitazone

Sulfonylureas and pioglitazone are recommended for people who need further treatment because the evidence showed that these both reduced HbA1c. However, there was also limited evidence indicating that they both had a potential for adverse effects:

- sulfonylureas and insulin-based therapies might increase hypoglycaemic events and weight gain
- pioglitazone might worsen cardiovascular outcomes and should be avoided for people with heart failure.

The committee acknowledged that pioglitazone increases the risk of fractures and weight gain, as stated in the BNF. As with each medicine listed in this section, they agreed that healthcare professionals should consider the benefits and risks of each treatment when deciding if a treatment is appropriate, on a case-by-case basis. This information should be discussed with the person with diabetes so that they and their healthcare professional can come to an informed decision together about their treatment plan.

Insulin-based treatments

Evidence showed that insulin-based treatments are less effective than most other antidiabetic therapies at reducing harm from adverse events because it can increase the risk of hypoglycaemic events and weight gain. There are 2 main scenarios in which insulin is an effective treatment:

- managing acute hyperglycaemia
- managing long-term worsening hyperglycaemia that does not respond to other treatments.

However, in the committee's experience, insulin may also be a good option for people who cannot tolerate other medicines. Therefore, they recommended insulin alongside other options for people who need further medicines to reach their individualised glycaemic targets.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

These recommendations are likely to be a change from current practice, with wider access to therapies with more recent evidence of clinical and cost effectiveness.

Subcutaneous semaglutide

Subcutaneous semaglutide is a GLP-1 receptor agonist. GLP-1 receptor agonists were previously recommended after triple therapy with metformin and 2 other oral medicines was not effective, tolerated or contraindicated. Therefore, recommending the treatment as triple therapy after taking metformin and 1 oral medicine (an SGLT-2 inhibitor) may lead to increases in costs. The committee agreed this will likely reduce over time, because the cardiovascular benefits and weight loss side effect of subcutaneous semaglutide will reduce the number of appointments needed to treat atherosclerotic cardiovascular disease. An increase in subcutaneous semaglutide use will reduce DPP-4 inhibitor use. Early intervention could lead to weight loss as a beneficial side effect and so to a better long-term prognosis, which, if maintained, will reduce:

- long-term treatment requirements and
- the need for later stage treatments (such as insulin) and
- downstream treatment costs.

Sulfonylureas, pioglitazone and insulin

The recommendations on sulfonylureas, pioglitazone and insulin do not reflect a significant change in current practice and are unlikely to increase resource use. The use of more intensive earlier treatment may lead to a reduction in the use of insulin, which may offset costs in the long term.

1.28 People with early onset type 2 diabetes

1.28.1 For adults with early onset type 2 diabetes who need further medicines to reach

their individualised glycaemic targets, consider adding a GLP-1 receptor agonist or tirzepatide. **[2026]**

1.28.2 For adults with early onset type 2 diabetes who need further medicines to reach their individualised glycaemic targets and for whom a GLP-1 receptor agonist or tirzepatide is contraindicated, not tolerated or not appropriate:

- offer to add a DPP-4 inhibitor to their current treatment
- if this is contraindicated, not tolerated or is not effective, offer to add:
  - a sulfonylurea or
  - pioglitazone or
  - an insulin-based treatment (see the section on insulin-based treatments). **[2026]**

1.28.3 For adults with early onset type 2 diabetes who need further medicines to reach their individualised glycaemic targets and are taking a GLP-1 receptor agonist or tirzepatide, offer to add to their current treatment:

- a sulfonylurea or
- pioglitazone or
- an insulin-based treatment (see the section on insulin-based treatments). **[2026]**

Why the committee made these recommendations

GLP-1 receptor agonists and tirzepatide

Though there were no clinical trials focusing solely on people with early onset diabetes, there was good evidence in the wider population of people with type 2 diabetes, which the committee agreed could be extrapolated to people with early onset type 2 diabetes. It showed that GLP-1 receptor agonists reduce the risk of cardiovascular events and lead to weight loss as a side effect. Based on their experience, the committee agreed that people with early onset type 2 diabetes:

- have a very high lifetime risk of cardiovascular and renal complications, and of dying from them, and
- are more likely to be living with obesity.

Taking this into account, they agreed that, if not started as initial therapy, starting a GLP-1 receptor agonist or tirzepatide as subsequent therapy was likely the most appropriate treatment because it could help to reduce long-term cardiovascular, renal and glycaemic complications better than other medications, while also reducing weight as a side effect.

DPP-4 inhibitors (for people not taking a GLP-1 receptor agonist or tirzepatide)

Evidence was not available for people with early onset type 2 diabetes. The evidence for groups who did not have early onset type 2 diabetes, including people at higher risk of cardiovascular disease, showed that DPP-4 inhibitors were effective at reducing HbA1c and relatively safe. Based on this evidence, and their experience, the committee recommended that a DPP-4 inhibitor should be a choice for people with early onset type 2 diabetes who need further medicines when a GLP-1 receptor agonist or tirzepatide is not appropriate. DPP-4 inhibitors all have similar clinical efficacy, and no particular medicine was more cost effective than the others.

Sulfonylureas and pioglitazone

The committee recommended sulfonylureas and pioglitazone in this group based on

their own experience, and by extrapolating the evidence from other groups covered in this guideline (which showed that these medicines reduced HbA1c). However, there was also limited evidence for these other groups that showed a potential for adverse effects:

- sulfonylureas might increase hypoglycaemic events and weight gain
- pioglitazone might worsen cardiovascular outcomes and should be avoided for people with heart failure.

The committee acknowledged that pioglitazone increases the risk of fractures and weight gain, as stated in the BNF. As with each medicine listed in this section, they agreed that healthcare professionals should consider the benefits and risks of each treatment when deciding if a treatment is appropriate, on a case-by-case basis. This information should be discussed with the person with diabetes so that they and their healthcare professional can come to an informed decision together about their treatment plan.

Insulin-based treatments

For insulin-based treatments, the evidence for other populations showed that they are less effective than most other antidiabetic therapies at reducing harm from adverse events because it can increase the risk of hypoglycaemic events and weight gain. There are 2 main scenarios when insulin is an effective treatment:

- managing acute hyperglycaemia
- managing long-term worsening hyperglycaemia that does not respond to other treatments.

However, in the committee's experience, insulin may also be a good option for people who cannot tolerate other medicines. Therefore, they recommended insulin alongside other options for people who need further medicines to reach their individualised glycaemic targets.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management

- evidence review F: subsequent management.

How the recommendations might affect practice

These recommendations are likely to be a change from current practice, enabling wider access to therapies supported by recent evidence of clinical and cost effectiveness.

GLP-1 receptor agonists or tirzepatide

GLP-1 receptor agonists and tirzepatide were previously recommended after triple therapy with metformin and 2 other oral medicines was not effective, tolerated or contraindicated. Therefore, recommending the treatment as triple therapy after taking metformin and 1 oral medicine (an SGLT-2 inhibitor) may lead to increases in costs. The committee agreed that this will likely reduce over time, because the cardiovascular benefits and weight loss side effect of GLP-1 receptor agonists will reduce the number of appointments needed to treat atherosclerotic cardiovascular disease. Increased use of GLP-1 receptor agonists or tirzepatide will reduce DPP-4 inhibitor use. Early intervention could lead to weight loss as a beneficial side effect and so to a better long-term prognosis, which, if maintained, will reduce:

- long-term treatment requirements and
- the need for later stage treatments (such as insulin).

DPP-4 inhibitors, sulfonylureas, pioglitazone and insulin

The recommendations on DPP-4 inhibitors, sulfonylureas, pioglitazone and insulin do not reflect a significant change in current practice and are unlikely to increase resource use. There may be cost savings if people are no longer prescribed GLP-1 receptor agonists and DPP-4 inhibitors together. DPP-4 inhibitors vary in price, but the default assumption is that services will use the medicine with the lowest acquisition cost (in the absence of patient-specific factors). The use of more intensive earlier treatment may lead to a reduction in the use of insulin, which may offset costs in the long term.

1.29 People living with obesity

1.29.1 If considering medicines primarily for weight management, see information about medicines for overweight and obesity in NICE's guideline on overweight and obesity management. **[2026]**

1.29.2 Consider adding a GLP-1 receptor agonist or tirzepatide for adults with type 2 diabetes who are living with obesity, if:

- they have been taking initial therapy for at least 3 months and
- further medicines are needed to reach their individualised glycaemic targets and
- they are not already taking a GLP-1 receptor agonist or tirzepatide.

  For a definition of obesity, see the section on classifying overweight and obesity in adults in NICE's guideline on overweight and obesity management. **[2026]**

1.29.3 For adults with type 2 diabetes who are living with obesity who need further medicines to reach their individualised glycaemic targets and for whom a GLP-1 receptor agonist or tirzepatide is contraindicated, not tolerated, not appropriate or not effective:

- offer to add a DPP-4 inhibitor to their current treatment
- if this is contraindicated, not tolerated or not effective, offer to add:
  - a sulfonylurea or
  - pioglitazone or
  - an insulin-based treatment (see the section on insulin-based treatments). **[2026]**

1.29.4 For adults with type 2 diabetes who are living with obesity who need further medicines to reach their individualised glycaemic targets and are already taking a GLP-1 receptor agonist or tirzepatide, offer to add:

- a sulfonylurea or
- pioglitazone or
- an insulin-based treatment (see the section on insulin-based treatments). **[2026]**

Why the committee made these recommendations

GLP-1 receptor agonists or tirzepatide

The committee agreed GLP-1 receptor agonists and tirzepatide should be considered for people living with obesity because of the medicines' glycaemic reduction properties. GLP-1 receptor agonists also have the cardiovascular and renal benefits. These may also reduce weight, which may be an important side effect for the person with type 2 diabetes and their healthcare professionals. However, if weight reduction is the primary aim of the treatment, the committee agreed that guidance should be sought within NICE's guideline on overweight and obesity management instead of this guideline.

Evidence showed that out of the GLP-1 receptor agonists, only liraglutide reached the cost-effectiveness threshold in the base-case analysis for people living with obesity. The committee agreed that while liraglutide was cost effective, it was less clinically effective than other GLP-1 receptor agonists, for example semaglutide. Semaglutide was cost effective when more favourable assumptions around weight loss, such as it being maintained for a longer period, were used in the economic model. Given this, the committee agreed that it was plausible for both liraglutide and semaglutide to be cost effective. The committee therefore made the recommendation to consider more clinically effective GLP-1 receptor agonists dependent on the needs of the person.

Tirzepatide is a glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 dual-receptor agonist. The committee looked at the evidence from NICE's technology appraisal guidance for tirzepatide for people with type 2 diabetes, which recommends tirzepatide as an alternative to GLP-1 receptor agonists. In October 2023, the technology appraisal guidance recommended that it should be offered alongside diet and exercise to adults for whom type 2 diabetes is insufficiently controlled and only if triple therapy with metformin and 2 other oral antidiabetic medicines is ineffective, not tolerated or contraindicated (among other criteria). Given that the evidence supporting the technology appraisal guidance found tirzepatide was clinically and cost effective for reducing HbA1c and weight for people with type 2 diabetes, the committee for this guideline agreed to recommend it as an alternative to GLP-1 receptor agonists.

A GLP-1 receptor agonist or tirzepatide should only be added after at least 3 months of initial therapy, so that the effect of the initial therapy on the person's glycaemic targets can be assessed and taken into account when deciding whether additional treatment is needed. The committee agreed that the medicine should be continued as long as it has benefits in reducing HbA1c for the person.

Sulfonylureas and pioglitazone

The committee recommended sulfonylureas and pioglitazone in this group based on their own experience, and by extrapolating the evidence from other groups covered in this guideline (which showed that these medicines reduced HbA1c). However, there was also limited evidence for these other groups that showed a potential for adverse effects:

- sulfonylureas and insulin-based therapies might increase hypoglycaemic events and weight gain
- pioglitazone might worsen cardiovascular outcomes and should be avoided for people with heart failure.

The committee acknowledged that pioglitazone increases the risk of fractures and weight gain, as stated in the BNF. As with each medicine listed in this section, they agreed that healthcare professionals should consider the benefits and risks of each treatment when deciding if a treatment is appropriate, on a case-by-case basis. This information should be discussed with the person with diabetes so that they and their healthcare professional can come to an informed decision together about their treatment plan.

Insulin-based treatments

Evidence on insulin-based treatments for other populations showed that these treatments are less effective than most other antidiabetic therapies at reducing harm from adverse events because it can increase the risk of hypoglycaemic events and weight gain. There are 2 main scenarios when insulin is an effective treatment:

- managing acute hyperglycaemia
- managing long-term worsening hyperglycaemia that does not respond to other

treatments.

However, in the committee's experience insulin may also be a good option for people who cannot tolerate other medicines. Therefore, they recommended insulin alongside other options for people who need further medicines to reach their individualised glycaemic targets.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

These recommendations are likely to be a change from current practice, with wider access to therapies with more recent evidence of clinical and cost effectiveness.

GLP-1 receptor agonists and tirzepatide

GLP-1 receptor agonists and tirzepatide were previously recommended after triple therapy with metformin and 2 other oral medicines was not effective, tolerated or contraindicated. Therefore, recommending the treatment as triple therapy after taking metformin and 1 oral medicine (an SGLT-2 inhibitor) may lead to increases in costs. The committee agreed this will likely reduce over time, because the cardiovascular benefits and the weight loss side effect of GLP-1 receptor agonists will reduce the number of appointments needed to treat atherosclerotic cardiovascular disease. An increase in GLP-1 receptor agonist or tirzepatide use will mean that DPP-4 inhibitor use will reduce. Early intervention could lead to weight loss as a beneficial side effect and so to a better long-term prognosis, which, if maintained, will reduce:

- long-term treatment requirements and
- the need for later stage treatments (such as insulin).

DPP-4 inhibitors, sulfonylureas, pioglitazone and insulin

The recommendations on DPP-4 inhibitors, sulfonylureas, pioglitazone and insulin do not reflect a significant change in current practice and are unlikely to increase resource use. There may be cost savings if people are no longer prescribed GLP-1 receptor agonists or tirzepatide and DPP-4 inhibitors together. DPP-4 inhibitors do vary in price, but the default assumption is that services will use the medicine with the lowest acquisition cost (in the absence of patient-specific factors). The use of more intensive earlier treatment may lead to a reduction in the use of insulin, which may offset costs in the long term.

1.30 People with chronic kidney disease

Medicines vary in their contraindications and precautions for use in people with renal impairment. See NICE's information on prescribing medicines and refer to the summary of product characteristics for individual products.

1.30.1 For adults with type 2 diabetes and chronic kidney disease who need further medicines to reach their individualised glycaemic targets:

- consider adding a DPP-4 inhibitor
- if they are already taking a DPP-4 inhibitor or if a DPP-4 inhibitor is contraindicated, not tolerated or not effective, consider adding:
  - pioglitazone or
  - a sulfonylurea (if their eGFR is above 30 ml/min/1.73 m^2) or
  - an insulin-based treatment. **[2026]**

Why the committee made this recommendation

The committee made a recommendation for this group based on their knowledge and experience, because the clinical evidence was very limited.

DPP-4 inhibitors are effective at reducing HbA1c and have fewer adverse effects than other comparable options. If DPP-4 inhibitors are contraindicated, not tolerated or not effective, then in the committee's experience the best option is either pioglitazone, a sulfonylurea, or an insulin-based treatment.

The committee acknowledged that sulfonylureas increase the risk of hypoglycaemia, pioglitazone increases the risk of heart failure, fractures and weight gain, and insulin increases the risk of hypoglycaemic events and weight gain, as recorded in the BNF. As with each medicine listed in this section, they agreed that healthcare professionals should consider the benefits and risks of each treatment when deciding if a treatment is appropriate, on a case-by-case basis. This information should be discussed with the person with diabetes so that they and their healthcare professional can come to an informed decision together about their treatment plan.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendation might affect practice

The recommendations on DPP-4 inhibitors, sulfonylureas, pioglitazone and insulin do not reflect a significant change in current practice and are unlikely to increase resource use. There may be cost savings if people are no longer prescribed GLP-1 receptor agonists or tirzepatide and DPP-4 inhibitors together. DPP-4 inhibitors do vary in price, but the default assumption is that services will use the medicine with the lowest acquisition cost (in the absence of patient-specific factors).

1.31 People with frailty

1.31.1 For adults with frailty who need further medicines to manage their hyperglycaemia symptoms and reach their individualised glycaemic targets:

- consider adding a DPP-4 inhibitor to their current treatment or
- if they are already taking a DPP-4 inhibitor or if a DPP-4 inhibitor is contraindicated, not tolerated or is not effective, consider adding 1 of the following to their current treatment:
  - pioglitazone or
  - a sulfonylurea or
  - an insulin-based treatment (see the section on insulin-based treatments). **[2026]**

1.31.2 When choosing a treatment with the person, take into account that sulfonylureas and insulin-based treatments can increase the risk of hypoglycaemia and falls. **[2026]**

Why the committee made these recommendations

There was no evidence on outcomes for people with frailty. Using their knowledge from clinical practice, the committee recommended that, in this group, the aim of treatment should primarily be to control symptoms.

If initial therapy does not achieve the treatment goals, a DPP-4 inhibitor can reduce HbA1c with limited adverse effects.

Pioglitazone, sulfonylureas and insulin-based treatments are recommended as alternatives based on the committee's experience. The committee did not recommend one treatment over the other because of the lack of evidence and the diverse needs of people with frailty.

The committee acknowledged that sulfonylureas and insulin increase the risk of hypoglycaemia and falls, while pioglitazone increases the risk of fractures and weight gain, as recorded in the BNF. As with each medicine listed in this section, they agreed that healthcare professionals should consider the benefits and risks of each treatment when deciding if a treatment is appropriate, on a case-by-case basis. This information should be discussed with the person with diabetes so that they and their healthcare professional can come to an informed decision together about their treatment plan.

The committee did not recommend GLP-1 receptor agonists or tirzepatide for people with frailty. However, they agreed that there is no inherent safety risk for this population. Therefore, if a person has a relevant indication and frailty, they can still be offered a GLP-1 receptor agonist or tirzepatide.

Because of the lack of evidence, the committee made a recommendation for research on treatment strategies for people with type 2 diabetes and frailty.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

How the recommendations might affect practice

The recommendations on DPP-4 inhibitors, sulfonylureas, pioglitazone and insulin do not reflect a significant change in current practice and are unlikely to increase resource use. There may be cost savings if people are no longer prescribed GLP-1 receptor agonists or tirzepatide and DPP-4 inhibitors together. DPP-4 inhibitors do vary in price, but the default assumption is that services will use the medicine with the lowest acquisition cost (in the absence of patient-specific factors).

Insulin-based treatments

1.32 Starting an insulin-based treatment

1.32.1 Provide a structured education programme to adults with type 2 diabetes starting insulin therapy. The programme should include:

- injection technique, including rotating injection sites and avoiding repeated injections at the same point within sites
- self-monitoring
- dose titration to target levels
- dietary advice
- the DVLA's Assessing fitness to drive: a guide for medical professionals
- managing hypoglycaemia
- managing acute changes in plasma glucose
- support from a healthcare professional trained in insulin therapy. **[2015, amended 2026]**

1.32.2 When initiating insulin for adults with type 2 diabetes:

- continue to offer metformin to people already taking it
- stop any other medicines being used solely to manage hyperglycaemia
- discuss with the person the risks and benefits of continuing medicines for other benefits such as cardiovascular protection or weight management. **[2015, amended 2026]**

Why the committee made these recommendations

In 2026, the insulin-based treatment recommendations were amended to reflect the withdrawal of insulin products and known insulin brand shortages. Based on the committee's clinical experience and consensus, this refresh acknowledges the increased use of analogue insulin. The committee agreed that:

- different insulin therapies may be more useful for different people dependent on their symptoms (for example, if there is a risk of nocturnal hypoglycaemia, a longer acting basal insulin might be more suitable) and
- the added flexibility of recommending broad drug classes rather than specific insulins will support people with diabetes and healthcare professionals to choose the most suitable treatment.

How the recommendations might affect practice

The effect of the 2026 recommendation updates on current practice is uncertain. There may be a general decrease in insulin use because of the use of other medications.

1.33 Choosing a type of insulin

1.33.1 Offer basal insulin intended for administration once or twice a day to adults with type 2 diabetes as initial insulin therapy. **[2015, amended 2026]**

1.33.2 As initial insulin therapy for adults with type 2 diabetes, especially if the person's HbA1c is 75 mmol/mol (9.0%) or higher, consider combining:

- basal insulin intended for administration once or twice a day and
- short or rapid acting insulin.

This should be injected either separately or as a pre-mixed (biphasic) insulin preparation. **[2015, amended 2026]**

Why the committee made these recommendations

In 2026, the insulin-based treatment recommendations were amended to reflect the withdrawal of insulin products and known insulin brand shortages. Based on the committee's clinical experience and consensus, this refresh acknowledges the increased use of analogue insulin. The committee agreed that:

- different insulin therapies may be more useful for different people dependent on their symptoms (for example, if there is a risk of nocturnal hypoglycaemia, a longer acting basal insulin might be more suitable) and
- the added flexibility of recommending broad drug classes rather than specific insulins will support people with diabetes and healthcare professionals to choose the most suitable treatment.

How the recommendations might affect practice

The effect of the 2026 recommendation updates on current practice is uncertain. There may be a general decrease in insulin use because of the use of other medications.

1.34 Choosing a preparation

1.34.1 Make a shared decision with the person on the choice of basal insulin preparation, based on considerations that are specific to them, including whether:

- the person needs help from a carer or healthcare professional to inject insulin or
- there is a particular concern about nocturnal hypoglycaemia or
- the person has a strong preference for once-daily injections.

When multiple basal insulin types (including biosimilars) and regimens are

equally suitable for the person's needs, use the least expensive option. **[2015, amended 2026]**

1.34.2 Consider pre-mixed preparations that include insulin analogues rather than including human insulin, if:

- the person prefers injecting insulin immediately before a meal or
- hypoglycaemia is a problem or
- blood glucose levels rise markedly after meals. **[2015, amended 2026]**

Why the committee made these recommendations

In 2026, the insulin-based treatment recommendations were amended to reflect the withdrawal of insulin products and known insulin brand shortages. Based on the committee's clinical experience and consensus, this refresh acknowledges the increased use of analogue insulin. The committee agreed that:

- different insulin therapies may be more useful for different people dependent on their symptoms (for example, if there is a risk of nocturnal hypoglycaemia, a longer acting basal insulin might be more suitable) and
- the added flexibility of recommending broad drug classes rather than specific insulins will support people with diabetes and healthcare professionals to choose the most suitable treatment.

How the recommendations might affect practice

The effect of the 2026 recommendation updates on current practice is uncertain. There may be a general decrease in insulin use because of the use of other medications.

1.35 Reviews

1.35.1 At each review, check whether adults with type 2 diabetes who are on a basal insulin regimen also need a short or rapid acting bolus insulin before meals (or a pre-mixed [biphasic] insulin preparation). **[2015, amended 2026]**

1.35.2 At each review, check whether adults with type 2 diabetes who are using a pre-mixed (biphasic) preparation and whose individualised glycaemic targets are not met, need to change to:

- a different pre-mixed (biphasic) insulin preparation or
- a basal-bolus regimen with basal insulin intended for administration once or twice a day. **[2015, amended 2026]**

Why the committee made these recommendations

In 2026, the insulin-based treatment recommendations were amended to reflect the withdrawal of insulin products and known insulin brand shortages. Based on the committee's clinical experience and consensus, this refresh acknowledges the increased use of analogue insulin. The committee agreed that:

- different insulin therapies may be more useful for different people dependent on their symptoms (for example, if there is a risk of nocturnal hypoglycaemia, a longer acting basal insulin might be more suitable) and
- the added flexibility of recommending broad drug classes rather than specific insulins will support people with diabetes and healthcare professionals to choose the most suitable treatment.

How the recommendations might affect practice

The effect of the 2026 recommendation updates on current practice is uncertain. There may be a general decrease in insulin use because of the use of other medications.

1.35.3 Follow the MHRA's guidance on minimising the risk of medication error with high strength, fixed combination and biosimilar insulin products, including its advice for healthcare professionals when starting treatment with a biosimilar. **[2021]**

1.35.4 When people are already using an insulin for which a lower cost biosimilar is available:

- Discuss with the person the possibility of switching to the biosimilar.
- Make a shared decision about it with them. **[2021]**

Why the committee made these recommendations

Biosimilars have the potential to offer the NHS considerable cost savings. To gain approval for use, biosimilar medicines have to be shown to be safe and as effective as the original reference medicine, and to have the same quality. Based on this, the committee noted it was appropriate, when starting a new prescription of an insulin for which a biosimilar is available, to use the one with the lowest cost.

In addition, people may be using an insulin for which a lower cost biosimilar is available. In such cases, the committee recommended discussing with people the possibility of switching to the biosimilar. This could happen at the person's routine review. They also agreed that switching to the biosimilar should be carefully planned. A shared decision should be reached about the switch, taking into consideration the dose-switching protocols, monitoring, and the person's concerns about switching from their existing regimen. Healthcare professionals should also refer to the summary of product characteristics for further information when considering switching to biosimilars.

1.36 Insulin delivery

1.36.1 For guidance on insulin delivery for adults with type 2 diabetes, see the section on insulin injection delivery in NICE's guideline on type 1 diabetes. **[2015]**

Complications

1.37 Periodontitis

1.37.1 Advise adults with type 2 diabetes at their annual review that:

- they are at higher risk of periodontitis
- if they get periodontitis, managing it can improve their blood glucose control and can reduce their risk of hyperglycaemia. **[2022]**

1.37.2 Advise adults with type 2 diabetes to have regular oral health reviews (their oral healthcare or dental team will tell them how often, in line with NICE's guideline on dental checks: intervals between oral health reviews). **[2022]**

1.37.3 For guidance for oral healthcare and dental teams on how to provide oral health advice, see NICE's guideline on oral health promotion. **[2022]**

1.37.4 For adults with type 2 diabetes who have been diagnosed with periodontitis by an oral healthcare or dental team, offer dental appointments to manage and treat their periodontitis (at a frequency based on their oral health needs). **[2022]**

Why the committee made these recommendations

The evidence showed that people with diabetes are at increased risk of periodontitis, and that non-surgical periodontal treatment can improve diabetes control. However, in the committee's experience, people with diabetes are often unaware of this and may not be having regular oral health reviews. To address this, the committee recommended routinely discussing the risk of periodontitis at annual reviews, alongside eye disease and foot problems.

The evidence also showed that periodontal treatment is cost effective for people with type 2 diabetes, assuming improvements in HbA1c are maintained. This was tested with health economic modelling in a range of different scenarios. There were some scenarios where periodontal treatment was not cost effective, but the committee did not think these scenarios reflected real-world practice.

Full details of the evidence and the committee's discussion are in evidence review D: periodontitis.

How the recommendations might affect practice

For oral healthcare professionals, the long-term impact of the recommendations is uncertain. The recommendations specify that people should follow existing NICE guidelines on oral health. However, the recommendations may also increase awareness of periodontitis, leading to a possible short-term increase in the number of oral health reviews. Any increase in the number of oral health reviews will potentially impact on services, as NHS dental services already have capacity issues.

A short-term increase in the number of oral health reviews will also lead to a short-term increase in costs. However, there is likely to be a larger long-term reduction in costs from the improvement to oral health and diabetes control.

Oral healthcare and dental teams will need clear advice on what they need to do for people with diabetes. They will need clear care pathways to improve quality of care and service delivery, in line with the NHS England commissioning standard on dental care for people with diabetes.

Many people do not have regular oral health reviews, even if they are eligible for free NHS dental care. People are eligible for free dental care if they are:

- pregnant
- mothers with babies under 1 year old
- on low income benefits, or under 20 and dependent on someone who is receiving low income benefits
- having treatment in an NHS hospital by the hospital dentist.

The recommendations may encourage more people with diabetes to have regular oral health reviews. Combined with proactive engagement and enhanced support for people with diabetes, this may broaden access to dental and oral healthcare and help to reduce oral health inequalities.

1.38 Gastroparesis

1.38.1 Think about a diagnosis of gastroparesis in adults with type 2 diabetes who have erratic blood glucose control or unexplained gastric bloating or vomiting, taking into account possible alternative diagnoses. **[2009, amended 2015]**

1.38.2 For adults with type 2 diabetes who have vomiting caused by gastroparesis, explain that:

- there is no strong evidence that any available antiemetic therapy is effective
- some people have had benefit with domperidone, erythromycin or metoclopramide
- the strongest evidence for effectiveness is for domperidone, but prescribers must take into account its safety profile, in particular its cardiac risk and potential interactions with other medicines. **[2015]**

  In February 2026, the use of erythromycin was off label. See NICE's information on prescribing medicines.

1.38.3 To treat vomiting caused by gastroparesis in adults with type 2 diabetes:

- consider alternating the use of erythromycin and metoclopramide
- consider domperidone only in exceptional circumstances (if domperidone is the only effective treatment) and in accordance with MHRA guidance on domperidone. **[2015]**

  In February 2026, the use of erythromycin was off label. See NICE's information on prescribing medicines.

1.38.4 If gastroparesis is suspected, consider referring adults with type 2 diabetes to specialist services if:

- the differential diagnosis is in doubt or
- the person has persistent or severe vomiting. **[2009]**

1.39 Painful diabetic neuropathy

1.39.1 For guidance on managing painful diabetic peripheral neuropathy in adults with type 2 diabetes, see NICE's guideline on neuropathic pain in adults. **[2015]**

1.40 Autonomic neuropathy

1.40.1 Think about the possibility of contributory sympathetic nervous system damage in adults with type 2 diabetes who lose the warning signs of hypoglycaemia. **[2009, amended 2015]**

1.40.2 Think about the possibility of autonomic neuropathy affecting the gut in adults with type 2 diabetes who have unexplained diarrhoea that happens particularly at night. **[2009, amended 2015]**

1.40.3 For adults with type 2 diabetes and autonomic neuropathy who are taking tricyclic antidepressants and antihypertensive medicines, be aware of the increased likelihood of side effects such as orthostatic hypotension. For guidance on safe prescribing of antidepressants and managing withdrawal, see NICE's guideline on medicines associated with dependence or withdrawal symptoms. **[2009]**

1.40.4 For adults with type 2 diabetes who have unexplained bladder-emptying problems, investigate the possibility of autonomic neuropathy affecting the bladder. **[2009]**

1.40.5 In managing autonomic neuropathy symptoms, include specific interventions indicated by the manifestations (for example, for abnormal sweating or nocturnal diarrhoea). **[2009]**

1.41 Diabetic foot problems

1.41.1 For guidance on preventing and managing foot problems in adults with type 2 diabetes, see NICE's guideline on diabetic foot problems. **[2015]**

1.42 Erectile dysfunction

1.42.1 As part of the type 2 diabetes annual review, offer to discuss erectile dysfunction (if relevant). **[2015]**

1.42.2 Assess, educate and support people with type 2 diabetes who have problematic erectile dysfunction, addressing contributory factors such as cardiovascular disease as well as possible treatment options. **[2015]**

1.42.3 Consider a phosphodiesterase-5 inhibitor to treat problematic erectile dysfunction in people with type 2 diabetes. Initially choose the medicine with the lowest acquisition cost and take into account any contraindications. **[2015]**

1.42.4 After discussion, refer people with type 2 diabetes to a service offering other medical, surgical or psychological management of erectile dysfunction if treatment (including a phosphodiesterase-5 inhibitor, as appropriate) has been unsuccessful. **[2015]**

1.43 Eye disease

1.43.1 When adults are diagnosed with type 2 diabetes, refer them immediately to the local eye screening service. **[2009, amended 2020]**

1.43.2 Encourage adults to attend eye screening, and explain that it will help them to keep their eyes healthy and help to prevent problems with their vision. Explain that the screening service is effective at identifying problems so that they can be treated early. **[2009]**

1.43.3 Arrange emergency review by an ophthalmologist for:

- sudden loss of vision
- rubeosis iridis
- pre-retinal or vitreous haemorrhage
- retinal detachment. **[2009]**

1.43.4 Refer to an ophthalmologist in accordance with the NHS Diabetic eye screening pathway standards **[2009, amended 2026]**

For guidance on managing and monitoring diabetic retinopathy in people under the care of hospital eye services, see NICE's guideline on diabetic retinopathy.

1.44 Diagnosing and managing hypertension

The recommendations on diagnosing and managing hypertension have been removed. For recommendations on hypertension in people with type 2 diabetes, see NICE's guideline on hypertension in adults. Diagnosis, treatment and monitoring of hypertension is broadly the same for people with type 2 diabetes as for other people. When a different approach is needed for people with type 2 diabetes, this is specified in the hypertension guideline.

1.45 Antiplatelet therapy

1.45.1 Do not offer antiplatelet therapy (aspirin or clopidogrel) to adults with type 2 diabetes without cardiovascular disease. **[2015]**

1.45.2 For guidance on the primary and secondary prevention of cardiovascular disease in adults with type 2 diabetes, see NICE's guidelines on cardiovascular disease and acute coronary syndromes. **[2015]**

Terms used in this guideline

This section defines terms that have been used in a particular way for this guideline. For other definitions, see the NICE glossary and the Think Local, Act Personal Care and Support Jargon Buster.

Atherosclerotic cardiovascular disease

Cardiovascular disease caused by a hardening of arteries by a buildup of fats, cholesterol and other substances. This is called atherosclerosis. This set of conditions is also known as atherosclerosis. It includes:

- coronary artery disease such as myocardial infarction and unstable angina
- cerebrovascular disease such as transient ischaemic attack and ischaemic stroke
- peripheral arterial disease.

Continuous glucose monitoring

This covers both real-time continuous glucose monitoring (rtCGM) and intermittently scanned continuous glucose monitoring (isCGM, commonly referred to as 'flash').

A continuous glucose monitor is a device that measures blood glucose levels and sends the readings to a display device or smartphone.

Early onset type 2 diabetes

Diabetes that has been diagnosed before the age of 40.

Multiple daily injections

Two or more daily insulin injections, which could either be a basal-bolus regimen or more than one daily insulin injection.

No relevant comorbidity

People with no relevant comorbidities are people with none of the comorbidities covered in the guideline, that is, people who do not have heart failure, atherosclerotic cardiovascular disease, obesity, chronic kidney disease, or frailty that puts them at risk of adverse events from certain medicines.

Periodontitis

A chronic inflammatory gum disease that destroys the supporting tissues of the teeth (the periodontium).

Gingivitis is a milder form of periodontal disease than periodontitis. However, gingivitis still causes inflammation in the gum, and if not treated it can lead to periodontitis.

Recurrent hypoglycaemia

Frequent events of hypoglycaemia that occur each week or month and have an impact on quality of life.

Severe hypoglycaemia

Episodes of hypoglycaemia that require assistance from another person to treat.

Maximum tolerated dose

The highest dose of the medicine someone can take to experience positive effects without experiencing adverse effects.

Very low carbohydrate and ketogenic diets

A very low carbohydrate diet has 20 to 50 grams per day of carbohydrate or less than 10% of a 2,000 kcal/day diet. A ketogenic diet is a very low carbohydrate, high fat diet that is designed to induce ketosis.

Recommendations for research

The guideline committee has made the following recommendations for research.

Key recommendations for research

1 Treatment strategy for people with type 2 diabetes and frailty

For people with type 2 diabetes and frailty, what is the clinical and cost effectiveness of different treatment strategies compared with usual care? **[2026]**

Why the committee made the recommendation for research

Because of concerns about adverse effects and polypharmacy, the committee agreed that SGLT-2 inhibitors may not be appropriate for some people with frailty and type 2 diabetes.

There was no specific evidence for people with frailty, so the committee could not recommend a particular method of assessment or cutoff for prescribing SGLT-2 inhibitors. The decision would need to be made based on clinical judgement, taking into account the needs of each person.

The committee recommended medicines for this group based on:

- their own expertise
- common medicine contraindications in this group
- their knowledge of which medicines were likely to have the most manageable side effects.

The committee did not recommend GLP-1 receptor agonists and tirzepatide for people with frailty. However, they agreed that there is no additional safety risk for this population. Therefore, if a person has a relevant indication and frailty, they can still be offered a GLP-1 receptor agonists or tirzepatide.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

2 Access to SGLT-2 inhibitors

How can prescribing and access to SGLT-2 inhibitors be improved for people with type 2 diabetes from the most deprived groups?

- What factors influence healthcare professionals' decisions about prescribing SGLT-2 inhibitors to adults with and without early onset type 2 diabetes?

- What are the most effective and cost-effective methods to increase access and uptake of SGLT-2 inhibitors for people with and without early onset type 2 diabetes who are underserved in the current service? **[2026]**

Why the committee made the recommendation for research

The committee reviewed real-world evidence that SGLT-2 inhibitors are under-prescribed, particularly to women and older people, people from some ethnic backgrounds, and people who have experienced higher levels of deprivation when sex and age are accounted for. They agreed that further research is needed to understand the reasons behind this so made a recommendation for research on improving access to SGLT-2 inhibitors.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

3 Treatments for people with early onset type 2 diabetes

What is the clinical and cost effectiveness of GLP-1 receptor agonists or tirzepatide with SGLT-2 inhibitors compared to SGLT-2 inhibitors alone and to placebo alone for people with early onset type 2 diabetes who are taking metformin? **[2026]**

Why the committee made the recommendation for research

The committee recommended combining a GLP-1 agonist or tirzepatide with metformin and an SGLT-2 inhibitor based on evidence from a pooled network meta-analysis and their clinical experience.

The evidence in the pooled network meta-analysis used in the health economic modelling came from a review of people at higher risk of developing cardiovascular disease or people with existing atherosclerotic cardiovascular disease adding subsequent therapies to previous treatment. It showed benefits from GLP-1 receptor agonists, but most studies did not give separate results based on the number or type of other treatments received. A small number of studies included triple therapy combining GLP-1 receptor agonists, SGLT-2 inhibitors and metformin. When compared in health economic evaluation, adding most GLP-1 receptor agonists was not cost effective, while adding liraglutide to an SGLT-2 inhibitor and metformin reported an incremental cost-effectiveness ratio (ICER) approaching £20,000 per quality-adjusted life year (QALY) gained. Tirzepatide was not analysed for this population.

The evidence for combination therapy with metformin and SGLT-2 inhibitors showed that the cardiovascular benefits came from the SGLT-2 inhibitors alone. This was clear because the people receiving metformin and placebo did not get the same benefits. When compared with placebo in clinical trials, GLP-1 receptor agonists also showed cardiovascular benefits regardless of other treatment received. The evidence evaluated for tirzepatide did not show cardiovascular benefits, which leaves some uncertainty about its use for this purpose. However, the committee acknowledged the benefits in reducing HbA1c and weight, and how this could lead to beneficial cardiovascular outcomes in the long term.

The committee agreed that GLP-1 receptor agonists and tirzepatide should be considered in addition to metformin and SGLT-2 inhibitors, given the:

- relatively small size of this group
- health inequalities that this group would face if they did not receive treatment early, and
- challenges in identifying appropriate data.

The committee also made a recommendation for research on treatments for people with early onset diabetes.

Full details of the evidence and the committee's discussion are in:

- evidence review E: initial management
- evidence review F: subsequent management.

4 The effects of stopping or switching medicines to control blood glucose levels

In adults with type 2 diabetes, what are the effects of stopping and/or switching medicines to control blood glucose levels, and what criteria should inform the decision? **[2015]**

Why this is important

There is a lack of evidence on the effects of stopping and/or switching medicines to control blood glucose levels. The current practice of 'stopping rules' is typically motivated by either inadequate blood glucose control (rising HbA1c levels) or intolerable side effects. There is limited understanding of the short- and long-term effects of stopping a therapy and switching to another in terms of diabetes control (HbA1c levels), hypoglycaemic risk, weight gain, and cardiovascular morbidity and mortality. In addition, there is limited understanding of how quickly consideration should be given to stopping and switching to another medicine and, if stopping and switching may be needed, what the optimal sequencing is of medicines. Randomised controlled trials examining these different issues would help to improve diabetes care.

5 Self-monitoring of blood glucose levels

What is the optimal frequency for self-monitoring of blood glucose in adults with type 2 diabetes? **[2015]**

Why this is important

There is limited evidence in relation to the long-term effects (at least 5 years) of blood glucose lowering therapies, particularly newer agents in terms of efficacy and adverse

events (for example, cardiovascular outcomes). Randomised controlled trials and prospective longitudinal studies are needed to better understand the long-term efficacy and safety issues surrounding these medicines.

Other recommendations for research

6 Using routinely collected real-world data to assess the effectiveness of continuous glucose monitoring

Based on routinely collected real-world data, what is the effectiveness and cost effectiveness of CGM devices to improve glycaemic control in adults with type 2 diabetes? **[2022]**

Why the committee made the recommendation for research

The committee also made a recommendation for research on using routinely collected real-world data to assess the effectiveness and cost effectiveness of CGM. They agreed that this has the potential to show the direct effects of the technology used by people with type 2 diabetes instead of interpreting it through the results of clinical trials. Increased monitoring of routine healthcare data including registries and audits would ensure that findings from a broader population are captured.

Full details of the evidence and the committee's discussion are in evidence review C: continuous glucose monitoring in adults with type 2 diabetes.

Finding more information and committee details

To find NICE guidance on related topics, including guidance in development, see the NICE topic page on diabetes.

For details of the guideline committee see the committee member list.

Update information

February 2026: We reviewed evidence on medicines for type 2 diabetes, for people with no relevant comorbidities as well as for people with common comorbidities.

We made new and updated recommendations on metformin, SGLT-2 inhibitors, GLP-1 receptor agonists, DPP-4 inhibitors, sulfonylureas and pioglitazone. These are marked **[2026]**.

We made pragmatic changes without an evidence review to the recommendations on insulin, in the context of the withdrawal of insulin products and known insulin brand shortages.

We have also amended other recommendations without reviewing the evidence:

- In the section on dietary advice, we have added a link to NICE's guideline on overweight and obesity management. We have also added links throughout to the NHS Type 2 diabetes Path to Remission Programme.
- Some recommendations have been amended to align them with the new medicine recommendations. This includes recommendations on HbA1c targets, that now refer to an 'initial medication regimen' rather than a 'single drug', and recommendations on introducing or reviewing medicines, that now reflect the updated medicine pathway.
- We have updated terminology throughout the guideline so that recommendations now refer to 'living with overweight' rather than 'being overweight' and to 'healthy living' rather than 'lifestyle'.

These amended recommendations are marked **[2009, amended 2026]**, **[2015, amended 2026]** and **[2022, amended 2026]**.

June 2022: We reviewed evidence on periodontitis in people with type 2 diabetes and made new recommendations. These recommendations are marked **[2022]**.

March 2022: We reviewed the evidence on continuous glucose monitoring for adults with type 2 diabetes. These recommendations are marked **[2022]**.

We also made one change without an evidence review: in the section on self-monitoring of

capillary blood glucose, the word 'capillary' has been added to the heading and recommendations, to make it clear that recommendations apply to adults who are using capillary blood glucose monitoring rather than CGM. These recommendations are marked **[2015, amended 2022]**.

Recommendations are marked to show when they last had an evidence review, for example **[2009]** or **[2015]**. In some cases, minor changes have been made to the wording to bring the language and style up to date, without changing the meaning.

February 2022: We reviewed the evidence and made new recommendations on drug treatment for adults with type 2 diabetes. These recommendations are marked **[2022]**.

In recommendation 1.1.1 we have removed 'because of reduced life expectancy'. This change was made without an evidence review.

These recommendations are marked [**2015, amended 2022**].

November 2021: We reviewed the evidence and made new recommendations on SGLT2 inhibitors for adults with type 2 diabetes and chronic kidney disease. They are marked **[2021]**.

December 2020: We amended recommendations in the section on eye disease to bring them in line with the diabetic eye screening programme. The evidence for these recommendations has not been reviewed, and they are marked **[2009, amended 2020]**.

August 2019: The recommendations on diagnosing and managing hypertension have been removed because diagnosis, treatment and monitoring of hypertension is broadly the same for people with type 2 diabetes as for other people (see the NICE guideline on hypertension in adults). When a different approach is needed for people with type 2 diabetes, this is specified in the hypertension guideline.

December 2015: We updated and replaced NICE guideline CG87 (published May 2009) and NICE technology appraisal guidance 203 and 248. We made a change without an evidence review. The recommendation on the treatment of gastroparesis was replaced by recommendations from the NICE guideline on type 1 diabetes. This change is labelled **[2015]**.

Minor changes since publication

March 2025: Links were updated following publication of NICE's guideline on overweight and obesity management.

August 2024: We added a link to NICE's guideline on diabetic retinopathy in the section on complications.

August 2022: We added a new recommendation to the section on reviewing drug treatments, to clarify what to do for adults who start taking an SGLT2 inhibitor before they are 40. This recommendation is marked **[2022]**.

We also updated the visual summary following stakeholder feedback. See the tables on summary of first-line medicines and on summary of medicines for further treatment.

May 2022: We added a link to NICE's guideline on medicines associated with dependence or withdrawal symptoms in the section on autonomic neuropathy.

December 2019: Relationships to the NICE guideline on hypertension were clarified, and a link was added to the decision aid on choice of medicine to control blood glucose.

June 2018: A recommendation was added to link to NICE's advice on bariatric surgery.

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