

Managing type 1 diabetes in adults

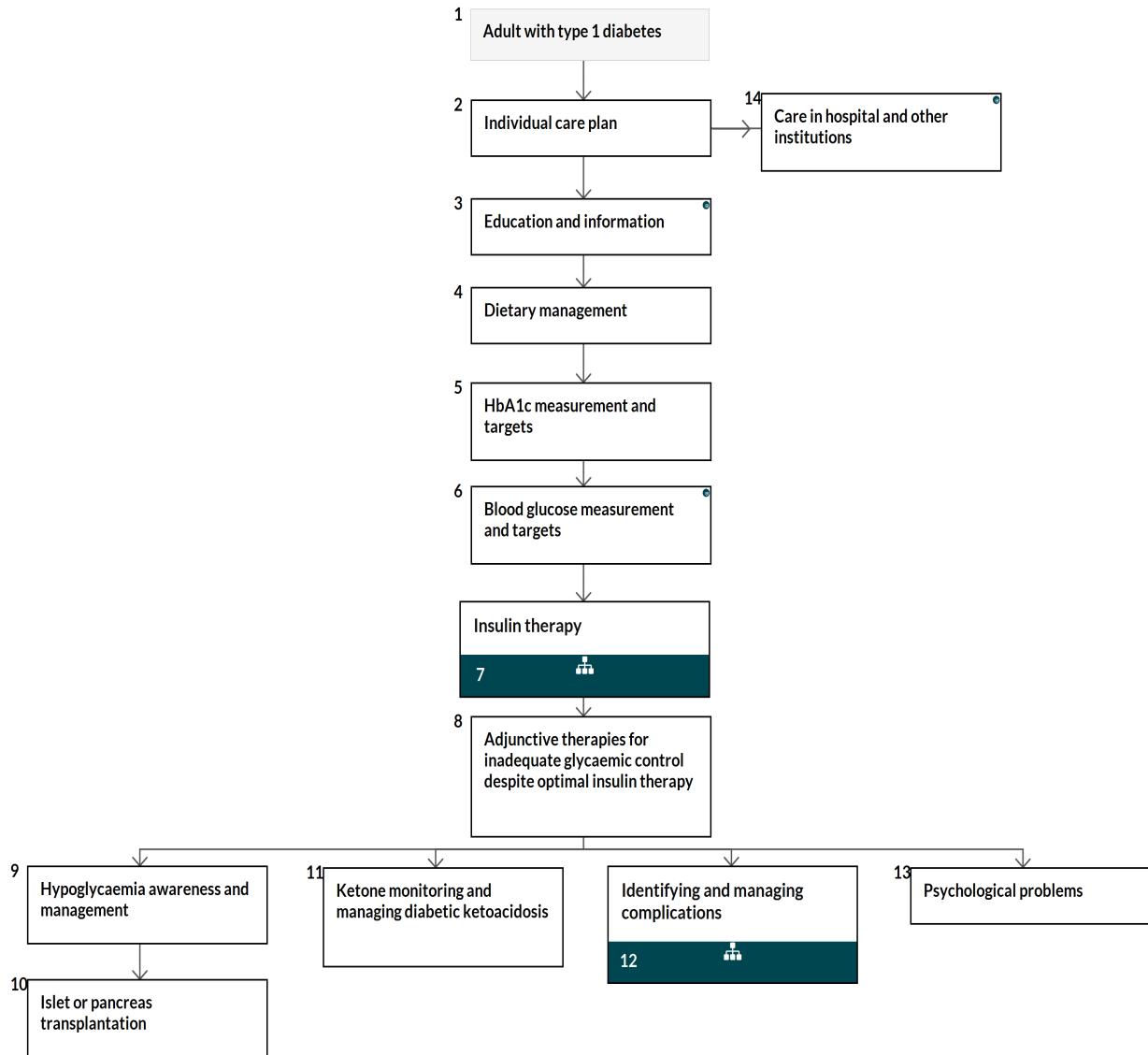
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They are updated regularly as new NICE guidance is published. To view the latest version of this NICE Pathway see:

<http://pathways.nice.org.uk/pathways/type-1-diabetes-in-adults>

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This document contains a single flowchart and uses numbering to link the boxes to the associated recommendations.



1 Adult with type 1 diabetes

No additional information

2 Individual care plan

Jointly agree an individual care plan with the adult with type 1 diabetes. Review this plan annually and amend it as needed, taking into account changes in the person's wishes, circumstances and medical findings.

Individual care plans should include:

- diabetes education, including dietary advice (see [education and information \[See page 4\]](#) and [dietary management \[See page 6\]](#))
- insulin therapy, including dosage adjustment (see [insulin therapy for adults with type 1 diabetes](#))
- self-monitoring (see [blood glucose measurement and targets \[See page 9\]](#))
- avoiding hypoglycaemia and maintaining hypoglycaemia awareness
- family planning, contraception and pregnancy planning (see [the NICE Pathway on diabetes in pregnancy](#))
- cardiovascular risk factor monitoring and management (see [managing cardiovascular disease risk in adults with type 1 diabetes](#))
- complications monitoring and management (see [identifying and managing complications in adults with type 1 diabetes](#))
- communicating with the diabetes professional team (how often and how to contact them)
- how often they will have follow-up appointments, and what these will cover (including review of HbA1c levels, experience of hypoglycaemia, and annual reviews).

Associated illness

In adults with type 1 diabetes who have a low BMI or unexplained weight loss, assess for coeliac disease. For guidance on testing for coeliac disease, see [the NICE Pathway on coeliac disease](#).

Be alert to the possibility of other autoimmune diseases in adults with type 1 diabetes (including Addison's disease and pernicious anaemia).

Measure blood thyroid-stimulating hormone (TSH) levels in adults with type 1 diabetes at their

annual review.

See [the NICE Pathway on multimorbidity](#).

3 Education and information

Offer all adults with type 1 diabetes a structured education programme of proven benefit, for example the [DAFNE \(dose-adjustment for normal eating\) programme](#).

Offer the structured education programme 6 to 12 months after diagnosis. For adults who have not had a structured education programme by 12 months, offer it at any time that is clinically appropriate and suitable for the person, regardless of how long they have had type 1 diabetes.

For adults with type 1 diabetes who are unable or unwilling to take part in group education, provide an alternative of equal standard.

Ensure that any structured education programme for adults with type 1 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 in developing attitudes, beliefs, knowledge and skills to self-manage diabetes
- has a structured curriculum that is theory driven, evidence-based and resource effective and 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 and
 - 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.

Explain to adults with type 1 diabetes that structured education is an integral part of diabetes care.

Provide information about type 1 diabetes and its management to adults with type 1 diabetes at all opportunities from diagnosis onwards. Follow the principles in [the NICE Pathway on patient experience in adult NHS services](#).

Consider the Blood Glucose Awareness Training (BGAT) programme for adults with type 1 diabetes who are having recurrent episodes of hypoglycaemia (see also [hypoglycaemia awareness and management \[See page 14\]](#)).

Carry out an annual review of self-care and needs for all adults with type 1 diabetes. Decide what to cover each year by agreeing priorities with the adult with type 1 diabetes.

Self-monitoring skills

Teach self monitoring skills at the time of diagnosis and the start of insulin therapy.

Teach adults with type 1 diabetes how to measure their blood glucose level, interpret the results and take appropriate action. Review these skills at least annually.

Support adults with type 1 diabetes through structured education (see recommendations 1.3.1 and 1.3.2) to make the best use of data from self monitoring of blood glucose.

Physical activity

Advise adults with type 1 diabetes that physical activity can reduce their enhanced cardiovascular risk in the medium and long term.

For adults with type 1 diabetes who choose to increase their level of physical activity as part of a healthier lifestyle, provide information about:

- appropriate intensity and frequency of physical activity
- self monitoring their changed insulin and/or nutritional needs
- the effect of physical activity on blood glucose levels (which are likely to fall) when insulin levels are adequate
- the effect of physical activity on blood glucose levels when hyperglycaemic and hypoinsulinaemic (there is a risk of worsening hyperglycaemia and ketonaemia)
- appropriate adjustments of insulin dosage and/or nutritional intake for periods during and immediately after physical activity, and the 24 hours after this
- interactions of physical activity and alcohol
- further contacts and sources of information.

See [the NICE Pathway on physical activity](#).

Sick-day rules

Give clear guidelines and protocols ('sick-day rules') to all adults with type 1 diabetes, to help them to adjust insulin doses appropriately when they are ill.

Quality standards

The following quality statement is relevant to this part of the interactive flowchart.

Diabetes in adults

3. Structured education programmes for adults with type 1 diabetes

4 Dietary management

Dietary advice

Offer dietary advice to adults with type 1 diabetes about issues other than blood glucose control (such as managing weight and cardiovascular risk), as needed.

From diagnosis, provide nutritional information that is sensitive to the personal needs and culture of each adult with type 1 diabetes.

Provide nutritional information individually and as part of a structured education programme (see [education and information \[See page 4\]](#)). Include advice from professionals who are trained and accredited to provide dietary advice to people with health conditions.

Offer opportunities to receive dietary advice at intervals agreed between adults with type 1 diabetes and their healthcare professionals.

Discuss the hyperglycaemic effects of the different foods the adult with type 1 diabetes wants to eat in the context of the insulin regimens chosen to match those food choices.

Provide education programmes for adults with type 1 diabetes to help them with:

- healthy eating and a balanced diet
- changing their insulin dosage to reduce glucose excursions when varying their diet.

Discuss snacks with the adult with type 1 diabetes.

- Cover the choice of snack, the quantity, and when to eat them.
- Explain the effects of eating different food types, and how long these effects last.
- Explain which insulin regimens are available to match different food types.
- Discuss changes in choice of snack if needed, based on the results of self monitoring tests.

Provide information on:

- the effects of different alcohol-containing drinks on blood glucose excursions and calorie intake
- high-calorie and high-sugar 'treats'.

As part of dietary education after diagnosis (and as needed after this), provide information on how healthy eating can reduce cardiovascular risk. Include information about fruit and vegetables, types and amounts of fat, and how to make the appropriate dietary changes.

Modify nutritional recommendations to adults with type 1 diabetes to take account of associated features of diabetes, including:

- excess weight and obesity
- underweight
- disordered eating
- hypertension
- renal failure.

Healthcare professionals giving dietary advice to adults with type 1 diabetes should be able to advise about common topics of concern and interest, and should seek advice from specialists when needed. Suggested common topics include:

- body weight, energy balance and obesity management
- cultural and religious diets, feasts and fasts
- foods sold as 'diabetic'
- sweeteners
- dietary fibre intake
- protein intake
- vitamin and mineral supplements
- alcohol
- matching carbohydrate intake, insulin and physical activity
- salt intake in hypertension

- comorbidities, including nephropathy and renal failure, coeliac disease, cystic fibrosis or eating disorders
- peer support groups.

Carbohydrate counting

Offer carbohydrate-counting training to adults with type 1 diabetes as part of structured education programmes for self-management (see [education and information \[See page 4\]](#)).

Consider carbohydrate counting courses for adults with type 1 diabetes who are waiting for a more detailed structured education programme or who are unable to take part in a standalone structured education programme.

Glycaemic index diets

Do not advise adults with type 1 diabetes to follow a low glycaemic index diet for blood glucose control.

5 HbA1c measurement and targets

Measurement

Measure HbA1c levels every 3 to 6 months in adults with type 1 diabetes.

Consider measuring HbA1c levels more often in adults with type 1 diabetes if their blood glucose control is suspected to be changing rapidly; for example, if their HbA1c level has risen unexpectedly above a previously sustained target.

Measure HbA1c using methods calibrated according to International Federation of Clinical Chemistry (IFCC) standardisation.

Tell adults with type 1 diabetes their HbA1c results after each measurement and have their most recent result available at consultations. Follow the principles on communication in [the NICE Pathway on patient experience in adult NHS services](#).

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:

- fructosamine estimation
- quality-controlled blood glucose profiles

- total glycated haemoglobin estimation (if abnormal haemoglobins).

Targets

Support adults with type 1 diabetes to aim for a target HbA1c level of 48 mmol/mol (6.5%) or lower, to minimise the risk of long-term vascular complications.

Agree an individualised HbA1c target with each adult with type 1 diabetes. Take into account factors such as their daily activities, aspirations, likelihood of complications, comorbidities, occupation and history of hypoglycaemia.

Ensure that aiming for an HbA1c target is not accompanied by problematic hypoglycaemia in adults with type 1 diabetes.

Diabetes services should document the proportion of adults with type 1 diabetes in a service who reach an HbA1c level of 53 mmol/mol (7%) or lower.

6

Blood glucose measurement and targets

Blood glucose and plasma glucose

'Blood glucose' is the more commonly used term. However, a lot of the evidence this guideline is based on uses 'plasma' rather than 'blood' glucose, and patient held glucose meters and monitoring systems are calibrated to plasma glucose equivalents. Because of this, these recommendations use the term 'blood glucose', except when referring to specific concentration values.

Blood glucose targets

[1.6.13] Advise adults with type 1 diabetes to aim for:

- a fasting plasma glucose level of 5 to 7 mmol/litre on waking **and**
- a plasma glucose level of 4 to 7 mmol/litre before meals at other times of the day.

[1.6.14] Advise adults with type 1 diabetes who choose to test after meals to aim for a plasma glucose level of 5 to 9 mmol/litre at least 90 minutes after eating. (This timing may be different in pregnancy – for guidance on plasma glucose targets in pregnancy, see [the NICE Pathway on diabetes in pregnancy](#).)

[1.6.15] Agree bedtime target plasma glucose levels with each adult with type 1 diabetes. Take

into account the timing of their last meal of the day and the related insulin dose, and ensure the target is consistent with the recommended fasting level on waking.

Self-monitoring

[1.6.10] Advise adults with type 1 diabetes to routinely self-monitor their blood glucose levels, and to test at least 4 times a day (including before each meal and before bed).

[1.6.11] Support adults with type 1 diabetes to test at least 4 times a day, and up to 10 times a day:

- if their target for blood glucose control, measured by HbA1c level (see [HbA1c measurement and targets \[See page 8\]](#)), is not reached
- if they are having more frequent hypoglycaemic episodes
- if there is a legal requirement to do so, such as before driving (see the [DVLA guide for medical professionals](#))
- during periods of illness
- before, during and after sport
- when planning pregnancy, during pregnancy and while breastfeeding (see [the NICE Pathway on diabetes in pregnancy](#))
- if they need to know their blood glucose levels more than 4 times a day for other reasons (for example, impaired hypoglycaemia awareness, or they are undertaking high-risk activities).

[1.6.12] Enable additional blood glucose testing (more than 10 times a day) for adults with type 1 diabetes if this is necessary because of:

- the person's lifestyle (for example, they drive for long periods of time, they undertake high-risk activities or have a high-risk occupation, or they are travelling) or
- impaired hypoglycaemia awareness.

[1.6.17] When choosing blood glucose meters:

- take the needs of the adult with type 1 diabetes into account
- ensure that meters meet current ISO standards.

[1.6.20] Monitoring blood glucose using sites other than the fingertips cannot be recommended as a routine alternative to conventional self-monitoring of blood glucose.

For information about self-monitoring skills, see [education and information \[See page 4\]](#).

NICE has published a [medtech innovation briefing on FreeStyle Libre for glucose monitoring](#).

Continuous glucose monitoring

Do not routinely offer real-time continuous glucose monitoring to adults with type 1 diabetes.

Consider real-time continuous glucose monitoring for adults with type 1 diabetes who are willing to commit to using it at least 70% of the time and to calibrate it as needed, and who have any of the following despite optimised insulin therapy and conventional blood glucose monitoring:

- More than 1 episode a year of severe hypoglycaemia with no obvious preventable cause.
- Complete loss of hypoglycaemia awareness.
- Frequent (more than 2 episodes a week) asymptomatic hypoglycaemia that is causing problems with daily activities.
- Extreme fear of hypoglycaemia.
- Hyperglycaemia (HbA1c level of 75 mmol/mol [9%] or higher) that persists despite testing at least 10 times a day. Continue real-time continuous glucose monitoring only if HbA1c can be sustained at or below 53 mmol/mol (7%) and/or there has been a fall in HbA1c of 27 mmol/mol (2.5%) or more.

For adults with type 1 diabetes who are using real time continuous glucose monitoring, use the principles of flexible insulin therapy, with either a multiple daily injection regimen or an insulin pump.

Real-time continuous glucose monitoring should be provided by a centre with expertise in its use, as part of a strategy to optimise a person's HbA1c levels and reduce the frequency of hypoglycaemic episodes.

NICE has published a [medtech innovation briefing on Dexcom G6 for real-time continuous glucose monitoring](#).

Integrated sensor-augmented pump therapy systems

The following recommendations are from NICE diagnostics guidance on [integrated sensor-augmented pump therapy systems for managing blood glucose levels in type 1 diabetes \(the MiniMed Paradigm Veo system and the Vibe and G4 PLATINUM CGM system\)](#).

The MiniMed Paradigm Veo system is recommended as an option for managing blood glucose levels in people with type 1 diabetes only if:

- they have episodes of disabling hypoglycaemia despite optimal management with

- continuous subcutaneous insulin infusion and
- the company arranges to collect, analyse and publish data on the use of the MiniMed Paradigm Veo system (see [section 7.1](#) of NICE diagnostics guidance 21).

The MiniMed Paradigm Veo system should be used under the supervision of a trained multidisciplinary team who are experienced in continuous subcutaneous insulin infusion and continuous glucose monitoring for managing type 1 diabetes only if the person or their carer:

- agrees to use the sensors for at least 70% of the time
- understands how to use it and is physically able to use the system and
- agrees to use the system while having a structured education programme on diet and lifestyle, and counselling.

People who start to use the MiniMed Paradigm Veo system should only continue to use it if they have a decrease in the number of hypoglycaemic episodes that is sustained. Appropriate targets for such improvements should be set.

The Vibe and G4 PLATINUM CGM system shows promise but there is currently insufficient evidence to support its routine adoption in the NHS for managing blood glucose levels in people with type 1 diabetes. Robust evidence is needed to show the clinical effectiveness of using the technology in practice.

People with type 1 diabetes who are currently provided with the MiniMed Paradigm Veo system or the Vibe and G4 PLATINUM CGM system by the NHS for clinical indications that are not recommended in this NICE guidance should be able to continue using them until they and their NHS clinician consider it appropriate to stop.

NICE has published a [medtech innovation briefing on MiniMed 640G system with SmartGuard for managing blood glucose levels in people with type 1 diabetes](#).

Quality standards

The following quality statement is relevant to this part of the interactive flowchart.

Diabetes in pregnancy

6. Self-monitoring of blood glucose levels during pregnancy

7 Insulin therapy

See Type 1 diabetes in adults / Insulin therapy for adults with type 1 diabetes

8 Adjunctive therapies for inadequate glycaemic control despite optimal insulin therapy

Sotagliflozin with insulin

The following recommendations are from NICE technology appraisal guidance on sotagliflozin with insulin for treating type 1 diabetes.

Sotagliflozin with insulin is recommended as an option for treating type 1 diabetes in adults with a BMI of at least 27 kg/m², when insulin alone does not provide adequate glycaemic control despite optimal insulin therapy, only if:

- sotagliflozin is given as one 200 mg tablet daily
- they are on insulin doses of 0.5 units/kg of body weight/day or more and
- they have completed a structured education programme that is evidence based, quality assured, delivered by trained educators and includes information about diabetic ketoacidosis, such as:
 - how to recognise its risk factors, signs and symptoms
 - how and when to monitor blood ketone levels
 - what actions to take for elevated blood ketones, and
- treatment is started and supervised by a consultant physician specialising in endocrinology and diabetes treatment, and HbA1c levels are assessed after 6 months and regularly after this.

Stop sotagliflozin if there has not been a sustained improvement in glycaemic control (that is, a fall in HbA1c level of about 0.3% or 3 mmol/mol).

These recommendations are not intended to affect treatment with sotagliflozin that was started in the NHS before this guidance was published. People having treatment outside these recommendations may continue without change to the funding arrangements in place for them before this guidance was published, until they and their NHS clinician consider it appropriate to stop.

See [why we made the recommendations on sotagliflozin with insulin](#).

NICE has written [information for the public on sotagliflozin with insulin](#).

9 Hypoglycaemia awareness and management

Identifying and quantifying impaired hypoglycaemia awareness

Assess hypoglycaemia awareness in adults with type 1 diabetes at each annual review.

Use the Gold score or Clarke score to quantify hypoglycaemia awareness in adults with type 1 diabetes, checking that the questionnaire items have been answered correctly.

Explain to adults with type 1 diabetes that impaired awareness of the symptoms of plasma glucose levels below 3 mmol/litre is associated with a significantly increased risk of severe hypoglycaemia.

Managing impaired hypoglycaemia awareness

Ensure that adults with type 1 diabetes and impaired hypoglycaemia awareness have had structured education in flexible insulin therapy using basal-bolus regimens, and are following its principles correctly.

Offer additional education focusing on avoiding and treating hypoglycaemia to adults with type 1 diabetes who still have impaired hypoglycaemia awareness after structured education in flexible insulin therapy.

Avoid relaxing individualised blood glucose targets to address impaired hypoglycaemia awareness for adults with type 1 diabetes.

For adults with type 1 diabetes and impaired hypoglycaemia awareness who are using lower target blood glucose levels than recommended in this Pathway, encourage them to use the recommended targets (see [blood glucose measurement and targets \[See page 9\]](#)).

Review insulin regimens and doses, and prioritise ways to avoid hypoglycaemia in adults with type 1 diabetes with impaired hypoglycaemia awareness, including:

- reinforcing the principles of structured education
- offering an insulin pump
- offering real-time continuous glucose monitoring.

If, despite these interventions, an adult with type 1 diabetes has impaired hypoglycaemia awareness that is associated with recurrent severe hypoglycaemia, consider referring them to a specialist centre.

Preventing and managing hypoglycaemia

Explain to adults with type 1 diabetes that a fast-acting form of glucose is needed for managing hypoglycaemic symptoms or signs in people who can swallow.

Adults with type 1 diabetes who have a decreased level of consciousness because of hypoglycaemia and so cannot safely take oral treatment should be:

- given intramuscular glucagon by a family member or friend who has been shown how to use it (intravenous glucose may be used by healthcare professionals skilled in getting intravenous access)
- checked for response at 10 minutes, and then given intravenous glucose if their level of consciousness is not improving significantly
- then given oral carbohydrate when it is safe to administer it, and put under continued observation by someone who has been warned about the risk of relapse.

Explain to adults with type 1 diabetes that:

- it is very common to experience some hypoglycaemic episodes with any insulin regimen
- they should use a regimen that avoids or reduces the frequency of hypoglycaemic episodes, while maintaining the most optimal blood glucose control possible.

Make hypoglycaemia advice available to all adults with type 1 diabetes, to help them find the best possible balance with any insulin regimen. (See [insulin therapy for adults with type 1 diabetes](#).)

If hypoglycaemia becomes unusually problematic or increases in frequency, review the following possible causes:

- inappropriate insulin regimens (incorrect dose distributions and insulin types)
- meal and activity patterns, including alcohol
- injection technique and skills, including insulin resuspension if necessary
- injection site problems
- possible organic causes including gastroparesis
- changes in insulin sensitivity (including drugs affecting the renin–angiotensin system and renal failure)
- psychological problems

- previous physical activity
- lack of appropriate knowledge and skills for self-management.

Manage nocturnal hypoglycaemia (symptomatic or detected on monitoring) by:

- reviewing knowledge and self-management skills
- reviewing current insulin regimen, evening eating habits and previous physical activity
- choosing an insulin type and regimen that is less likely to cause low glucose levels at night.

If early cognitive decline occurs in adults on long term insulin therapy, then in addition to normal investigations consider possible brain damage from overt or covert hypoglycaemia, and the need to manage this.

10 Islet or pancreas transplantation

For adults with type 1 diabetes who have recurrent severe hypoglycaemia that has not responded to other treatments (see [hypoglycaemia awareness and management \[See page 14\]](#)), consider referral to a centre that assesses people for islet and/or pancreas transplantation.

Consider islet or pancreas transplantation for adults with type 1 diabetes with suboptimal diabetes control, if they have had a renal transplant and are currently on immunosuppressive therapy.

Allogeneic pancreatic islet cell transplantation

NICE has published interventional procedures guidance on [allogeneic pancreatic islet cell transplantation for type 1 diabetes mellitus with normal arrangements](#) for clinical governance in units with established experience in allogeneic pancreatic islet cell transplantation.

11 Ketone monitoring and managing diabetic ketoacidosis

Ketone self-monitoring to prevent diabetic ketoacidosis

Consider ketone monitoring (blood or urine) as part of 'sick-day rules' for adults with type 1 diabetes, to help with self-management of hyperglycaemia.

Ketone monitoring in hospital

In adults with type 1 diabetes presenting to emergency services, consider capillary blood ketone testing if:

- diabetic ketoacidosis (DKA) is suspected **or**
- the person has uncontrolled diabetes during an illness, and urine ketone testing is positive.

Consider capillary blood ketone testing (incorporated into a formal protocol) for inpatient management of DKA in adults with type 1 diabetes.

Management of DKA

Professionals managing DKA in adults should have adequate and up-to-date training, and be familiar with all aspects of DKA management that are associated with mortality and morbidity.

These topics should include:

- fluid balance
- acidosis
- cerebral oedema
- electrolyte imbalance
- that DKA can affect the results of standard diagnostic tests (white cell count, body temperature, ECG)
- respiratory distress syndrome
- cardiac abnormalities
- precipitating causes
- infection management, including opportunistic infections
- gastroparesis
- use of high dependency and intensive care units
- the recommendations below.

Management of DKA in adults should be in line with local clinical governance.

Use isotonic saline for primary fluid replacement in adults with DKA, not given too rapidly except in cases of circulatory collapse.

Do not generally use bicarbonate for managing DKA in adults.

Give intravenous insulin by infusion to adults with DKA.

When the plasma glucose concentration has fallen to 10 to 15 mmol/litre in adults with DKA, give glucose containing fluids (not more than 2 litres in 24 hours) so that the insulin infusion can be continued at a sufficient rate to clear ketones (for example, 6 units/hour, monitored for effect).

Begin potassium replacement early in DKA in adults, with frequent monitoring for hypokalaemia.

Do not generally use phosphate replacement when managing DKA in adults.

In adults with DKA who have reduced consciousness, think about:

- inserting a nasogastric tube and
- monitoring urine output using a urinary catheter and
- giving venous thromboembolism (VTE) prophylaxis.

To reduce the risk of catastrophic outcomes in adults with DKA, use continuous monitoring and frequent reviews that cover all aspects of clinical management.

12 Identifying and managing complications

[See Type 1 diabetes in adults / Identifying and managing complications in adults with type 1 diabetes](#)

13 Psychological problems

Members of diabetes professional teams providing care or advice to adults with type 1 diabetes should be alert to possible clinical or subclinical depression and/or anxiety, particularly if someone reports or appears to be having difficulties with self-management.

Diabetes professionals should:

- ensure they have appropriate skills to identify and provide basic management of non-severe psychological disorders in people from different cultural backgrounds
- be familiar with appropriate counselling techniques and drug therapy, while arranging prompt referral to specialists for people whose psychological difficulties continue to interfere significantly with their wellbeing or diabetes self-management.

See also [the NICE Pathways on common mental health disorders in primary care, depression, generalised anxiety disorder and panic disorder](#).

Eating disorders

Members of diabetes professional teams should be alert to the possibility of bulimia nervosa, anorexia nervosa and disordered eating in adults with type 1 diabetes with:

- over-concern with body shape and weight
- low BMI
- hypoglycaemia
- suboptimal overall blood glucose control.

See also [the NICE Pathway on eating disorders](#).

Think about making an early (or if, needed, urgent) referral to local eating disorder services for adults with type 1 diabetes with an eating disorder.

From diagnosis, the diabetes professional team should provide regular high-quality support and counselling about lifestyle and diet for all adults with type 1 diabetes (see [education and information](#) [See page 4] and [dietary management](#) [See page 6]).

14 Care in hospital and other institutions

Blood glucose control for adults with type 1 diabetes in hospital

Aim for a target plasma glucose level of 5 to 8 mmol/litre for adults with type 1 diabetes during surgery or acute illness.

Establish a local protocol for controlling blood glucose levels in adults with type 1 diabetes during surgery or acute illness to reach the target level.

Use intravenous rather than subcutaneous insulin regimens for adults with type 1 diabetes if:

- they are unable to eat or are predicted to miss more than 1 meal **or**
- an acute situation is expected to result in unpredictable blood glucose levels – for example, major surgery, high-dose steroid treatment, inotrope treatment or sepsis **or**
- insulin absorption is expected to be unpredictable, for example because of circulatory compromise.

Consider continuing the person's existing basal insulin regimen (including basal rate if they are using insulin pump therapy) together with protocol-driven insulin delivery for controlling blood glucose levels in adults with type 1 diabetes during surgery or acute illness.

Use subcutaneous insulin regimens (including rapid-acting insulin before meals) if an adult with type 1 diabetes and acute illness is eating.

Enable adults with type 1 diabetes who are hospital inpatients to self-administer subcutaneous insulin if they are willing and able and it is safe for them to do so.

Delivering care in hospital and other institutions

These recommendations are for care teams caring for adults with type 1 diabetes in hospital and in institutions such as nursing homes, residential homes and prisons.

From admission, provide ongoing advice to adults with type 1 diabetes and the team caring for them from a trained multidisciplinary team with expertise in diabetes.

Throughout inpatient admission, respect the personal expertise of adults with type 1 diabetes in managing their own diabetes and incorporate this into routine ward-based blood glucose monitoring and insulin delivery.

Throughout inpatient admission, support adults with type 1 diabetes to make their own food choices based on their personal knowledge of their dietary needs, except when illness or medical or surgical intervention significantly disturbs those requirements.

Provide optimal insulin therapy, which can be achieved using intravenous insulin and glucose, to all adults with type 1 diabetes with threatened or actual stroke. Critical care and emergency departments should have a protocol for such management.

Also see [ketone monitoring and managing diabetic ketoacidosis \[See page 16\]](#).

For information on foot care for inpatients, see [the NICE Pathway on foot care for people with diabetes](#).

For information on managing hyperglycaemia in the first 48 hours for patients admitted to hospital with acute coronary syndrome, see [the NICE Pathway on hyperglycaemia in acute coronary syndromes](#).

Quality standards

The following quality statement is relevant to this part of the interactive flowchart.

Diabetes in adults

7. Inpatient care for adults with type 1 diabetes

Glossary

BMI

body mass index

HbA1c

haemoglobin A1c

Sources

[Type 1 diabetes in adults: diagnosis and management](#) (2015 updated 2021) NICE guideline NG17

[Sotagliflozin with insulin for treating type 1 diabetes](#) (2020) NICE technology appraisal guidance 622

[Integrated sensor-augmented pump therapy systems for managing blood glucose levels in type 1 diabetes \(the MiniMed Paradigm Veo system and the Vibe and G4 PLATINUM CGM system\)](#) (2016) NICE diagnostics guidance 21

Your responsibility

Guidelines

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.

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.

Technology appraisals

The recommendations in this interactive flowchart represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, health professionals are expected to take these recommendations fully into account, alongside the individual needs, preferences and values of their patients. The application of the recommendations in this interactive flowchart is at the discretion of health professionals and their individual patients and do not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

Commissioners and/or providers have a responsibility to provide the funding required to enable the recommendations to be applied when individual health professionals and their patients wish to use it, in accordance with the NHS Constitution. They should do so 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.

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.

Medical technologies guidance, diagnostics guidance and interventional procedures guidance

The recommendations in this interactive flowchart represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, healthcare professionals are expected to take these recommendations fully into account. However, the

interactive flowchart does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

Commissioners and/or providers have a responsibility to implement the recommendations, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity, and foster good relations. Nothing in this interactive flowchart should be interpreted in a way that would be inconsistent with compliance 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.