NICE National Institute for Health and Care Excellence

Managing type 1 diabetes in adults

A NICE pathway brings together all NICE guidance, quality standards and materials to support implementation on a specific topic area. The pathways are interactive and designed to be used online. This pdf version gives you a single pathway diagram and uses numbering to link the boxes in the diagram to the associated recommendations.

To view the online version of this pathway visit:

http://pathways.nice.org.uk/pathways/diabetes

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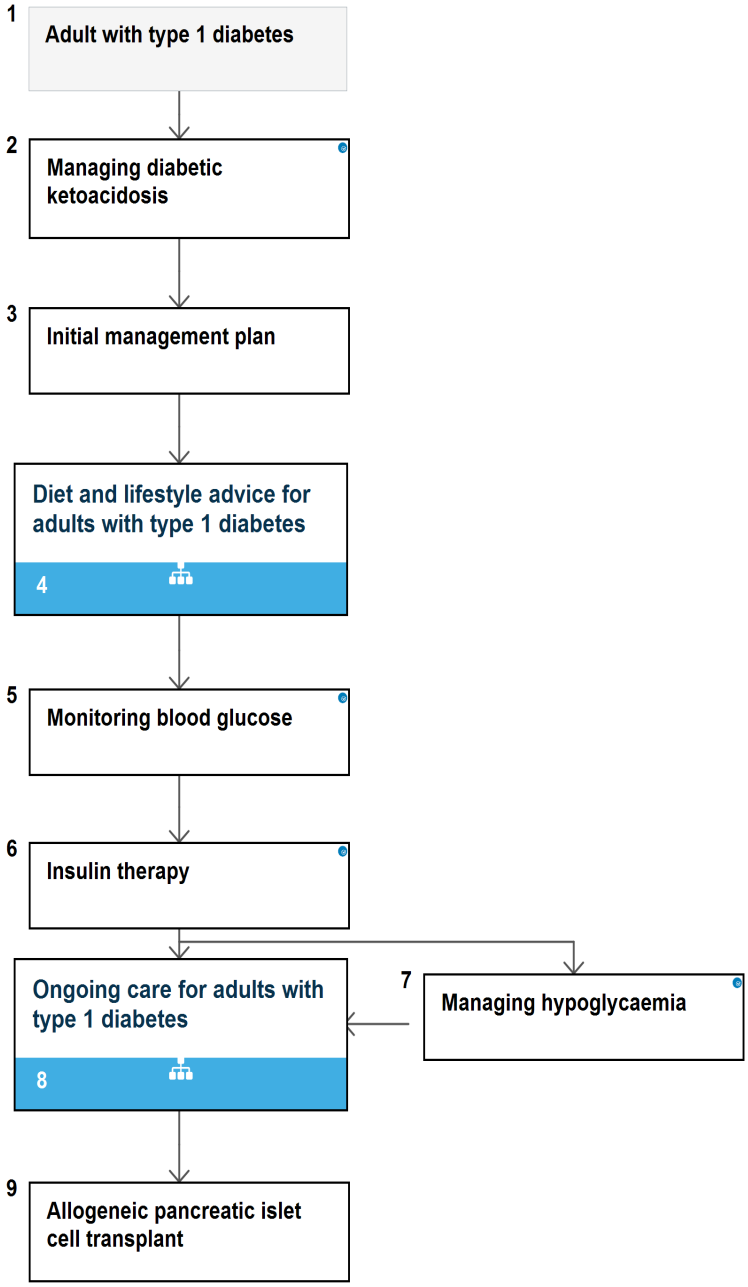
NICE *Pathways*



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1 Adult with type 1 diabetes

No additional information

2 Managing diabetic ketoacidosis

Professionals managing diabetic ketoacidosis (DKA) should be adequately trained including regular updating, and be familiar with all aspects of its management that are associated with mortality and morbidity. Management of DKA should be in line with local clinical governance.

Use:

- isotonic saline as primary fluid not given too rapidly
- intravenous insulin
- when plasma glucose concentration has fallen to 10–15 mmol/litre: glucose-containing fluids (not more than 2 litres in 24 hours) with higher rates of insulin infusion than used in other situations (for example, 6 U/hour monitored for effect)
- early potassium replacement with frequent monitoring.

For patients whose consciousness level is impaired, consider insertion of a nasogastric tube, urinary catheterisation to monitor urine production, and heparinisation.

Generally avoid use of bicarbonate and general phosphate replacement.

Monitor continuously and review frequently.

Quality standards

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

11. Diabetic ketoacidosis

3 Initial management plan

Agree between the professional team and the person with type 1 diabetes a plan for their early diabetes care.

Ensure care plan is individualised and culturally appropriate.

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Implement the plan without inappropriate delay.

Modify the plan as required.

Elements needed for a robust agreed care plan – medical assessment

Acute medical history.

Complications history/symptoms.

Long-term/recent diabetes history.

Other medical history/systems.

Family history of diabetes/arterial disease.

Drug history/current drugs.

Vascular risk factors including smoking.

General examination, weight/body mass index.

Foot/eye/vision examination.

Urine albumin excretion/urine protein/serum creatinine.

Psychological well-being.

Elements needed for a robust agreed care plan – environmental assessment

Social, home, work and recreational circumstances of the individual and carers.

Immediate family and social relationships and availability of informal support.

Preferences in nutrition and physical activity.

Other relevant factors such as substance use.

Elements needed for a robust agreed care plan – cultural and educational assessment

Attitudes to medicine and self-care.

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Prior knowledge of diabetes.

Components of an individual care plan

Diabetes education, including nutritional advice. See the section on diet and lifestyle advice for adults in this pathway.

Insulin therapy. See the section on insulin therapy in this pathway.

Self-monitoring. See the section on monitoring blood glucose in this pathway.

Arterial risk factor surveillance and management. For more information see the managing arterial risk section of this pathway.

Late complications surveillance and management. For more information see the surveillance and management of late microvascular complications section of this pathway.

Means and frequency of communication with the professional care team.

Follow-up consultations, including next annual review.

4 Diet and lifestyle advice for adults with type 1 diabetes

See Diabetes / Diet and lifestyle advice for adults with type 1 diabetes

5 Monitoring blood glucose

Clinical monitoring

Measure HbA_{1c} (high precision DCCT-aligned method) every 2–6 months at the time of, or a few days before, consultation.

Communicate the results (as 'A_{1c}' for simplicity) to the person with diabetes.

If haemoglobinopathy or haemoglobin turnover are abnormal, use other methods (total glycated haemoglobin estimation, or assessment of glucose profiles).

Avoid fructosamine measurement as a routine.

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Consider continuous glucose monitoring systems if:

- there is repeated hyper- or hypoglycaemia at the same time of day, or
- hypoglycaemia unawareness is unresponsive to conventional insulin dose adjustment.

Self-monitoring

Advise use of self-monitoring as part of an integrated package including:

- appropriate insulin regimens
- other diabetes education.

Advise use of meters and strips chosen to suit individual needs (but not use of sites other than the fingertips for self-monitoring).

Advise a frequency of self-monitoring depending on:

- characteristics of an individual's blood glucose control
- insulin treatment regimen
- personal preference in using the results to achieve the desired lifestyle.

Teach self-monitoring skills close to time of diagnosis and initiation of insulin therapy.

Interpret results in the light of clinically significant life events.

Reassess skills, use of results and equipment used at least annually.

Targets for clinical monitoring

HbA_{1c} < 7.5 %

If increased arterial risk: HbA_{1c} = 6.5 %. For more information on arterial risk, see the managing arterial risk section of this pathway.

Advise that any improvement is beneficial, even if target HbA_{1c} levels are not reached (and the greater the improvement, the more the benefit).

Targets for self-monitoring

Pre-prandial blood glucose level 4.0–7.0 mmol/litre.

Post-prandial blood glucose level < 9.0 mmol/litre.

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Targets – points to consider

With lower HbA_{1c} levels, beware of:

- undetected hypoglycaemia
- risk of disabling hypoglycaemia
- risk of hypoglycaemia unawareness.

Avoid inappropriately pursuing tight blood glucose control if quality of life is compromised despite otherwise optimal care, or the risk of hypoglycaemia is significant to the individual.

Quality standards

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

4. Glycaemic control

6 Insulin therapy

Prescribe the types of insulin that allow people optimal well-being.

Use multiple insulin injection regimens in adults who prefer them in an integrated package with education, food, skills training and appropriate self-monitoring.

Advise twice-daily insulin regimens (often biphasic pre-mixes; analogues in those prone to hypoglycaemia at night) for those who want them, who find adherence to lunch-time insulin injections difficult and those with learning difficulties who may require assistance.

Meal-time insulin

Use unmodified ('soluble') insulin or rapid-acting insulin analogues.

Use rapid-acting insulin analogues rather than unmodified insulin:

- where nocturnal or late inter-prandial hypoglycaemia is a problem
- to avoid need for snacks, while maintaining equivalent blood glucose control.

Basal/nocturnal insulin supply

Use isophane (NPH) insulin or long-acting insulin analogues (insulin glargine).

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Use isophane (NPH) insulin or long-acting insulin analogues (insulin glargine) for basal/ nocturnal insulin supply (isophane (NPH) insulin given at bedtime, or given twice daily with meal-time insulin analogues).

Use long-acting insulin analogues (insulin glargine) when:

- nocturnal hypoglycaemia is a problem on isophane (NPH) insulin
- morning hyperglycaemia on isophane (NPH) insulin results in difficult day-time blood glucose control
- rapid-acting insulin analogues are used for meal-time blood glucose control.

Advise detailed review of regimens and monitoring for people whose nutritional and physical activity patterns vary considerably from day to day.

NICE technology appraisal guidance 53 also recommends insulin glargine as a treatment option for people with type 1 diabetes.

Insulin glargine is recommended as a treatment option for people with type 1 diabetes.

NICE has written information for the public explaining the guidance on insulin glargine for people with type 1 diabetes.

Oral glucose-lowering drugs

Avoid the general use of oral glucose-lowering drugs in people with type 1 diabetes.

Special situations

Eating before fasting or sleeping: consider use of a rapid-acting insulin analogue.

Erratic and unpredictable blood glucose control: consider resuspension of insulin and injection technique, injection sites, self-monitoring skills, knowledge and self-management skills, nature of lifestyle, psychological and psychosocial difficulties, and possible organic causes such as gastroparesis.

Recurrent severe hypoglycaemia problems despite optimised control: NICE has produced technology appraisal guidance on the use of insulin pump therapy in diabetes.

Continuous subcutaneous insulin infusion (CSII or 'insulin pump') therapy is recommended as a treatment option for adults and children 12 years and older with type 1 diabetes mellitus provided that:

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- attempts to achieve target haemoglobin A_{1c} (HbA_{1c}) levels with multiple daily injections (MDIs) result in the person experiencing disabling hypoglycaemia. For the purpose of this guidance, disabling hypoglycaemia is defined as the repeated and unpredictable occurrence of hypoglycaemia that results in persistent anxiety about recurrence and is associated with a significant adverse effect on quality of life

or

- HbA_{1c} levels have remained high (that is, at 8.5% or above) on MDI therapy (including, if appropriate, the use of long-acting insulin analogues) despite a high level of care.

It is recommended that CSII therapy be initiated only by a trained specialist team, which should normally comprise a physician with a specialist interest in insulin pump therapy, a diabetes specialist nurse and a dietitian. Specialist teams should provide structured education programmes and advice on diet, lifestyle and exercise appropriate for people using CSII.

Following initiation in adults and children 12 years and older, CSII therapy should only be continued if it results in a sustained improvement in glycaemic control, evidenced by a fall in HbA_{1c} levels, or a sustained decrease in the rate of hypoglycaemic episodes. Appropriate targets for such improvements should be set by the responsible physician, in discussion with the person receiving the treatment or their carer.

The recommendations on insulin pump therapy are from NICE technology appraisal guidance 151.

NICE has written information for the public explaining the guidance on insulin pump therapy .

Adults starting insulin therapy: consider partial insulin replacement if it can meet control targets.

Concurrent illness: provide guidelines and protocols ('sick day rules') prospectively as part of the education programme.

Insulin delivery

Provide the device (usually injection pen[s]) that allows optimal well-being – special devices are useful in some people with special needs.

Injection: into deep subcutaneous fat, using needles of length appropriate to the individual.

Site: usually the abdominal wall (if not a problem) but thigh may give better absorption for isophane (NPH) insulin.

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- Rotate within a site, but not between sites, for insulin given at one time of day.

Monitor injection sites annually, or more often if glucose control problem.

Disposal of needles: provide sharps containers and arrangements for their disposal.

Quality standards

The following quality statements are relevant to this part of the pathway.

5. Medication

6. Insulin therapy

7 Managing hypoglycaemia

Aim

Aim for hypoglycaemia avoidance, while maintaining blood glucose control as close to optimum levels as is feasible. See the section on insulin therapy in this pathway for more information.

Self-managed event

Take any available glucose/sucrose-containing substance that can be swallowed.

Decreased consciousness level and unable to take oral treatment safely

Give intramuscular glucagon (administered by trained user) or intravenous glucose (administered by a skilled professional).

If level of consciousness is not improving significantly at 10 minutes, give intravenous glucose.

Give oral carbohydrate when safe, and ensure continuing observation for risk of relapse.

Problematic hypoglycaemia

Review:

- insulin regimens (dose distributions/insulin types)
- meal and activity patterns, including alcohol

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- injection technique and skills, including insulin resuspension
- injection site problems
- possible organic causes, including gastroparesis
- changes in insulin sensitivity (drugs/renal failure)
- psychological problems
- physical activity
- appropriate knowledge and skills for self management.

See the section on insulin therapy in this pathway for more information.

Hypoglycaemia unawareness

Assume secondary to undetected periods of hypoglycaemia (commonly at night) until excluded by monitoring.

Offer specific education on detection and management.

Nocturnal hypoglycaemia (symptomatic or detected on monitoring)

Review knowledge, self-management skills, insulin regimen, evening eating habits and earlier physical activity.

Use insulin type and regimens such as

- isophane (NPH) insulin at bedtime
- rapid-acting analogue with the evening meal
- long-acting insulin analogue (insulin glargine)
- insulin pump, see the section on insulin therapy in this pathway for more information.

Late post-prandial hypoglycaemia

Advise appropriate snacks or rapid-acting insulin analogues.

Early cognitive decline

Consider hypoglycaemic brain damage.

Quality standards

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

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12. Hypoglycaemia

8 Ongoing care for adults with type 1 diabetes

See Diabetes / Ongoing care for adults with type 1 diabetes

9 Allogeneic pancreatic islet cell transplant

NICE interventional procedures guidance

NICE interventional procedure guidance makes recommendations on whether interventional procedures used for diagnosis or treatment are safe enough and work well enough for routine use.

Allogeneic pancreatic islet cell transplantation for type 1 diabetes mellitus

The evidence on allogeneic pancreatic islet cell transplantation for type 1 diabetes mellitus shows short-term efficacy with some evidence of long-term efficacy. The evidence on safety shows that serious complications may occur as a result of the procedure. The long-term immunosuppression required is also associated with a risk of adverse events. In units with established experience in allogeneic pancreatic islet cell transplantation, the procedure may be used with normal arrangements for clinical governance.

During consent, clinicians should ensure that patients understand the potential complications of the procedure and the uncertainty about its efficacy in the long term. They should provide patients with clear, written information. In addition, use of the Institute's information for the public is recommended.

Patient selection for this procedure should involve a multidisciplinary team. Selection criteria should take into account that the procedure is particularly indicated for patients with hypoglycaemia unawareness and/or those already on immunosuppressive therapy because of renal transplantation.

Further audit and research should address the effect of the procedure on quality of life and its long-term efficacy, particularly in relation to the complications of diabetes.

These recommendations are from Allogeneic pancreatic islet cell transplantation for type 1 diabetes (NICE interventional procedure guidance 257).

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Sources

Type 1 diabetes. NICE clinical guideline 15 (2004)

Continuous subcutaneous insulin infusion for the treatment of diabetes mellitus. NICE technology appraisal guidance 151 (2008)

Guidance on the use of long-acting insulin analogues for the treatment of diabetes – insulin glargine. NICE technology appraisal guidance 53 (2002)

Allogeneic pancreatic islet cell transplantation for type 1 diabetes. NICE interventional procedure guidance 257 (2008)

Your responsibility

The guidance in this pathway represents the view of NICE, which was arrived at after careful consideration of the evidence available. Those working in the NHS, local authorities, the wider public, voluntary and community sectors and the private sector should take it into account when carrying out their professional, managerial or voluntary duties. Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way which would be inconsistent with compliance with those duties.

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