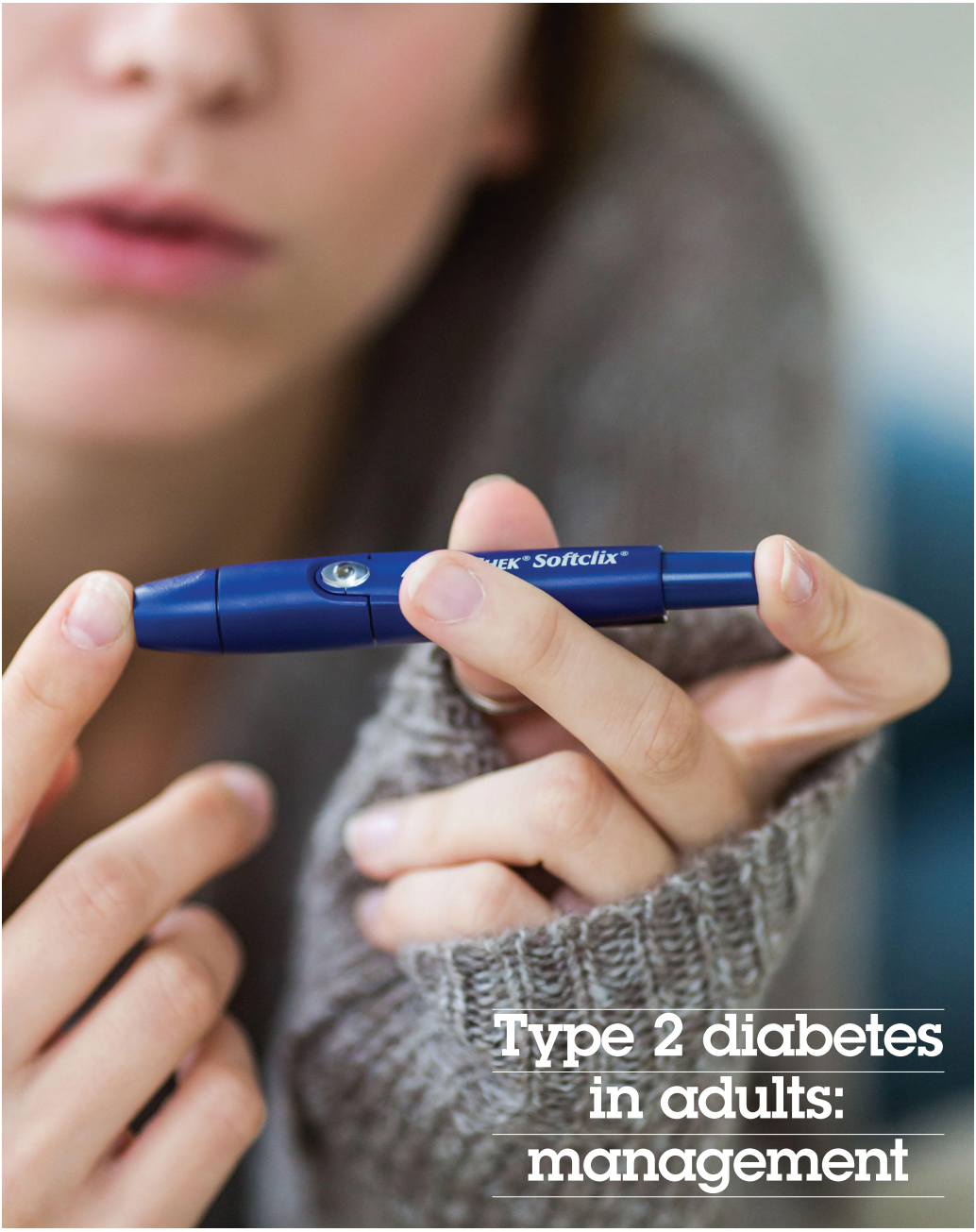

Type 2 diabetes in adults: management

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Welcome

NICE issued its clinical guidance on *Type 2 diabetes in adults: management* in December 2015. This guideline updates and replaces NICE guideline CG87, NICE guideline CG66, NICE technology appraisal guidance 248 and NICE technology appraisal guidance 203. The full version of this guidance is available at www.nice.org.uk/guidance/ng28.

Clinical guideline

The NICE guideline covers the care and management of type 2 diabetes in adults (aged 18 and over). It focuses on patient education, dietary advice, managing cardiovascular risk, managing blood glucose levels, and identifying and managing long-term complications.

Type 2 diabetes is a chronic metabolic condition characterised by insulin resistance (that is, the body's inability to effectively use insulin) and insufficient pancreatic insulin production, resulting in high blood glucose levels (hyperglycaemia). Type 2 diabetes is commonly associated with obesity, physical inactivity, raised blood pressure, disturbed blood lipid levels and a tendency to develop thrombosis, and therefore is recognised to have an increased cardiovascular risk. It is associated with long-term microvascular and macrovascular complications, together with reduced quality of life and life expectancy.

In 2013, over 3.2 million adults were diagnosed with diabetes, with prevalence rates of 6% and 6.7% in England and Wales respectively. It is estimated that about 90% of adults currently diagnosed with diabetes have type 2 diabetes. Type 2 diabetes is more common in people of African, African-Caribbean and South Asian family origin. It can occur in all age groups and is increasingly being diagnosed in children.

Multiple vascular risk factors and wide-ranging complications make diabetes care complex and time-consuming, and many areas of healthcare services must be involved for optimal management. Necessary lifestyle changes, the complexities and possible side effects of therapy make patient education and self-management important aspects of diabetes care. Diabetes care is estimated to account for at least 5% of UK healthcare expenditure, and up to 10% of NHS expenditure.

The guideline contains recommendations for managing type 2 diabetes in adults, and focuses on patient education, dietary advice, managing cardiovascular risk, managing blood glucose levels, and identifying and managing long-term complications. The guideline does not cover diagnosis, secondary diabetes, type 1 diabetes in adults, diabetes in pregnancy and diabetes in children and young people.

NICE RECOMMENDATIONS

INDIVIDUALISED CARE

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, risks from polypharmacy, and their ability to benefit from long-term interventions because of reduced life expectancy. Such an approach is especially important in the context of multimorbidity. Reassess the person's needs

and circumstances at each review and think about whether to stop any medicines that are not effective.

Take into account any disabilities, including visual impairment, when planning and delivering care for adults with type 2 diabetes.

PATIENT EDUCATION

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

Ensure that any structured education programme for adults with type 2 diabetes includes the following components:

- It is evidence-based, and suits the needs of the person.
- It 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.
- It has a structured curriculum that is theory-driven, evidence-based and resource-effective, has supporting materials, and is written down.
- It is delivered by trained educators who have an understanding of educational theory appropriate to the age and needs of the person, and who are trained and competent to deliver the principles and content of the programme.
- It is quality assured, and reviewed by trained, competent, independent assessors who measure it against criteria that ensure consistency.
- The outcomes are audited regularly.

Ensure the patient-education programme provides the necessary resources to support the educators, and that educators are properly trained and given time to develop and maintain their skills.

Offer group education programmes as the preferred option. Provide an alternative of equal standard for a person unable or unwilling to participate in group education.

Ensure that the patient-education programmes available meet the cultural, linguistic, cognitive and literacy needs within the local area.

Ensure that all members of the diabetes healthcare team are familiar with the patient-education programmes available locally, that these programmes are integrated with the rest of the care pathway, and that adults with type 2 diabetes and their family members or carers (as appropriate) have the opportunity to contribute to the design and provision of local programmes.

DIETARY ADVICE

Provide individualised and ongoing nutritional advice from a healthcare professional with specific expertise and competencies in nutrition.

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.

Emphasise advice on healthy balanced eating that is applicable to the general population when providing advice to adults with type 2 diabetes. Encourage high-fibre, low-glycaemic-index sources of carbohydrate in the diet, such as fruit, vegetables, wholegrains and pulses; include low-fat dairy

products and oily fish; and control the intake of foods containing saturated and trans fatty acids.

Integrate dietary advice with a personalised diabetes management plan, including other aspects of lifestyle modification, such as increasing physical activity and losing weight.

For adults with type 2 diabetes who are overweight, set an initial body weight loss target of 5-10%. Remember that lesser degrees of weight loss may still be of benefit, and that larger degrees of weight loss in the longer term will have advantageous metabolic impact.

Individualise recommendations for carbohydrate and alcohol intake, and meal patterns. Reducing the risk of hypoglycaemia should be a particular aim for a person using insulin or an insulin secretagogue.

Advise adults with type 2 diabetes that limited substitution of sucrose-containing foods for other carbohydrate in the meal plan is allowable, but that they should take care to avoid excess energy intake.

Discourage the use of foods marketed specifically for people with diabetes.

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

For recommendations on lifestyle advice, see the NICE guidelines: *Preventing excess weight gain, Weight management: lifestyle services for overweight or obese adults, Obesity: identification, assessment and management, Physical activity: brief advice for adults in primary care, Smoking: brief interventions and referrals, Stop smoking services, Smoking: harm reduction,* and *Smoking: acute, maternity and mental health services.*

BLOOD PRESSURE MANAGEMENT

Measure blood pressure at least annually in an adult with type 2 diabetes without previously diagnosed hypertension or renal disease. Offer and reinforce preventive lifestyle advice.

For an adult with type 2 diabetes on antihypertensive drug treatment when diabetes is diagnosed, review blood pressure control and medications used. Make changes only if there is poor control or if current drug treatment is not appropriate

because of microvascular complications or metabolic problems.

Repeat blood pressure measurements within:

- 1 month if blood pressure is higher than 150/90 mmHg
- 2 months if blood pressure is higher than 140/80 mmHg
- 2 months if blood pressure is higher than 130/80 mmHg and there is kidney, eye or cerebrovascular damage.

Provide lifestyle advice (see section: Dietary advice in this guideline and the Lifestyle interventions section in NICE guideline *Hypertension in adults: diagnosis and management*) if blood pressure is confirmed as being consistently above 140/80 mmHg (or above 130/80 mmHg if there is kidney, eye or cerebrovascular damage). Add medications if lifestyle advice does not reduce blood pressure to below 140/80 mmHg (below 130/80 mmHg if there is kidney, eye or cerebrovascular damage).

Monitor blood pressure every 1-2 months, and intensify therapy if the person is already on antihypertensive drug treatment, until the blood pressure is consistently below 140/80 mmHg (below 130/80 mmHg if there is kidney, eye or cerebrovascular damage).

First-line antihypertensive drug treatment should be a once-daily, generic angiotensin-converting enzyme (ACE) inhibitor.

Exceptions to this are people of African or Caribbean family origin, or women for whom there is a possibility of becoming pregnant.

The first-line antihypertensive drug treatment for a person of African or Caribbean family origin should be an ACE

inhibitor plus either a diuretic or a generic calcium-channel blocker.

A calcium-channel blocker should be the first-line antihypertensive drug treatment for a woman for whom, after an informed discussion, it is agreed there is a possibility of her becoming pregnant.

For a person with continuing intolerance to an ACE inhibitor (other than renal deterioration or hyperkalaemia), substitute an angiotensin II-receptor antagonist for the ACE inhibitor.

Do not combine an ACE inhibitor with an angiotensin II-receptor antagonist to treat hypertension.

If the person's blood pressure is not reduced to the individually agreed target with first-line therapy, add a calcium-channel blocker or a diuretic (usually a thiazide or thiazide-related diuretic). Add the other drug (that is, the calcium-channel blocker or diuretic) if the target is not reached with dual therapy.

If the person's blood pressure is not reduced to the individually agreed target with triple therapy, add an alpha-blocker, a beta-blocker or a potassium-sparing diuretic (the last with caution if the person is already taking an ACE inhibitor or an angiotensin II-receptor antagonist).

Monitor the blood pressure of a person who has attained and consistently remained at his or her blood pressure target every 4-6 months. Check for possible adverse effects of antihypertensive drug treatment – including the risks from unnecessarily low blood pressure.

ANTIPLATELET THERAPY

Do not offer antiplatelet therapy (aspirin or clopidogrel) for adults with type 2 diabetes without cardiovascular disease.

For guidance on the primary and secondary prevention of cardiovascular disease in adults with type 2 diabetes, see the NICE guidelines: *Cardiovascular disease: risk assessment and reduction, including lipid modification* and *Myocardial infarction: cardiac rehabilitation and prevention of further MI.*

BLOOD GLUCOSE MANAGEMENT

HbA1c measurement and targets

Measurement

In adults with type 2 diabetes, measure HbA1c levels at:

- 3-6 monthly intervals (tailored to individual needs), until the HbA1c is stable on unchanging therapy
- 6-monthly intervals once the HbA1c level and blood glucose lowering therapy are stable.

Use methods to measure HbA1c that have been calibrated according to International Federation of Clinical Chemistry (IFCC) standardisation.

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.

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

Targets

Involve adults with type 2 diabetes in decisions about their individual HbA1c target. Encourage them to achieve the target and maintain it unless any resulting adverse effects (including hypoglycaemia), or their efforts to achieve their target, impair their quality of life.

Offer lifestyle advice and drug treatment to support adults with type 2 diabetes to achieve and maintain their HbA1c target (see section in this guideline: Dietary advice). For more information about supporting adherence, see the NICE guideline: *Medicines adherence: involving patients in decisions about prescribed medicines and supporting adherence.*

For adults with type 2 diabetes managed either by lifestyle and diet, or by lifestyle and diet combined with a single drug not associated with hypoglycaemia, support the person to aim for an HbA1c level of 48 mmol/mol (6.5%). For adults on a drug associated with hypoglycaemia, support the person to aim for an HbA1c level of 53 mmol/mol (7.0%).

In adults with type 2 diabetes, if HbA1c levels are not adequately controlled by a single drug and rise to 58 mmol/mol (7.5%) or higher:

- reinforce advice about diet, lifestyle and adherence to drug treatment and
- support the person to aim for an HbA1c level of 53 mmol/mol (7.0%) and
- intensify drug treatment.

Consider relaxing the target HbA1c level (see Targets section in this guideline) on a case-by-case basis, with particular consideration for people who are older or frail, for adults with type 2 diabetes:

- who are unlikely to achieve longer-term risk-reduction benefits, for example, people with a reduced life expectancy
- for whom tight blood glucose control poses a high risk of the consequences of hypoglycaemia, for example, people who are at risk of falling, people who have impaired awareness of hypoglycaemia, and people who drive or operate machinery as part of their job
- for whom intensive management would not be appropriate, for example, people with significant comorbidities.

If adults with type 2 diabetes achieve 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.

For guidance on HbA1c targets for women with type 2 diabetes who are pregnant or planning to become pregnant, see the NICE guideline: *Diabetes in pregnancy: management from preconception to the postnatal period*.

Self-monitoring of blood glucose

Take the Driver and Vehicle Licensing Agency (DVLA) guide, *At a glance guide to the current medical standards of fitness to drive*, into account when offering self-monitoring of blood glucose levels for adults with type 2 diabetes.

Do not routinely offer self-monitoring of 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
- the person is pregnant, or is planning to become pregnant. For more information, see the NICE guideline: *Diabetes in pregnancy: management from preconception to the postnatal period*.

Consider short-term self-monitoring of blood glucose levels in adults with type 2 diabetes (and review treatment as necessary):

- when starting treatment with oral or intravenous corticosteroids or
- to confirm suspected hypoglycaemia.

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

If adults with type 2 diabetes are self-monitoring their 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.

Drug treatment

Recommendations in this section that cover dipeptidyl peptidase-4 (DPP-4) inhibitors, glucagon-like peptide-1 (GLP-1) mimetics and sulfonylureas refer to each of these groups of drugs at a class level.

For adults with type 2 diabetes, discuss the benefits and risks of drug treatment, and the options available. Base the choice of drug treatment(s) on:

- the effectiveness of the drug treatment(s) in terms of metabolic response
- safety (see Medicines and Healthcare products Regulatory Agency [MHRA] guidance: www.gov.uk/drug-safety-update) and tolerability of the drug treatment(s)
- the person's individual clinical circumstances, for example, comorbidities, risks from polypharmacy
- the person's individual preferences and needs
- the licensed indications or combinations available
- cost (if 2 drugs in the same class are appropriate, choose the option with the lowest acquisition cost).

Rescue therapy at any phase of treatment

If an adult with type 2 diabetes is symptomatically hyperglycaemic, consider insulin (see section in this guideline on Insulin-based treatments) or a sulfonylurea, and review treatment when blood glucose control has been achieved.

Initial drug treatment

Offer standard-release metformin as the initial drug treatment for adults with type 2 diabetes.

Gradually increase the dose of standard-release metformin over several weeks to minimise the risk of gastrointestinal side effects in adults with type 2 diabetes.

If an adult with type 2 diabetes experiences gastrointestinal side effects with standard-release metformin, consider a trial of modified-release metformin.

A pdf of algorithm for blood glucose lowering therapy in adults with type 2 diabetes is available to download from www.nice.org.uk/guidance/ng28/resources.

In adults with type 2 diabetes, review the dose of metformin if the estimated glomerular filtration rate (eGFR) is below 45 ml/minute/1.73m^2:

- Stop metformin if the eGFR is below 30 ml/minute/1.73m^2.
- Prescribe metformin with caution for those at risk of a sudden deterioration in kidney function and those at risk of eGFR falling below 45 ml/minute/1.73m^2.

In adults with type 2 diabetes, if metformin is contraindicated or not tolerated, consider initial drug treatment* with:

- a dipeptidyl peptidase-4 (DPP-4) inhibitor or
- pioglitazone* or
- a sulfonylurea.

In adults with type 2 diabetes, do not offer or continue pioglitazone* if they have any of the following:

- heart failure or history of heart failure
- hepatic impairment
- diabetic ketoacidosis
- current, or a history of, bladder cancer
- uninvestigated macroscopic haematuria.

First intensification of drug treatment

In adults with type 2 diabetes, if initial drug treatment with metformin has not continued to control HbA1c to below the person's individually agreed threshold for intensification, consider dual therapy with:

- metformin and a DPP-4 inhibitor or
- metformin and pioglitazone* or
- metformin and a sulfonylurea.

In adults with type 2 diabetes, if metformin is contraindicated or not tolerated and initial drug treatment has not continued to control HbA1c to below the person's individually agreed threshold for intensification, consider dual therapy* with:

- a DPP-4 inhibitor and pioglitazone* or
- a DPP-4 inhibitor and a sulfonylurea or
- pioglitazone* and a sulfonylurea.

Treatment with combinations of medicines including sodium-glucose cotransporter 2 (SGLT-2) inhibitors may be appropriate for some people with type 2 diabetes; see the NICE guidelines: *Canagliflozin in combination therapy for treating type 2 diabetes, Dapagliflozin in combination therapy for treating type 2 diabetes* and *Empagliflozin in combination therapy for treating type 2 diabetes.*

Second intensification of drug treatment

In adults with type 2 diabetes, if dual therapy with metformin and another oral drug (see section in this guideline: First intensification on drug treatment) has not continued to control HbA1c to below the person's individually agreed threshold for intensification, consider either:

1. triple therapy with:
   - metformin, a DPP-4 inhibitor and a sulfonylurea or
   - metformin, pioglitazone* and a sulfonylurea or
2. starting insulin-based treatment (see recommendations in this guideline on Insulin-based treatements).

If triple therapy with metformin and 2 other oral drugs (see section in this guideline: Second intensification of drug treatment (point 1)) is not effective, not tolerated or contraindicated, consider combination therapy with metformin, a sulfonylurea and a glucagon-like peptide-1 (GLP-1) mimetic for adults with type 2 diabetes who:

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

Only continue GLP-1 mimetic therapy if the person with type 2 diabetes has had a beneficial metabolic response (a reduction of at least 11 mmol/mol [1.0%] in HbA1c and a weight loss of at least 3% of initial body weight in 6 months).

In adults with type 2 diabetes, if metformin is contraindicated or not tolerated, and if dual therapy with 2 oral drugs (see section in this guideline: First intensification of drug treatment) has not continued to control HbA1c to below the person's individually agreed threshold for intensification, consider insulin-based treatment (see section in this guideline: Insulin-based treatments).

In adults with type 2 diabetes, only offer a GLP-1 mimetic in combination with insulin with specialist care advice and ongoing support from a consultant-led multidisciplinary team.

Treatment with combinations of medicines including SGLT-2 inhibitors may be appropriate for some people with type 2 diabetes; see the NICE guidelines: *Canagliflozin in combination therapy for treating type 2 diabetes, Dapagliflozin in combination therapy for treating type 2 diabetes* and *Empagliflozin in combination therapy for treating type 2 diabetes.*

Insulin-based treatments

When starting insulin therapy in adults with type 2 diabetes, use a structured programme employing active insulin dose titration that encompasses:

- injection technique, including rotating injection sites and avoiding repeated injections at the same point within sites
- continuing telephone support
- self-monitoring
- dose titration to target levels
- dietary understanding
- DVLA guidance (*At a glance guide to the current medical standards of fitness to drive*)
- management of hypoglycaemia

- management of acute changes in plasma glucose control
- support from an appropriately trained and experienced healthcare professional.

When starting insulin therapy in adults with type 2 diabetes, continue to offer metformin for people without contraindications or intolerance. Review the continued need for other blood glucose lowering therapies*.

Start insulin therapy for adults with type 2 diabetes from a choice of a number of insulin types and regimens:

- Offer NPH insulin injected once or twice daily according to need.
- Consider starting both NPH and short-acting insulin (particularly if the person's HbA1c is 75 mmol/mol [9.0%] or higher), administered either:
  - separately or
  - as a pre-mixed (biphasic) human insulin preparation.
- Consider, as an alternative to NPH insulin, using insulin detemir or insulin glargine* if:
  - the person needs assistance from a carer or healthcare professional to inject insulin, and use of insulin detemir or insulin glargine* would reduce the frequency of injections from twice to once daily or
  - the person's lifestyle is restricted by recurrent symptomatic hypoglycaemic episodes or
  - the person would otherwise need twice-daily NPH insulin injections combination with oral glucose-lowering drugs.
- Consider pre-mixed (biphasic) preparations that include short-acting insulin analogues, rather than pre-mixed (biphasic) preparations that include short-acting human insulin preparations, if:
  - a person prefers injecting insulin immediately before a meal or
  - hypoglycaemia is a problem or blood glucose levels rise markedly after meals.

Consider switching to insulin detemir or insulin glargine* from NPH insulin in adults with type 2 diabetes:

- who do not reach their target HbA1c because of significant hypoglycaemia or
- who experience significant hypoglycaemia on NPH insulin irrespective of the level of HbA1c reached or
- who cannot use the device needed to inject NPH insulin but who could administer their own insulin safely and accurately if a switch to one of the long-acting insulin analogues was made or
- who need help from a carer or healthcare professional to administer insulin injections and for whom switching to one of the long-acting insulin analogues would reduce the number of daily injections.

Monitor adults with type 2 diabetes who are on a basal insulin regimen (NPH insulin, insulin detemir or insulin glargine* for the need for short-acting insulin before meals (or a pre-mixed [biphasic] insulin preparation).

Monitor adults with type 2 diabetes who are on pre-mixed (biphasic) insulin for the need for a further injection of short-acting insulin before meals or for a change to a basal bolus regimen with NPH insulin or insulin detemir or insulin glargine* if blood glucose control remains inadequate.

Treatment with combinations of

medicines including SGLT-2 inhibitors may be appropriate for some people with type 2 diabetes; see the NICE guidelines: *Canagliflozin in combination therapy for treating type 2 diabetes, Dapagliflozin in combination therapy for treating type 2 diabetes* and *Empagliflozin in combination therapy for treating type 2 diabetes.*

Insulin delivery

For guidance on insulin delivery for adults with type 2 diabetes, see the Insulin delivery section in the NICE guideline: *Type 1 diabetes in adults: diagnosis and management.*

MANAGING COMPLICATIONS

Gastroparesis

Think about a diagnosis of gastroparesis in adults with type 2 diabetes with erratic blood glucose control or unexplained gastric bloating or vomiting, taking into account possible alternative diagnoses.

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

- there is not 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.

For treating vomiting caused by gastroparesis in adults with type 2 diabetes:

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

If gastroparesis is suspected, consider referral to specialist services if:

- the differential diagnosis is in doubt or
- persistent or severe vomiting occurs.

Painful diabetic neuropathy

For guidance on managing painful diabetic peripheral neuropathy in adults with type 2 diabetes, see the NICE guideline: *Neuropathic pain in adults: pharmacological management in non-specialist settings.*

Autonomic neuropathy

Think about the possibility of contributory sympathetic nervous system damage for adults with type 2 diabetes who lose the warning signs of hypoglycaemia.

Think about the possibility of autonomic neuropathy affecting the gut in adults with type 2 diabetes.

When using tricyclic drugs and antihypertensive drug treatments in adults with type 2 diabetes who have autonomic neuropathy, be aware of the increased likelihood of side effects such as orthostatic hypotension.

Investigate the possibility of autonomic neuropathy affecting the bladder in adults with type 2 diabetes who have unexplained bladder-emptying problems.

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

Diabetic foot problems

For guidance on preventing and managing foot problems in adults with type 2 diabetes, see the NICE guideline: *Diabetic foot problems: prevention and management*.

Diabetic kidney disease

For guidance on managing kidney disease in adults with type 2 diabetes, see the NICE guideline: *Chronic kidney disease in adults: assessment and management.*

Erectile dysfunction

Offer men with type 2 diabetes the opportunity to discuss erectile dysfunction as part of their annual review.

Assess, educate and support men with type 2 diabetes who have problematic erectile dysfunction, addressing contributory factors such as cardiovascular disease as well as possible treatment options.

Consider a phosphodiesterase-5 inhibitor to treat problematic erectile dysfunction in men with type 2 diabetes, initially choosing the drug with the lowest acquisition cost and taking into account any contraindications.

Following discussion, refer men 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.

Eye disease

Arrange or perform eye screening at or around the time of diagnosis. Arrange repeat of structured eye screening annually.

Explain the reasons for, and success of, eye screening systems to adults with type 2 diabetes, so that attendance is not reduced by lack of knowledge or fear of outcome.

Use mydriasis with tropicamide when photographing the retina, after prior informed agreement following discussion of the advantages and disadvantages. Discussions should include precautions for driving.

Use a quality-assured digital retinal photography programme using appropriately trained staff.

Perform visual acuity testing as a routine part of eye screening programmes.

Depending on the findings, follow structured eye screening by:

- routine review in 1 year or
- earlier review or
- referral to an ophthalmologist.

Arrange emergency review by an ophthalmologist for:

- sudden loss of vision
- rubeosis iridis
- pre-retinal or vitreous haemorrhage
- retinal detachment.

Arrange rapid review by an ophthalmologist for new vessel formation.

Refer to an ophthalmologist in accordance with the National Screening Committee criteria and timelines if any of these features are present:

- referable maculopathy:
  - exudate or retinal thickening within 1 disc diameter of the centre of the fovea
  - circinate or group of exudates within the macula (the macula is defined here as a circle centred on the fovea, with a diameter the distance between the temporal border of the optic disc and the fovea)
  - any microaneurysm or haemorrhage within 1 disc diameter of the centre of the fovea, only if associated with deterioration of best visual acuity to 6/12 or worse.
- referable pre-proliferative retinopathy (if cotton wool spots are present, look carefully for the following features, but cotton wool spots themselves do not define pre-proliferative retinopathy):
  - any venous beading
  - any venous reduplication
  - any intraretinal microvascular abnormalities
  - multiple deep, round or blot haemorrhages.
- any large, sudden unexplained drop in visual acuity.

RESOURCES

For more information on research recommendations, visit www.nice.org.uk/guidance/ng28/chapter/2-Research-recommendations. For the full NICE guideline *Type 2 diabetes in adults: management*, visit www.nice.org.uk/guidance/ng28.

*See full guidance for footnote details.

once daily

Vipidia®▼

alogliptin tablets

The DPP-4 inhibitor with the lowest acquisition cost*

CARDIOVASCULAR SAFETY EVIDENCE

The only DPP-4 inhibitor with cardiovascular safety evidence in very high risk Type 2 diabetes patients (with recent ACS**)[1]

HbA_{1c} DURABLE REDUCTION

The only DPP-4 inhibitor to demonstrate a durable reduction in HbA_{1c} levels at 2 years that was statistically superior to a sulphonylurea (glipizide – mean dose 5.2 mg) when added to metformin[2]

The DPP-4 inhibitor with the lowest acquisition cost[3,4]

The NICE guideline on the management of type 2 diabetes in adults (NG28) suggests that prescribers should choose the individual DPP-4 inhibitor with the lowest acquisition cost available to them, if two drugs in the same class are appropriate[5]

* Based on NHS list price as of December 2015 ** ACS - Acute Coronary Syndrome

Lowering costs as well as HbA_{1c} in Type 2 diabetes

Vipidia® ▼ (alogliptin) PRESCRIBING INFORMATION. Refer to summary of Product Characteristics (SmPC) before prescribing. Presentation: Alogliptin 6.25 mg, 12.5 mg and 25 mg film-coated tablets. **Indication:** Adults aged 18 years and older with Type 2 diabetes mellitus to improve glycaemic control in combination with other glucose lowering medicinal products including insulin, when these, together with diet and exercise, do not provide adequate glycaemic control. **Dosage & Administration:** In adults the usual recommended dose of Vipidia is one tablet of 25 mg once daily (o.d.) with or without food.Elderly: No dose adjustment is necessary. Renal impairment: Mild renal impairment, no dose adjustment is necessary. Moderate renal impairment 12.5 mg o.d. Severe renal impairment or end-stage renal disease requiring dialysis 6.25 mg o.d. Experience in patients on dialysis is limited. Vipidia has not been studied in patients undergoing peritoneal dialysis. Hepatic impairment: No dose adjustment is necessary for patients with mild to moderate hepatic impairment. Has not been studied in patients with severe hepatic impairment, therefore not recommended for use in these patients. Paediatric population: No data are available. **Contraindications:** Hypersensitivity to the active substance or to its excipients or history of a serious hypersensitivity reaction to any dipeptidyl-peptidase-4 (DPP-4) inhibitor. **Warnings & Precautions:** General: Do not use in patients with Type 1 diabetes mellitus or for treatment of diabetic ketoacidosis. Use with other antihyperglycaemic medicinal products and hypoglycaemia: When used in combination with a sulphonylurea, insulin or combination therapy with thiazolidinedione plus metformin, a lower dose of these medications may be considered to reduce the risk of hypoglycaemia. Combinations not studied: Has not been studied in combination with sodium glucose cotransporter 2 (SGLT-2) inhibitors or glucagon like peptide 1 (GLP-1) analogues nor formally as triple therapy with metformin and sulphonylurea. Renal impairment: Renal function assessment is recommended prior to initiation of Vipidia therapy and periodically thereafter. Cardiac failure: Not recommended in patients with congestive heart failure of New York Heart Association (NYHA) functional class III – IV. Hypersensitivity reactions: Anaphylactic reactions, angioedema and exfoliative skin conditions including Stevens-Johnson syndrome and erythema multiforme have been observed for DPP-4 inhibitors and have been spontaneously reported for alogliptin in the post-marketing setting. Acute pancreatitis: Use of DPP-4 inhibitors has been associated with a risk of developing acute pancreatitis. Spontaneous reports of adverse reactions of acute pancreatitis in the post-marketing setting. Patients should be informed of the characteristic symptoms of acute pancreatitis. If pancreatitis is suspected, Vipidia should be discontinued; if acute pancreatitis is confirmed, Vipidia should not be restarted. Caution should be exercised in patients with a history of pancreatitis. Hepatic effects: Postmarketing reports of hepatic dysfunction, including failure, have been received. Patients should be observed for possible liver abnormalities and liver function should be obtained promptly in patients with any symptoms. Discontinue Vipidia treatment if an abnormality is found and an alternative aetiology is not established. **Interactions:** Primarily excreted unchanged in the urine and metabolism by the cytochrome (CYP) P450 system is negligible. Studies show no clinically relevant pharmacokinetic interactions. **Fertility, Pregnancy & Lactation:** No data from use in pregnant women. Avoid use during pregnancy. Unknown whether Vipidia is excreted in human milk, a risk to the suckling child cannot be excluded. Consider the risk-benefit balance of use in breast-feeding mothers. The effect of Vipidia on fertility in humans has not been studied. **Undesirable Effects:** Common (≥1/100 to <1/10): Upper respiratory tract infections; nasopharyngitis; headache; abdominal pain; gastro-oesophageal reflux disease; pruritis; rash. Other serious undesirable effects (frequency unknown): Acute pancreatitis; hepatic dysfunction including hepatic failure; angioedema; hypersensitivity; exfoliative skin conditions. **Refer to the SmPC for details on full side effect profile and interactions. Basic NHS Price:** £26.60 for 28 tablets. **Legal Classification:** POM. **Marketing Authorisation:** EU/1/13/844/009 6.25 mg; EU/1/13/844/018 12.5 mg; EU/1/13/844/027 25 mg. Takeda UK Ltd. is responsible for the sale and supply of Vipidia in the UK. Further information is available from Takeda UK Ltd, Building 3, Glory Park, Glory Park Avenue, Wooburn Green, Bucks, HP10 0DF. Tel 01628 537900. Fax 01628 526617. **PI Approval Code**: UK/VIP/1411/0121(1). **Date of revision:** February 2015.

Adverse events should be reported. Reporting forms and information can be found at https://yellowcard.mhra.gov.uk/. Adverse events should also be reported to Takeda UK Ltd. Tel 01628 537900.

References: 1. White WB, et al. *N Engl J Med* 2013; 369: 1327-1335. **2.** Del Prato S, et al. *Diabetes Obes Metab* 2014; 16 (12): 1239-1246. **3.** Midlands Therapeutic Review and Advisory Committee – Commissioning Support for DPP-4 inhibitors. 2014. Available from http://centreformedicinesoptimisationco.uk/files/MTRAC guidance on the gliptins final public version Dec 2014.pdf; last accessed January 2016. **4.** MIMS. Available from www.mims.co.uk; last accessed January 2016. **5.** National Institute for Health and Care Excellence, 2015. Type 2 diabetes in adults: management, NG28. Available from https://www.nice.org.uk/guidance/ng28; last accessed January 2016.

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