NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

SCOPE

1 Guideline title

Diabetes in pregnancy: management of diabetes and its complications from preconception to the postnatal period

1.1 Short title

Diabetes in pregnancy

2 The remit

This is an update of Diabetes in pregnancy (NICE clinical guideline 63). See section 4.3.1 for details of which sections will be updated. We will also carry out an editorial review of all recommendations to ensure that they comply with NICE's duties under equalities legislation.

This update is being undertaken as part of the guideline review cycle.

This is the scope for 1 of 4 NICE clinical guidelines being developed that address diabetes care. Included below is a summary of the content for each guideline and of the NICE steering committee.

Guideline 1 – Diabetes in children and young people (developed by the National Collaborating Centre for Women's and Children's Health)

This guideline will update Type 1 diabetes in children, young people and adults (NICE clinical guideline 15) It will cover the diagnosis and management of type 1 and type 2 diabetes in children and young people (younger than 18 years). It will include: structured education programmes, behavioural interventions to improve adherence, glucose monitoring strategies, ketone monitoring, insulin regimens for type 1 diabetes and metformin monotherapy for type 2 diabetes.

Guideline 2 – Diabetes in pregnancy (developed by the National Collaborating Centre for Women's and Children's Health)

This guideline will update Diabetes in pregnancy (NICE clinical guideline 63). It will cover women of reproductive age who have pre-existing diabetes or who develop diabetes during pregnancy and it will also cover their newborn babies. It will include: target glucose ranges in the preconception period and during pregnancy, glucose monitoring strategies during pregnancy, screening, diagnosis and treatment of gestational diabetes, and postnatal testing for type 2 diabetes.

Guideline 3 – Type 1 diabetes in adults (developed by the National Clinical Guideline Centre)

This guideline will update Type 1 diabetes in children, young people and adults (NICE clinical guideline 15). It will cover adults (18 years or older) with type 1 diabetes. It will include: tests to differentiate type 1 diabetes from type 2 diabetes, structured education programmes, clinical monitoring of glucose control, insulin regimens, ketone monitoring, dietary advice on carbohydrate counting and glycaemic index, and treatment and monitoring of specific complications.

Guideline 4 –Type 2 diabetes in adults (developed by the Internal Clinical Guidelines Programme, Centre for Clinical Practice, NICE)

This guideline will update Type 2 diabetes (NICE clinical guideline 66) and Type 2 diabetes: newer agents (NICE clinical guideline 87). It will cover adults (18 years or older) with type 2 diabetes. It will include: pharmacological management of blood glucose levels, target values for blood glucose control, self-monitoring of blood glucose levels for blood glucose control, antithrombotic therapy and drug therapy for erectile dysfunction.

NICE steering committee

NICE has set up a steering committee to oversee the production of these clinical guidelines. The group, which includes the Guideline Development

Groups' chairs, together with staff from the 3 guidance-producing centres and NICE, will identify and act on any gaps or overlaps across the different guidance topics to ensure that the final guidelines are complementary and consistent. It is intended that the guidance-producing centres will share systematic reviews and cross-refer to recommendations in the other guidelines where appropriate. This update is being undertaken as part of the guideline review cycle.

3 Clinical need for the guideline

3.1 Epidemiology

a) Diabetes is a disorder of carbohydrate metabolism that requires immediate changes in lifestyle. People who have diabetes for many years can develop long-term microvascular complications, including retinopathy, nephropathy and neuropathy as well as macrovascular complications of cardiovascular disease.

b) Diabetes that complicates pregnancy is becoming more common worldwide. Up to 5% of the approximately 700,000 women who give birth in England and Wales each year have pre-existing or gestational diabetes.

c) Less than 1% of pregnant women have pre-existing diabetes. Within this 1%, around 75% have type 1 diabetes, 25% have type 2 diabetes and a small number have secondary diabetes (for example, cystic fibrosis-related or monogenic diabetes). The proportion of women with type 1 or type 2 diabetes varies depending on the ethnic origins of the population. The duration of diabetes before conception also varies but is increasing because the average age of onset of type 1 diabetes is declining and more women are developing type 2 diabetes at an earlier age. This is important because duration of diabetes is one of the strongest factors associated with microvascular complications and it is, therefore, more likely that women with diabetes will enter

pregnancy with established retinopathy, nephropathy and neuropathy.

d) In the UK, at least 4% of women have gestational diabetes but this figure will vary greatly depending on the local population. The incidence of gestational diabetes is increasing due to higher rates of obesity in the general population and more pregnancies in older women. Most of the risks of gestational diabetes occur in the second half of pregnancy because the majority of women affected are normoglycaemic at the time of conception.

e) Gestational diabetes is defined as any degree of glucose intolerance that is detected for the first time during pregnancy. This includes women whose glucose intolerance resolves after pregnancy and up to 20% whose glucose intolerance persists, including women who had undiagnosed pre-existing type 2 diabetes (or in small numbers, type 1 diabetes) before pregnancy. Women with gestational diabetes are at increased risk of developing type 2 diabetes in the future.

f) Maternal risks of pre-existing diabetes include recurrent hypoglycaemia, progression of retinopathy, nephropathy, increased incidence of pre-eclampsia (especially in women with microvascular disease) and operative delivery.

g) Fetal risks of pre-existing maternal diabetes include structural congenital abnormality, pathological fetal growth (macrosomia) and ‘unexplained’ fetal death. Neonatal complications include premature delivery, respiratory distress syndrome, transient tachypnoea, birth trauma, hypoglycaemia, hypomagnesaemia, hypocalcaemia, polycythaemia and neonatal death.

3.2 Current practice

a) The additional care of women with diabetes in pregnancy, as set out in Diabetes in pregnancy (NICE clinical guideline 63), can be considered according to the stage of the pregnancy.

b) Preconception care aims to enable women with established diabetes to have a positive experience of pregnancy and childbirth and to minimise the risk of structural abnormalities in the baby. It includes information-giving and education, and emphasises the importance of planning pregnancy; offering assessment for, and management of, diabetes complications; improving blood glucose control; high-dose folic acid supplementation and changing potentially teratogenic medications are also important components of this stage of care.

c) Identification of gestational diabetes is a routine element of antenatal care for all women, as set out in Antenatal care (NICE clinical guideline 62). A risk factor based screening approach is recommended to identify women with gestational diabetes in a healthy population.

d) Antenatal care of women with diabetes follows a multidisciplinary approach characterised by an increased schedule of appointments. Care includes:

- regular blood glucose testing (fasting or preprandial, and 1-hour postprandial)
- treating diabetes with diet, insulin and/or oral hypoglycaemic drugs to maintain blood glucose profiles in the normal range
- use of concentrated glucose solutions or glucagon to treat hypoglycaemic episodes
- vigilance for diabetic ketoacidosis
- regular ophthalmic review and, if necessary, specialist referral
- review of renal function and, if necessary, specialist referral
- vigilance for pre-eclampsia.

e) Antenatal care for the baby includes offering screening for fetal abnormality and monitoring fetal growth and wellbeing. In special cases, monitoring may need to be individualised.

f) Care during labour includes offering elective birth after 38 completed weeks of pregnancy, maintaining blood glucose levels in the normal range and continuous electronic fetal heart rate monitoring.

g) Postnatal care for women with diabetes includes:

- resuming pre-pregnancy diabetes treatment in women with pre-existing diabetes
- stopping all diabetic treatment initiated during pregnancy in women with gestational diabetes and monitoring their blood glucose levels to confirm euglycaemia
- monitoring women with gestational diabetes who have persistently high blood glucose levels after birth to detect type 2 diabetes
- offering advice about the importance of contraception.

h) Additional postnatal and neonatal care for women and their babies includes encouraging breastfeeding and vigilance to prevent neonatal hypoglycaemia.

i) Since the publication of Diabetes in pregnancy (NICE clinical guideline 63), new evidence has been published on levels of hyperglycaemia in pregnancy. The blood glucose level at which intervention becomes cost effective and the importance that should be given to different outcomes remain issues for debate.

j) Consideration is also being given to early screening in pregnancy to identify and treat women with gestational diabetes who may have undiagnosed pre-existing diabetes and be unaware of the risks associated with diabetes in pregnancy.

k) New evidence has also been identified that may alter recommendations on:

- target ranges for preconception care
- continuous glucose monitoring
- the appropriate test to undertake at the postnatal check-up to diagnose type 2 diabetes in women who had gestational diabetes in pregnancy but who are euglycaemic on discharge to community care.

4 The guideline

The guideline development process is described in detail on the NICE website (see section 6, 'Further information').

This scope defines what the guideline will (and will not) examine, and what the guideline developers will consider. The scope is based on the referral from the Department of Health.

The areas that will be addressed by the guideline are described in the following sections.

4.1 Population

4.1.1 Groups that will be covered

For the topic of screening for gestational diabetes:

a) All pregnant women who do not have previously diagnosed non-gestational diabetes (new 2012).

For all other topics:

b) Women of reproductive age who have pre-existing diabetes or who develop diabetes during pregnancy, and their newborn babies.

c) Where the evidence supports it, the following subgroups will be given special consideration:

- Women of reproductive age with type 1 or type 2 diabetes.
- Women with gestational diabetes or a history of gestational diabetes.
- Young women of reproductive age with diabetes whose care has not yet transferred from paediatric to adult services
- Women with an ethnicity associated with a high prevalence of diabetes.

4.1.2 Groups that will not be covered

For the topic of screening for gestational diabetes:

a) Women of reproductive age who are not pregnant (new 2012).

b) Women who have previously diagnosed type 1 or type 2 diabetes (new 2012).

For all other topics:

c) Women of reproductive age who do not have diabetes.

4.2 Healthcare setting

a) All healthcare settings in which NHS care is received or commissioned.

4.3 Clinical management

4.3.1 Key clinical issues that will be covered

Note that guideline recommendations will normally fall within licensed indications; exceptionally, and only if clearly supported by evidence, use outside a licensed indication may be recommended. The guideline will assume that prescribers will use a drug's summary of product characteristics to inform decisions made with individual patients.

Areas from the original guideline that will be updated

a) Target ranges for haemoglobin A_{1c} (HbA_{1c}) and blood glucose for women with type 1 or type 2 diabetes who are planning pregnancy

and for women with type 1, type 2 or gestational diabetes during pregnancy.

b) The effectiveness of blood ketone monitoring when compared with urine ketone monitoring in women with type 1 or type 2 diabetes who are planning pregnancy and in women with type 1, type 2 or gestational diabetes during pregnancy.

c) The effectiveness of the following screening procedures to detect gestational diabetes between 24–28 weeks:

- risk factor based screening
- urine testing for glycosuria
- random blood glucose test
- 50 g oral glucose challenge test
- fasting blood glucose test
- HbA_{1c} test.

d) The criteria that should be used to diagnose gestational diabetes using the 75 g oral glucose tolerance test (OGTT). There are two options:

- World Health Organization (WHO)
- International Association of Diabetes and Pregnancy Study Groups (IADPSG).

e) The effectiveness of the following interventions (alone or in combination) in women with gestational diabetes:

- non-pharmacological interventions (diet and/or exercise)
- pharmacological interventions (metformin, glibenclamide and insulin).

f) The effectiveness of continuous glucose monitoring in pregnant women with diabetes when compared with intermittent capillary blood glucose monitoring.

g) The effectiveness of specialist teams for pregnant women with diabetes.

h) The gestational age specific risk of intrauterine death in pregnancies with type 1, type 2 or gestational diabetes and the optimal timing of birth.

i) The effectiveness of the following tests in detecting glucose intolerance after pregnancy in women who have had gestational diabetes (but are not hyperglycaemic before they are transferred to community care):

- fasting plasma glucose test
- HbA_{1c} test
- 75 g OGTT.

j) The optimal timing of postnatal testing for the detection of glucose intolerance after pregnancy in women who have had gestational diabetes (but are not hyperglycaemic before they are transferred to community care).

Areas not in the original guideline that will be included in the update

k) The effectiveness of oral hormonal contraceptives in women with diabetes compared with women without diabetes.

l) The effectiveness of the following screening procedures to detect glucose intolerance in the first trimester:

- risk factor based screening
- urine test for glycosuria
- random blood glucose test
- 50 g oral glucose challenge test
- fasting blood glucose test
- HbA_{1c} test.

4.3.2 Clinical issues that will not be covered

Areas from the original guideline that will not be updated

The following areas addressed in Diabetes in pregnancy (NICE clinical guideline 63) will not be updated (the existing recommendations will remain as current guidance):

a) All aspects of preconception care, gestational diabetes, antenatal care, intrapartum care, postnatal care that are not listed in section 4.3.1.

b) Neonatal care.

Areas not covered by the original guideline or the update

c) Aspects of routine antenatal, intrapartum and postnatal care that apply equally to women with or without diabetes.

d) Aspects of routine care for women with diabetes that do not change during the preconception, antenatal, intrapartum and postnatal periods.

e) Investigation, management and treatment of comorbidities, for example fertility problems or pre-eclampsia.

f) Management of morbidity in newborn babies of women with diabetes beyond initial assessment and diagnosis.

4.4 Main outcomes

Outcomes will vary by the type of clinical question and systematic review undertaken. No more than seven outcomes will normally be prioritised for each topic.

a) Diagnostic accuracy:

- sensitivity and specificity.

b) Quality of life:

- health-related quality of life (validated questionnaire) – for example, diabetes-specific health-related quality of life.

c) Neonatal outcomes:

- admission to a neonatal intensive care unit, special care baby unit, or transitional care unit
- miscarriage, stillbirth (fetal death), neonatal or infant death
- macrosomia, large for gestational age, small for gestational age and intrauterine growth restriction
- neonatal hypoglycaemia requiring active management
- respiratory distress
- shoulder dystocia and birth trauma (bone fracture or nerve palsy)
- other neonatal complications (jaundice, polycythaemia, sepsis, hypocalcaemia or hypoxic ischaemic encephalopathy)
- congenital abnormality.

d) Maternal outcomes:

- maternal death
- perineal trauma
- preterm birth
- mode of birth (spontaneous vaginal, instrumental, or caesarean section)
- mode of infant feeding
- diabetic complications (hypoglycaemia, diabetic ketoacidosis, retinopathy, nephropathy, or macrovascular disease)
- antenatal and intrapartum complications in the unborn baby
- development of type 2 diabetes
- obstetric complications (haemorrhage, infection, thrombosis, admission to critical care, or incontinence)
- diabetes control (HbA_{1c}, fructosamine or mean glucose)
- postnatal mental health

- maternal satisfaction.

4.5 Review questions

These are draft review questions and the final questions will be agreed by the Guideline Development Group during development.

4.5.1 Preconception care

- What is the effectiveness of oral oestrogen-containing contraceptives in women with diabetes compared with women without diabetes?
- What is the effectiveness of oral progestogen-containing contraceptives in women with diabetes compared with women without diabetes?
- What is the target value for HbA_{1c} in women with type 1 or type 2 diabetes who are planning pregnancy?
- What are the target ranges for blood glucose in women with type 1 or type 2 diabetes who are planning pregnancy?
- What is the effectiveness of blood ketone monitoring compared with urine ketone monitoring for women with type 1 or type 2 diabetes who are planning pregnancy?

4.5.2 Gestational diabetes

- What is the effectiveness of the following procedures in detecting glucose intolerance in the first trimester:
  - risk factor based screening
  - urine test for glycosuria
  - random blood glucose test
  - 50 g oral glucose challenge test
  - fasting blood glucose test
  - HbA_{1c} test?

- What is the effectiveness of the following procedures in detecting glucose intolerance in the second trimester:
  - risk factor based screening
  - urine test for glycosuria
  - random blood glucose test

  - 50 g oral glucose challenge test
  - fasting blood glucose test
  - HbA_{1c} test?

- Which criteria should be used to diagnose gestational diabetes using the 75 g OGTT:
  - WHO or
  - IADPSG?

- What is the effectiveness of the following interventions (alone or in combination) in women with gestational diabetes:
  - non-pharmacological interventions (diet and/or exercise)
  - pharmacological interventions (metformin, glibenclamide and insulin)?

4.5.3 Antenatal care

- What is the effectiveness of HbA_{1c} monitoring in predicting adverse outcomes in women with type 1 or type 2 diabetes during pregnancy?
- What is the effectiveness of blood glucose monitoring in predicting adverse outcomes in women with type 1 or type 2 diabetes during pregnancy?
- What is the target value for HbA_{1c} in women with type 1, type 2 or gestational diabetes during pregnancy?
- What are the target ranges for blood glucose in women with type 1, type 2 or gestational diabetes during pregnancy?
- What is the effectiveness of blood ketone monitoring compared with urine ketone monitoring for women with type 1, type 2 or gestational diabetes during pregnancy?
- What is the effectiveness of continuous glucose monitoring in pregnant women with diabetes compared with intermittent capillary blood glucose monitoring?
- What is the effectiveness of specialist teams for pregnant women with diabetes?

4.5.4 Intrapartum care

- What is the gestational age-specific risk of intrauterine death in pregnancies with type 1, type 2 or gestational diabetes, and the optimal timing of birth?

4.5.5 Postnatal care

- What is the effectiveness of the following tests in detecting glucose intolerance after pregnancy in women who have had gestational diabetes (but are not hyperglycaemic before they are transferred to community care):
  - fasting plasma glucose test
  - HbA_{1c} test
  - 75 g OGTT?

- What is the optimal timing of postnatal testing in detecting glucose intolerance after pregnancy in women who have had gestational diabetes (but are not hyperglycaemic before they are transferred to community care)?

4.6 Economic aspects

Developers will take into account both clinical and cost effectiveness when making recommendations involving a choice between alternative interventions. A review of the economic evidence will be conducted and analyses will be carried out as appropriate. The preferred unit of effectiveness is the quality-adjusted life year (QALY), and the costs considered will usually be only from an NHS and personal social services (PSS) perspective. Further detail on the methods can be found in 'The guidelines manual' (see ‘Further information’).

4.7 Status

4.7.1 Scope

This is the final scope.

4.7.2 Timing

The development of the guideline recommendations is expected to begin in October 2012.

5 Related NICE guidance

5.1 Published guidance

5.1.1 NICE guidance to be updated

Depending on the evidence, this guideline might update and replace parts of the following NICE guidance (in relation to gestational diabetes only):

- Antenatal care. NICE clinical guideline 62 (2008).

5.1.2 Related NICE guidance

- Preventing type 2 diabetes – risk identification and interventions for individuals at high risk. NICE public health guidance 38 (2012).
- Patient experience in adult NHS services. NICE clinical guideline 138 (2012).
- Caesarean section. NICE clinical guideline 132 (2011).
- Multiple pregnancy. NICE clinical guideline 129 (2011).
- Diabetic foot problems. NICE clinical guideline 119 (2011).
- Preventing type 2 diabetes: population and community-level interventions in high-risk groups and the general population. NICE public health guidance 35 (2011).
- Hypertension in pregnancy. NICE clinical guideline 107 (2010).
- Dietary interventions and physical activity interventions for weight management before, during and after pregnancy. NICE public health guidance 27 (2010).
- Type 2 diabetes: newer agents. NICE clinical guideline 87 (2009).
- Induction of labour. NICE clinical guideline 70 (2008).
- Continuous subcutaneous insulin infusion for the treatment of diabetes mellitus. NICE technology appraisal guidance 151 (2008).
- Intrapartum care. NICE clinical guideline 55 (2007).

- Antenatal and postnatal mental health. NICE clinical guideline 45 (2007).
- Routine postnatal care of women and their babies. NICE clinical guideline 37 (2006).
- Smoking cessation services. NICE public health guidance 10 (2008).
- Obesity. NICE clinical guideline 43 (2006).
- Nutrition support in adults. NICE clinical guideline 32 (2006).
- Four commonly used methods to increase physical activity. NICE public health guidance 2 (2006).
- Type 1 diabetes. NICE clinical guideline 15 (2004).
- Type 2 diabetes: prevention and management of foot problems. NICE clinical guideline 10 (2004).

5.2 Guidance under development

NICE is currently developing the following related guidance (details available from the NICE website):

- Type 1 diabetes (update). NICE clinical guideline. Publication expected 2014.
- Type 2 diabetes (update). NICE clinical guideline. Publication expected 2014.
- Diabetes in children and young people (update). NICE clinical guideline. Publication expected 2014.

6 Further information

Information on the guideline development process is provided in the following documents, available from the NICE website:

- 'How NICE clinical guidelines are developed: an overview for stakeholders the public and the NHS'
- 'The guidelines manual'.

Information on the progress of the guideline will also be available from the NICE website.