

Antenatal care
Diabetes in pregnancy

Costing report

Implementing NICE guidance

Section 2.2.10 of this report was amended in November 2014 to reflect new guidance in [Vitamin D: increasing supplement use among at-risk groups](#) (NICE guideline PH56).

March 2008

NICE guidelines CG62 and CG63



This costing report accompanies the guidelines: 'Antenatal care: routine care for the healthy pregnant woman' (available at www.nice.org.uk/guidance/CG62) and 'Diabetes in pregnancy: management of diabetes and its complications from pre-conception to the postnatal period' (available at www.nice.org.uk/guidance/CG63).

Issue date: March 2008

This guidance is written in the following context

This report represents the view of the Institute, which was arrived at after careful consideration of the available data and through consulting healthcare professionals. It should be read in conjunction with the NICE guidelines. The report and templates are implementation tools and focus on those areas that were considered to have significant impact on resource utilisation.

The cost and activity assessments in the reports are estimates based on a number of assumptions. They provide an indication of the likely impact of the principal recommendations and are not absolute figures. Assumptions used in the report are based on assessment of the national average. Local practice may be different from this, and the template can be amended to reflect local practice to estimate local impact.

Section 2.2.10 of this costing report was amended in November 2014 to reflect new guidance in [Vitamin D: increasing supplement use among at-risk groups](#) (NICE guideline PH56).

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Executive summary

This costing report looks at the resource impact of implementing the NICE guidelines 'Antenatal care: routine care for the healthy pregnant woman' (which partially updates and replaces NICE clinical guideline 6, published in 2003) and 'Diabetes in pregnancy: management of diabetes and its complications from pre-conception to the postnatal period' in England.

The costing tools for these guidelines have been combined to reflect the integrated nature of the recommendations. In particular, screening for gestational diabetes in a healthy population using risk factors is included in both the Antenatal care guideline and the Diabetes in pregnancy guideline. Diagnostic testing for gestational diabetes in women identified through screening as having one or more risk factors, and treatment of gestational diabetes, are contained in the Diabetes in pregnancy guideline.

NICE public health guidance 11, 'Improving the nutrition of pregnant and breastfeeding mothers and children in low-income households', is also published in March 2008. This guidance is not considered to have significant resource impact in England, and the accompanying costing statement is included in appendix B for information.

The costing method adopted is outlined in appendix A; it uses the most accurate data available, was produced in conjunction with key clinicians, and reviewed by clinical and financial professionals.

Supporting implementation

The NICE Antenatal care and Diabetes in pregnancy clinical guidelines are supported by a range of implementation tools available on our website (www.nice.org.uk/guidance/CG62 for Antenatal care and www.nice.org.uk/guidance/CG63 for Diabetes in pregnancy) and detailed in the main body of this report.

Significant resource-impact recommendations

Because of the breadth and complexity of the guidelines, this report focuses on recommendations that are considered to have the greatest resource impact and therefore require the most additional resources to implement or can potentially generate savings. They are:

- screening for fetal anomalies using fetal echocardiography involving four-chamber and outflow tracts views [Antenatal care and Diabetes in pregnancy guidelines]
- screening for Down's syndrome using the 'combined test' between 11 weeks 0 days and 13 weeks 6 days, and using the most clinically and cost-effective serum screening test between 15 and 20 weeks (triple or quadruple test) [Antenatal care guideline]
- screening for gestational diabetes using risk factors in a healthy population [Antenatal care guideline], testing women with one or more risk factors and treating additional cases of gestational diabetes diagnosed [Diabetes in pregnancy guideline]
- the avoidance of unnecessary admissions to neonatal care for babies of women with diabetes [Diabetes in pregnancy guideline].

Total cost impact

The annual changes in revenue costs arising from fully implementing the guidelines are summarised in the table below.

Recurrent costs for England	Year 1	Year 2	Year 3
	£000s	£000s	£000s
Screening for fetal anomalies	6,908	6,908	6,908
Screening for Down's syndrome	3,528	3,528	3,528
Screening and testing for gestational diabetes	1,596	1,596	1,596
Treatment for gestational diabetes	840	897	953
Avoidance of neonatal care	-1,224	-1,224	-1,224
Total movement in resources	11,648	11,705	11,762

It is not expected that there will be a significant delay in implementing these guidelines; however, this will depend on individual circumstances and training needs and so should be assessed locally.

The 'Diabetes in pregnancy' guideline includes a recommendation for annual fasting plasma glucose tests following a diagnosis of gestational diabetes. This recommendation is unlikely to be implemented retrospectively and it will take time before annual fasting plasma glucose tests are being offered to all women who have had gestational diabetes. The costs for the first 3 years have been included above.

Depending on where routine antenatal care is provided, the costs associated with implementing the Antenatal care guideline may fall within the scope of 'Payment by results'. If routine antenatal care is provided outside of a hospital setting, its costs will not fall within the scope of 'Payment by results'. The majority of the costs associated with the Diabetes in pregnancy guideline are likely to be within secondary care and hence within the scope of 'Payment by results'. However, the annual fasting plasma glucose test for women who have been diagnosed with gestational diabetes may take place in other settings such as primary care.

Routine antenatal care falls within programme budgeting category 18X, maternity and reproductive health. Expenditure on diabetes in pregnancy may fall into category 4A, endocrine, nutritional and metabolic problems – diabetes or category 18X, maternity and reproductive health. Expenditure on routine antenatal care or diabetes in pregnancy in primary care falls into category 23, other.

Benefits and savings

Implementing these new and updated clinical guidelines will bring the following benefits:

- better identification of women for whom additional care is necessary
- increased detection of fetal anomalies
- increased detection of Down's syndrome, and a reduction in cases of Down's syndrome incorrectly identified leading to further tests and distress

- increased detection and treatment of gestational diabetes, leading to improved care for the mother and a reduction in complications during pregnancy and labour
- a possible reduction in caesarean section rates
- a reduction in unnecessary admissions to neonatal care for babies of women with diabetes, with a possible increase in rates of breastfeeding and the associated benefits for these mothers and babies
- compliance with NICE guidance is one of the criteria indicating good risk reduction strategies, and in combination with meeting other criteria could lead to a discount on contributions to the NHS Litigation Authority schemes, including CNST.

Local costing template

The costing template produced to support these guidelines enables organisations in England, Wales and Northern Ireland to estimate the impact locally and replace variables with ones that depict the current local position. A sample calculation using this template showed that additional costs of £21,000 could be incurred for a population of 100,000 in the first year.

1 Introduction

1.1 Supporting implementation

1.1.1 The NICE Antenatal care and Diabetes in pregnancy clinical guidelines are supported by the following implementation tools available on our website (www.nice.org.uk/guidance/CG62 for Antenatal care and www.nice.org.uk/guidance/CG63 for Diabetes in pregnancy).

- costing tools
 - a national costing report; this document
 - a local costing template; a simple spreadsheet that can be used to estimate the local cost of implementation.
- slide sets; key messages for local discussion
- implementation advice; practical suggestions on how to address potential barriers to implementation

- audit support.

- 1.1.2 The costing tools for these guidelines have been combined to reflect the integrated nature of the recommendations. In particular, screening for gestational diabetes in a healthy population using risk factors is included in both the Antenatal care guideline and the Diabetes in pregnancy guideline. Diagnostic testing for gestational diabetes in women identified through screening as having one or more risk factors, and treatment of gestational diabetes, are contained in the Diabetes in pregnancy guideline.
- 1.1.3 The NICE public health guidance 'Improving the nutrition of pregnant and breastfeeding mothers and children in low-income households' is also published in March 2008. This guidance is not considered to have significant resource impact in England, and the accompanying costing statement is included for information in appendix B.
- 1.1.4 A practical guide to implementation, 'How to put NICE guidance into practice: a guide to implementation for organisations', is also available to download from the NICE website. It includes advice on establishing organisational level implementation processes as well as detailed steps for people working to implement different types of guidance on the ground.

1.2 *What is the aim of this report?*

- 1.2.1 This report provides estimates of the national cost impact arising from implementation of the Antenatal care guideline and the Diabetes in pregnancy guideline in England. These estimates are based on assumptions made about current practice and predictions of how current practice might change following implementation.
- 1.2.2 This report aims to help organisations plan for the financial implications of implementing NICE guidance.
- 1.2.3 This report does not reproduce the NICE Antenatal care guideline or the NICE Diabetes in pregnancy guideline and should be read in

conjunction with them (see www.nice.org.uk/guidance/CG62 for Antenatal care and www.nice.org.uk/guidance/CG63 for Diabetes in pregnancy).

- 1.2.4 The costing template that accompanies this report is designed to help those assessing the resource impact at a local level in England, Wales or Northern Ireland. NICE clinical guidelines are developmental standards in the Department of Health's document [Standards for better health](#). The costing template may help inform local action plans demonstrating how implementation of the guidelines will be achieved.

1.3 *Epidemiology of pregnancy and diabetes in pregnancy*

- 1.3.1 Approximately 650,000 women give birth in England and Wales each year. The majority of these (around 99%) are singleton pregnancies (Office for National Statistics 2005). Approximately 2-5% of pregnancies involve women with diabetes, which is the most common complicating factor for pregnant women.
- 1.3.2 Diabetes is a disorder of carbohydrate metabolism that requires immediate changes in lifestyle. In its chronic forms, diabetes is associated with long-term vascular complications, including retinopathy, nephropathy, neuropathy and vascular disease. It is estimated that gestational diabetes (which may or may not resolve after pregnancy) accounts for approximately 87.5% of diabetes in pregnancy. Of the remainder, it is estimated that 7.5% is type 1 diabetes and 5% is type 2 diabetes. The prevalence of diabetes is increasing. In particular, type 2 diabetes is increasing in certain minority ethnic groups (including people of African, African-Caribbean, South Asian, Middle Eastern and Chinese family origin).
- 1.3.3 Diabetes in pregnancy is associated with risks to the woman and the developing fetus. Miscarriage, pre-eclampsia and preterm labour are more common in women with diabetes. In addition, diabetic retinopathy can worsen rapidly during pregnancy. Stillbirth, congenital malformations, macrosomia, birth injury, perinatal mortality and

postnatal adaptation problems (such as hypoglycaemia) are more common in babies born to women with diabetes.

1.4 *Models of care*

- 1.4.1 The Antenatal care guideline contains recommendations for the management of singleton pregnancies without medical or obstetric complications. This care can be delivered in primary, secondary or community settings.
- 1.4.2 The Diabetes in pregnancy guideline contains recommendations for the management of diabetes and its complications in women who wish to conceive and those who are already pregnant. The guideline builds on existing clinical guidelines for routine care during the antenatal, intrapartum and postnatal periods. It focuses on areas where additional or different care should be offered to women with diabetes and their newborn babies. The care provided for pregnant women with diabetes is likely to be carried out by the same maternity service as general antenatal care, with specialist diabetes input.

2 Costing methodology

2.1 *Process*

- 2.1.1 We use a structured approach for costing clinical guidelines (see appendix A).
- 2.1.2 There are several good sources of information on routine antenatal care, and national surveys have been undertaken of both women's experiences and services offered. There have also been two 'Confidential enquiry into maternal and child health' (CEMACH) reports on the treatment of diabetes in pregnancy. However, there are areas in which little information has been systematically collected, most noticeably screening for gestational diabetes, and this led to problems in building a comprehensive bottom-up model for costing (a costing methodology where the unit cost of individual elements and number of units are estimated and added together to provide a total cost). To

overcome this limitation, we had to make assumptions in the costing model. We developed these assumptions and tested them for reasonableness with members of the Guideline Development Groups (GDGs) and key clinical practitioners in the NHS.

2.2 *Scope of the cost-impact analysis*

- 2.2.1 The Antenatal care guideline offers best practice advice on antenatal care for women who have an uncomplicated singleton pregnancy.
- 2.2.2 The guideline partially updates and replaces NICE clinical guideline 6, 'Antenatal care: Routine care for the healthy pregnant woman' (2003).
- 2.2.3 This costing report therefore focuses only on those recommendations that are new, or that have been amended from the previous guideline.
- 2.2.4 The guideline does not cover high-risk pregnancies, for example in women who have medical or obstetric complications during the antenatal period. Therefore, these issues are outside the scope of the costing work.
- 2.2.5 The Diabetes in pregnancy guideline offers best practice advice on the care of women of reproductive age who have diabetes or who develop diabetes during pregnancy, and their newborn babies.
- 2.2.6 The guideline does not cover aspects of routine antenatal, intrapartum and postnatal care that apply equally to women with and without diabetes. It also does not cover aspects of routine care for women with diabetes that do not change during the pre-conception, antenatal, intrapartum and postnatal periods, advice about contraceptive methods for women with diabetes, the management of complications of pregnancy that are not specifically related to diabetes, or the management of morbidities in newborn babies of mothers with diabetes beyond initial assessment and diagnosis. Therefore, these issues are outside the scope of the costing work.

2.2.7 Due to the breadth and complexity of the guidelines, we worked with the GDGs and other professionals to identify the new or amended recommendations that would have the most significant resource impact (see table 1). Costing work has focused on these recommendations.

Table 1 Recommendations with a significant resource impact

High-cost recommendations	Recommendation number	Key priority?
Fetal echocardiography involving the four-chamber view of the fetal heart and outflow tracts is recommended as part of the routine anomaly scan.	1.7.1.5 [Antenatal care guideline]	
Women with diabetes should be offered antenatal examination of the four-chamber view of the fetal heart and outflow tracts at 18–20 weeks	1.3.6.1 [Diabetes in pregnancy guideline]	<input type="checkbox"/>
All pregnant women should be offered screening for Down's syndrome. Women should understand that it is their choice to embark on screening for Down's syndrome.	1.7.2.1 [Antenatal care guideline]	
The 'combined test'(nuchal translucency, beta-human chorionic gonadotrophin, pregnancy-associated plasma protein-A) should be offered to screen for Down's syndrome between 11 weeks 0 days and 13 weeks 6days. For women who book later in pregnancy the most clinically and cost-effective serum screening test (triple or quadruple test) should be offered between 15 weeks 0 days and 20 weeks 0 days.	1.7.2.3 [Antenatal care guideline]	<input type="checkbox"/>
<p>Screening for gestational diabetes using risk factors is recommended in a healthy population. At the booking appointment, the following risk factors for gestational diabetes should be determined:</p> <ul style="list-style-type: none"> • body mass index (BMI) above 30 kg/m² • previous macrosomic baby weighing 4.5 kg or above • previous gestational diabetes • family history of diabetes (first-degree relative with diabetes) • family origin with a high prevalence of diabetes: <ul style="list-style-type: none"> – South Asian (specifically women whose country of family origin is India, Pakistan or Bangladesh) – black Caribbean – Middle Eastern (specifically women whose country of family origin is Saudi Arabia, United Arab Emirates, Iraq, Jordan, Syria, Oman, Qatar, Kuwait, Lebanon or Egypt). <p>Women with any one of these risk factors should be offered testing for gestational diabetes (refer to the Diabetes in pregnancy</p>	1.9.1.1 [Antenatal care guideline] 1.2.2.1 [Diabetes in pregnancy guideline]	<input type="checkbox"/>

guideline)		
Hypoglycaemic therapy should be considered for women with gestational diabetes if diet and exercise fail to maintain blood glucose targets during a 1-2 week period	1.2.2.10 [Diabetes in pregnancy guideline]	
Hypoglycaemic therapy should be offered to women with gestational diabetes if ultrasound investigation suggests incipient fetal macrosomia (abdominal circumference above the 70 th percentile) at diagnosis.	1.2.2.11 [Diabetes in pregnancy guideline]	
Hypoglycaemic therapy for women with gestational diabetes(which may include regular insulin, rapid-acting insulin analogues [lispro and aspart] and/or hypoglycaemic agents[metformin and glibenclamide]) should be tailored to the glycaemic profile of, and acceptability to, the individual woman.	1.2.2.12 [Diabetes in pregnancy guideline]	
Babies of women with diabetes should be kept with their mothers unless there is a clinical complication or there are abnormal clinical signs that warrant admission for intensive or special care.	1.5.1.2 [Diabetes in pregnancy guideline]	<input type="checkbox"/>
Women who were diagnosed with gestational diabetes should be offered lifestyle advice(including weight control, diet and exercise) and offered a fasting plasma glucose measurement (but not an oral glucose tolerance test) at the 6-week postnatal check and annually thereafter.	1.6.2.4 [Diabetes in pregnancy guideline]	<input type="checkbox"/>

2.2.8 Six of the recommendations in the Antenatal care guideline have been identified as key priorities for implementation, and two of these are also among the four Antenatal care recommendations considered to have significant resource impact.

2.2.9 One key recommendation concerns the provision of information to pregnant women, and is not considered to have a significant resource impact nationally.

2.2.10 One key recommendation concerns informing all women of the importance of maintaining adequate stores of vitamin D. It states that women should be advised to take a 10 micrograms supplement of vitamin D per day, with women at greatest risk of vitamin D deficiency being advised to take this supplement. For more detail see the

Maternal and child nutrition costing statement in appendix B, and NICE Public health guideline 56, [Vitamin D: increasing supplement use](#) (2014).

- 2.2.11 One key recommendation concerns screening for haemoglobinopathies. This is not considered to be a significant change in practice, and so is not considered to have significant resource implications nationally.
- 2.2.12 The final key recommendation concerns participation in regional congenital anomaly registers and/or UK National Screening Committee-approved audit systems. It is not believed that this will have a significant resource impact nationally, as most regions already have a congenital anomaly register.
- 2.2.13 Nine of the recommendations in the Diabetes in pregnancy guideline have been identified as key priorities for implementation, and three of these are also among the seven Diabetes in pregnancy recommendations considered to have significant resource impact.
- 2.2.14 Three of the key recommendations concern pre-conception care and advice, and are not considered to be a significant change in practice.
- 2.2.15 Two recommendations concerning blood glucose level targets and advice on hypoglycaemia are also not considered to be significant changes in practice.
- 2.2.16 One recommendation concerning ketoacidosis is not considered to have significant resource impact owing to the low number of women affected by ketoacidosis during pregnancy.
- 2.2.17 We have limited the consideration of costs and savings to direct costs to the NHS that will arise from implementation. We have not included consequences for the individual, the private sector or the not-for-profit sector. Where applicable, any realisable cost savings arising from a

change in practice have been offset against the cost of implementing the change.

2.3 *General assumptions made*

2.3.1 The model is based on annual incidence and population estimates for England only (see tables 2 and 3).

Table 2 Annual pregnancies in England

	Number
Singleton pregnancies	600,200
2 or more babies	9,100
Total	609,300

Table 3 Prevalence of diabetes in pregnancy

	Prevalence	Number of pregnancies in England
Total singleton pregnancies		600,200
Type 1 diabetes	0.3%	1,800
Type 2 diabetes	0.2%	1,200
Gestational diabetes	3.50%	20,400
Total diabetes in pregnancy		23,400

2.3.2 The total number of singleton births in England each year is approximately 600,200 (based on 2005 live and still births, and assuming that all births outside of NHS hospitals are singleton births) (Office for National Statistics 2005). We have assumed that this is equivalent to the number of women with singleton pregnancies who will receive antenatal care (although there will be some women who receive antenatal care and do not carry the baby to full term).

2.3.3 The CEMACH (2005) report 'Pregnancy in women with type 1 and type 2 diabetes in 2002–03' states that the prevalence of diabetes in pregnancy is 0.27% for type 1 diabetes and 0.11% for type 2 diabetes.

2.3.4 There is little national information on the prevalence of gestational diabetes, and published estimates vary from 1.7–8% within the UK and

the US. Prevalence rates will also vary across England according to local circumstances; for example, the prevalence of gestational diabetes in Southampton is estimated as 1.7%, whereas the prevalence in parts of London may be above 10%.

2.3.5 As the prevalence of diabetes is recognised to be increasing, the prevalence of diabetes in pregnancy is uplifted to 0.3% for type 1, 0.2% for type 2 and 3.5% for gestational diabetes, based on the expert opinion of the Diabetes in pregnancy GDG.

2.3.6 We have assumed that 80% of singleton pregnancies, or approximately 480,200 annually, are uncomplicated by medical or obstetric complications at the start of pregnancy and hence covered by the Antenatal care guideline.

2.4 *Basis of unit costs*

2.4.1 The way the NHS is funded has undergone reform with the introduction of 'Payment by results', based on a national tariff. The national tariff will be applied to all activity for which healthcare resource groups (HRGs) or other appropriate case-mix measures are available. Where a national tariff price or indicative price exists for an activity this has been used as the unit cost; this has then been inflated by the national average market forces factor.

2.4.2 Using these prices ensures that the costs in the report are the cost to the primary care trust (PCT) of commissioning predicted changes in activity at the tariff price, but may not represent the actual cost to individual trusts of delivering the activity.

2.4.3 For new or developing services, where there is no national average unit cost, organisations already undertaking this activity have been asked their current unit cost.

2.4.4 The hourly rate of clinicians performing diagnostic tests has been taken as the midpoint of the band associated with the national profile identified with that role. The 2007/08 pay scales have been uplifted by

2% as an estimate of 2008/09 pay rates. The proportion of time these clinicians spend on patient contact is taken from the Personal Social Services Research Unit (PSSRU) 'Unit costs for health and social care 2007'. The cost per hour of client contact is shown in table 4.

Table 4 Hourly rate for clinicians

Clinician	Nursing assistant/ midwifery assistant
Agenda for change band (midpoint)	3/4
Salary plus employer's oncosts	£21,165
Annual working hours	1,655
Percentage clinical activity	60%
Number of hours of client contact	993
Cost per hour of client contact	£21.31

3 Cost of significant resource-impact recommendations

3.1 *Screening for fetal anomalies*

Background

- 3.1.1 Fetal echocardiography involving the four-chamber view of the fetal heart and outflow tracts is recommended as part of the routine anomaly scan [recommendation 1.7.1.5, Antenatal care guideline,].
- 3.1.2 Women with diabetes should be offered antenatal examination of the four-chamber view of the fetal heart and outflow tracts at 18–20 weeks [recommendation 1.3.6.1, Diabetes in pregnancy guideline].

Assumptions made

- 3.1.3 The UK National Screening Committee (2005) has reported that 97% of units routinely offer ultrasound scans for fetal anomalies. It also found that 57% of units offer four-chamber and outflow tracts views as part of this scan. It is assumed that the remaining 40% of units offer four-chamber views as part of the anomaly scan.

- 3.1.4 The expert opinion of the GDG is that all units now offer anomaly scans, and that 1% of women decline a fetal anomaly scan. We therefore assume that 58% of women receive a four-chamber and outflow tracts view, 41% of women receive a four-chamber view, and 1% of women decline an anomaly scan.
- 3.1.5 Expert opinion is that a four-chamber and outflow tracts view takes 5–10 minutes longer than a four-chamber view. The average length of time for an anomaly scan is 19.85 minutes (UK National Screening Committee 2005). It has been assumed in the costing work that a four-chamber and outflow tracts view takes longer than 15 minutes, and that a four-chamber view takes 15 minutes or less.
- 3.1.6 It is assumed that following implementation of this guideline, the number of women declining a fetal anomaly scan will remain constant at 1%. The other 99% of women will receive a four-chamber and outflow tracts view.
- 3.1.7 The cost of a four-chamber and outflow tracts view is taken to be the indicative national tariff for an ultrasound scan taking longer than 15 minutes, uplifted by the national average Market Forces Factor (1.1249), at £105.74.
- 3.1.8 The cost of a four-chamber view is taken to be the indicative national tariff for an ultrasound taking 15 minutes or less, uplifted by the national average MFF (1.1249), at £70.87.

Cost summary

- 3.1.9 The net cost of screening for fetal anomalies is summarised in table 5.

Table 5 Screening for fetal anomalies

		Current		Proposed		Change	
	Unit cost	Numbers of patients	Cost (£000s)	Numbers of patients	Cost (£000s)	Numbers of patients	Cost (£000s)
Four-chamber and outflow tracts view	£105.74	280,300	29,632	478,400	50,579	198,100	20,947
Four-chamber view	£70.87	198,100	14,039	0	0	-198,100	-14,039
No anomaly scan		4,800	0	4,800	0	0	0
Totals		483,200	43,671	483,200	50,579	0	6,908

Other considerations

- 3.1.10 The costs of additional investigations and consequent treatment of the mother or baby are excluded from the scope of this costing work.
- 3.1.11 Additional training needs for ultrasonographers may arise in units not already offering the four-chamber plus outflow tracts view. Organisations need to assess training needs and associated costs locally.

3.2 *Screening for Down's syndrome*

Background

- 3.2.1 All pregnant women should be offered screening for Down's syndrome. Women should understand that it is their choice to embark on screening for Down's syndrome [recommendation 1.7.2.1, Antenatal care guideline].
- 3.2.2 Screening for Down's syndrome should be performed by the end of the first trimester (13 weeks 6 days), but provision should be made to allow later screening (which could be as late as 20 weeks 0 days) for women booking later in pregnancy [recommendation 1.7.2.2, Antenatal care guideline].

- 3.2.3 The 'combined test' (nuchal translucency, beta-human chorionic gonadotrophin, pregnancy-associated plasma protein-A) should be offered to screen for Down's syndrome between 11 weeks 0 days and 13 weeks 6 days. For women who book later in pregnancy the most clinically and cost-effective serum screening test (triple or quadruple test) should be offered between 15 weeks 0 days and 20 weeks 0 days [recommendation 1.7.2.3, Antenatal care guideline].

Assumptions made

- 3.2.4 The combined test consists of a nuchal translucency scan and blood tests for beta-human chorionic gonadotrophin and pregnancy-associated plasma protein-A.
- 3.2.5 The triple test consists of blood tests for alpha-fetoprotein, estriol and human chorionic gonadotrophin, and the quadruple test also includes a blood test for high inhibin-alpha.
- 3.2.6 The nuchal translucency element of the combined test can take place at the same time as the dating scan. The expert opinion of the Antenatal care GDG is that approximately 15% of nuchal translucency scans, either alone or as part of the combined test, will need to be performed separately from the dating scan.
- 3.2.7 The current provision of Down's syndrome testing was taken from the Healthcare Commission survey of women's experiences of maternity care in the NHS in England (Healthcare Commission 2007). It was found that 25% of women chose not to undergo screening for Down's syndrome, 17% received the combined test, 11% received a nuchal translucency scan only, 43% received a blood test only and 4% were not offered screening.
- 3.2.8 It is assumed that those women currently receiving a blood test alone for screening will receive either a triple or quadruple screening test.
- 3.2.9 It has been reported that 58% of pregnant women have their booking appointment before 12 weeks (Healthcare Commission 2007). These

women will be able to have the combined test to screen for Down's syndrome, if they choose to do so.

- 3.2.10 A further 38% of pregnant women have their booking appointment between 12 and 18 weeks (Healthcare Commission 2007). We assume these women will be offered the triple or quadruple test.
- 3.2.11 The remaining 4% of women have their booking appointment at 19 weeks or later. We assume that most of these women will have their booking appointment at 20 weeks 0 days or later and therefore will not be offered a screening test for Down's syndrome.
- 3.2.12 Table 6 summarises the number of women eligible for each type of screening test.

Table 6 Eligibility for screening for Down's syndrome by booking date

Booking date	Proportion of women	Number of women	Screening test offered
Earlier than 12 weeks	58%	339,400	Combined test
Between 12 and 19 weeks	38%	222,400	Triple or quadruple test
20 weeks or later	4%	23,400	No test

- 3.2.13 Following implementation of this guideline, we assume the proportion of women offered a test who opt not to undergo screening for Down's syndrome is 25%, which is consistent with the Healthcare Commission (2007) survey. We also assume that the proportion of combined tests performed separately from the dating scan remains at 15%.
- 3.2.14 A nuchal translucency scan takes an average of 18.15 minutes if performed with a dating scan, which is 5.75 minutes longer than the average dating scan (UK National Screening Committee 2005).
- 3.2.15 The cost of a nuchal translucency test performed separately from a dating scan is taken to be the indicative national tariff for an ultrasound taking greater than 15 minutes, uplifted by the national average MFF (1.1249), at £105.74.

- 3.2.16 The additional cost of a nuchal translucency scan performed with a dating scan is taken to be the difference between the indicative national tariff for an ultrasound taking 15 minutes or less and the indicative national tariff for an ultrasound taking longer than 15 minutes, uplifted by the national average MFF (1.1249). This gives a cost of £70.87.
- 3.2.17 It is assumed that all required blood tests are collected at the same time, and that this takes 5 minutes of nursing assistant or midwifery assistant time. The cost per hour of client contact of a nursing assistant or midwifery assistant is shown in table 4.
- 3.2.18 The cost of collecting blood for the serum screening tests is then £1.78.
- 3.2.19 Each blood test is costed as the indicative national tariff for a biochemical pathology test uplifted by the national average MFF (1.1249), at £1.60. This reflects the cost to commissioners rather than providers.
- 3.2.20 The expected cost of the combined test is then £39.84 if performed at the same time as a dating scan and £110.71 if performed separately. The cost of a nuchal translucency scan is £34.87 if performed at the same time as a dating scan, and £105.74 if performed separately. The cost of a triple or quadruple test is taken as the average of the two, at £7.37.

Cost summary

- 3.2.21 The net cost of screening for Down's syndrome is summarised in table 7.

Table 7 Net cost of screening for Down's syndrome

	Unit cost	Current		Proposed		Change	
		Numbers of patients	Cost (£000s)	Numbers of patients	Cost (£000s)	Numbers of patients	Cost (£000s)
Combined test (at same time as dating scan)	£39.84	69,800	2,782	178,700	7,118	88,800	4,336
Combined test (separate from dating scan)	£110.71	12,300	1,364	31,500	3,490	19,200	2,126
Nuchal translucency alone (at same time as dating scan)	£34.87	45,200	1,575	0	0	-45,200	-1,575
Nuchal translucency alone (separate from dating scan)	£105.74	8,000	843	0	0	-8,000	-843
Triple or quadruple test	£7.37	207,800	1,531	137,700	1,015	-70,100	-516
No test		140,100	0	135,300	0	-4,800	0
Totals		483,200	8,095	483,200	11,623	0	3,528

Other considerations

3.2.22 The increased use of the combined test should increase the number of cases of Down's syndrome detected correctly, and decrease the numbers falsely detected. This may have consequent resource implications in counselling and subsequent pregnancy outcomes.

3.3 *Screening and testing for gestational diabetes*

Background

3.3.1 Screening for gestational diabetes using risk factors is recommended in a healthy population. At the booking appointment, the following risk factors for gestational diabetes should be determined:

- body mass index (BMI) above 30 kg/m²
- previous macrosomic baby weighing 4.5 kg or above
- previous gestational diabetes
- family history of diabetes (first-degree relative with diabetes)
- family origin with a high prevalence of diabetes:
 - South Asian (specifically women whose country of family origin is India, Pakistan or Bangladesh)
 - black Caribbean
 - Middle Eastern (specifically women whose country of family origin is Saudi Arabia, United Arab Emirates, Iraq, Jordan, Syria, Oman, Qatar, Kuwait, Lebanon or Egypt).

Women with any one of these risk factors should be offered testing for gestational diabetes [recommendation 1.9.1.1, Antenatal care guideline; recommendation 1.2.2.1, Diabetes in pregnancy guideline].

3.3.2 Screening via fasting plasma glucose, random blood glucose, glucose challenge test and urinalysis for glucose should not be undertaken [recommendation 1.9.1.3, Antenatal care guideline; recommendation 1.2.2.3, Diabetes in pregnancy guideline].

3.3.3 The 2-hour 75 g oral glucose tolerance test (OGTT) should be used to test for gestational diabetes and diagnosis made using the criteria defined by the World Health Organization. Women who have had gestational diabetes in a previous pregnancy should be offered early self-monitoring of blood glucose or an OGTT at 16–18 weeks, and a further OGTT at 28 weeks if the results are normal. Women with any of the other risk factors for gestational diabetes should be offered an

OGTT at 24–28 weeks [recommendation 1.2.2.4, Diabetes in pregnancy guideline].

Assumptions made

- 3.3.4 Clinical opinion is that 3.5% of pregnancies result in gestational diabetes. Published estimates vary from 1.7 to 8% within the UK and the US. Prevalence rates will also vary across England according to local circumstances; for example, the prevalence of gestational diabetes in Southampton is estimated as 1.7%, whereas the prevalence in parts of London may be above 10%.
- 3.3.5 It has been reported that 36% of pregnant women have a BMI of 27 kg/m² or above (Office of National Statistics 2001) (see appendix B of full guideline for health economic assumptions). We assume that 30% of women have a BMI of 30 kg/m² or above. In addition, 8.5% of pregnant women are within one of the high-risk ethnic groups (Davey and Hamblin 2001), 3.5% have previous gestational diabetes (Hospital Episode Statistics 2005) and 10% have a family history of diabetes (Davey and Hamblin 2001). Assuming these factors are independent (which may not be the case), 44% of women will have one or more of these risk factors. This is the maximum proportion of women with one or more risk factors. The effect of a lower proportion of women having one or more risk factors owing to a relationship between the risk factors is explored in the sensitivity analysis.
- 3.3.6 The previous Antenatal care guideline did not recommend screening for gestational diabetes in a healthy population. Current practice therefore varies across the country.
- 3.3.7 Mires et al. (1999) conducted a survey of all obstetric units in the UK, and concluded that the majority of units offer some form of screening and testing for gestational diabetes. This survey forms the basis of our assumptions about current practice, and these assumptions have been verified by the GDGs for the Antenatal care guideline and the Diabetes in pregnancy guideline.

- 3.3.8 A diagnostic test is offered to pregnant women with risk factors in 40% of units. We assume that the diagnostic test used is the 2-hour 75 g OGTT and that the risk factors are similar to those recommended in the guideline.
- 3.3.9 A biochemical test, followed by a diagnostic test where indicated, is offered to pregnant women with risk factors in 32% of units. We assume that the biochemical test is a random blood glucose test, that the diagnostic test used is the 2-hour 75 g OGTT, and that the risk factors are similar to those listed in the guidelines.
- 3.3.10 A biochemical test, followed by a diagnostic test where indicated, is offered to all pregnant women in 17% of units. We assume that the biochemical test is a random blood glucose test, and that the diagnostic test used is the 2-hour 75 g OGTT.
- 3.3.11 We assume, in line with the health economic modelling, that the
- 3.3.12 2-hour 75 g OGTT has a sensitivity and specificity of 100%; in other words, that no false-positive or false-negative results will be obtained.
- 3.3.13 We assume, in line with the health economic modelling, that a random blood glucose test has a sensitivity of 48% and a specificity of 97%. This affects the number of women who are not diagnosed with gestational diabetes currently and hence do not currently proceed to treatment (see section 3.4).
- 3.3.14 We assume that an OGTT takes 45 minutes of the time of a nursing or midwifery assistant or equivalent. This includes giving information to the woman. The cost per hour of client contact of a nursing assistant or midwifery assistant is shown in table 4.
- 3.3.15 We assume that a random blood test takes 5 minutes of the time of a nursing or midwifery assistant or equivalent.
- 3.3.16 We cost the pathology element of the random blood test and OGTT using the indicative tariff for a direct access pathology test –

biochemical, uplifted by the national average market forces factor (MFF) of 1.1249.

3.3.17 The cost of a random blood test is then £3.37.

3.3.18 The cost of an OGTT is then £17.58.

Cost summary

3.3.19 The numbers of women screened and tested for gestational diabetes are shown in table 8.

Table 8 Numbers of women screened and tested for gestational diabetes

Screening and testing	Biochemical test		Diagnostic test	
	Number tested	Number +ve (proceed to diagnostic test)	Number tested	Number +ve (proceed to treatment)
Current practice				
Diagnostic test offered to all women with risk factors			85,200	6,700
Biochemical test offered to all women with risk factors	68,200	4,500	4,500	2,400
Biochemical test offered to all women	81,600	3,800	3,800	1,400
Total	149,800	8,300	93,500	10,700
Future practice				
Diagnostic test offered to all women with risk factors			213,100	16,800

3.3.20 The net cost of screening and testing for gestational diabetes is summarised in table 9.

Table 9 Net cost of screening and testing for gestational diabetes

		Current		Proposed		Change	
	Unit cost	Numbers of women	Cost (£000s)	Numbers of women	Cost (£000s)	Numbers of women	Cost (£000s)
Random blood test	£3.37	149,800	505	0	0	-149,800	-505
2-hour 75 g OGTT	£17.58	93,500	1,645	213,100	3,746	119,600	2,101
Totals		243,300	2,150	213,100	3,746	-30,200	1,596

3.4 *Treatment of gestational diabetes*

Background

- 3.4.1 Hypoglycaemic therapy should be considered for women with gestational diabetes if diet and exercise fail to maintain blood glucose targets during a 1- to 2-week period [recommendation 1.2.2.10, Diabetes in pregnancy guideline].
- 3.4.2 Hypoglycaemic therapy should be offered to women with gestational diabetes if ultrasound investigation suggests incipient fetal macrosomia (abdominal circumference above the 70th percentile) at diagnosis [recommendation 1.2.2.11, Diabetes in pregnancy guideline].
- 3.4.3 Hypoglycaemic therapy for women with gestational diabetes (which may include regular insulin, rapid-acting insulin analogues [lispro and aspart] and hypoglycaemic agents [metformin and glibenclamide]) should be tailored to the glycaemic profile of, and acceptability to, the individual woman [recommendation 1.2.2.12, Diabetes in pregnancy guideline].

Assumptions made

- 3.4.4 It is estimated that current screening and testing methods identify approximately 10,700 cases of gestational diabetes annually (see 3.3). Testing with a 2-hour 75 g OGTT those women with the risk factors

listed in 3.1.1 will identify approximately 16,800 cases of gestational diabetes annually (see 3.3), an increase of 6,100 per year.

- 3.4.5 It is assumed that gestational diabetes will not respond to diet and exercise within the 1- to 2-week period, or incipient fetal macrosomia will be identified by ultrasound scan, in 35% of women with gestational diabetes, who will be given oral hypoglycaemic therapy (expert opinion of the Diabetes in pregnancy GDG).
- 3.4.6 Testing for gestational diabetes for the majority of women with one or more risk factors is recommended between 24 and 28 weeks. Allowing for the 1- to 2-week period for diet and exercise, it is assumed that, on average, women requiring medication for control of gestational diabetes will require approximately 90 days of treatment. All women diagnosed with gestational diabetes will need to self-monitor for an average of 12 weeks.
- 3.4.7 It is assumed that, of the 35% of women in whom gestational diabetes will not respond to diet and exercise or whose babies have incipient fetal macrosomia identified by ultrasound scan, approximately 20% will receive treatment with the oral hypoglycaemic agents glibenclamide or metformin, (expert opinion of the Diabetes in pregnancy GDG). The average cost of treatment with one of these oral agents is used.
- 3.4.8 The dose for glibenclamide is assumed to be 5 mg daily for 1 week, then 15 mg daily. The dose for metformin is assumed to be 1500 mg daily. The cost of treatment with oral agents is taken from the 'British national formulary' (BNF) 55, and is shown in table 10.

Table 10 Unit cost of oral agents for treatment of gestational diabetes

Oral agent	Dose	Cost for 90 days of treatment
Glibenclamide	5 mg daily for 7 days, 15 mg daily for 83 days	£1.04
Metformin	1500 mg daily	£5.14
Average		£3.09

- 3.4.9 It is assumed the remaining 15% of women will receive treatment with insulin or an insulin analogue. It is assumed that the average dose will be 10 units three times per day, and that this will be administered via a pre-filled administration device. The costs of the most commonly prescribed regular insulin and rapid-acting insulin analogues lispro and aspart are taken from BNF 55, and are shown in table 11.

Table 11 Unit cost of insulin or insulin analogue for treatment of gestational diabetes

Drug	Dose	Cost for 90 days of treatment
Regular insulin	10 units three times per day	£55.80
Insulin aspart	10 units three times per day	£64.00
Insulin lispro	10 units three times per day	£58.92
Average		£59.57

- 3.4.10 It is assumed that women with gestational diabetes will test their blood sugar level on average four times per day. The cheapest combination of lancets, strips and blood glucose meter has been assumed. This is shown in table 12.

Table 12 Unit cost of blood glucose monitoring

	Unit cost	Cost for 12 weeks of monitoring
Lancets	£5.70 for 200	£11.40
Testing strips	£13.97 for 50	£97.79
Blood glucose meter	£5.63	£5.63
Total		£114.82

- 3.4.11 The cost of a fasting plasma glucose test is taken as the indicative tariff for 2008/09 for a biochemical pathology test, uplifted by the national average MFF of 1.1249. This is different from the cost used in the health economic analysis, as it reflects the cost to commissioners rather than providers.

- 3.4.12 The number of women receiving annual fasting plasma glucose tests following a diagnosis of gestational diabetes is assumed to be the cumulative number of pregnancies involving gestational diabetes, and is given for the first 3 years only.

Cost summary

- 3.4.13 The net cost of the treatment of additional cases of gestational diabetes diagnosed is summarised in table 13.

Table 13 Net cost of treating additional cases of gestational diabetes diagnosed

	Unit cost	Numbers of cases	Predicted cost (£000s)
Blood glucose monitoring	£114.82	6,100	704
Oral medication	£3.09	1,200	4
Regular insulin or insulin analogue	£59.57	900	55
6-week postnatal blood glucose test	£3.37	6,100	21
Net cost/saving (-)			783

- 3.4.14 The net cost of annual blood glucose tests for women who have previously been diagnosed with gestational diabetes is summarised in table 14.

Table 14 Net cost of annual blood glucose tests for women who have previously been diagnosed with gestational diabetes

	Unit cost	Numbers of women	Predicted cost (£000s)
Annual blood glucose test - year 1	£3.37	16,900	56
Annual blood glucose test - year 2	£3.37	33,600	113
Annual blood glucose test - year 3	£3.37	50,400	170

Other considerations

- 3.4.15 Improved diagnosis and treatment of gestational diabetes may also result in a potential reduction in caesarean section rates, with resultant

cost savings and possible increased rates of breastfeeding, with associated benefits for these mothers and babies.

- 3.4.16 There may be other indirect costs and savings associated with improved diagnosis and treatment of gestational diabetes, including better outcomes for mothers and babies during pregnancy and the additional costs of increased monitoring of women with gestational diabetes, including increased hospital stay after birth. There may also be additional indirect costs and savings associated with annual fasting plasma glucose tests, such as the earlier diagnosis and treatment of type 2 diabetes.
- 3.4.17 Women with previous gestational diabetes may be diagnosed earlier in pregnancy, at 16–18 weeks. There may be additional costs associated with treating these women for longer than 90 days.

3.5 *Neonatal care for babies of women with diabetes*

Background

- 3.5.1 Babies of women with diabetes should be kept with their mothers unless there is a clinical complication or there are abnormal clinical signs that warrant admission for intensive or special care [recommendation 1.5.1.2, Diabetes in pregnancy guideline].

Assumptions made

- 3.5.2 CEMACH (2007) has reported that 30% of units have a policy of routinely admitting babies of women with diabetes to neonatal units. It also found that 38% of babies of women with diabetes are admitted to neonatal units and that 57% of these admissions could be avoided.
- 3.5.3 This equates to approximately 8,900 admissions to a neonatal unit of babies of women with diabetes annually, of which 5100 can be avoided.
- 3.5.4 We have assumed that this equates to 5100 neonatal bed days that could be avoided, as avoidable admissions are likely to be of short

duration, and indeed, two thirds of admissions to a neonatal unit of babies of women with diabetes were for less than 3 days (CEMACH 2007).

- 3.5.5 It is assumed that babies not admitted to a neonatal unit would still receive greater care than a baby not born to a mother with diabetes, on a transitional unit.
- 3.5.6 A transitional care ward falls under the reference costs and British Association of Perinatal Medicine category of care of special care.
- 3.5.7 The cost assumed for a transitional unit bed day is then assumed to be that of a special care baby unit occupied bed day taken from reference costs 2006/07 and uplifted for inflation to 2008/09 rates, at £433.95.
- 3.5.8 The cost assumed for a neonatal bed day is assumed to be that of a level 2 neonatal occupied bed day taken from reference costs 2006/07 and uplifted for inflation to 2008/09 rates, at £719.18.
- 3.5.9 The cost assumed for a transitional unit bed day is assumed to be that of a special care baby unit occupied bed day taken from reference costs 2006/07 and uplifted for inflation to 2008/09 rates, at £433.95.

Cost summary

- 3.5.10 The net saving of neonatal care for women with diabetes is summarised in table 15.

Table 15 Net saving of neonatal care for babies of women with diabetes

		Current		Proposed		Change	
	Unit cost	Number	Cost (£000s)	Number	Cost (£000s)	Number	Cost (£000s)
Neonatal care occupied bed day	£719.18	7,500	5,413	3,200	2,327	-4,300	-3,086
Transitional unit occupied bed day	£417.26			4,300	1,862	4,300	1,862
Totals		7,500	5,413	7,500	4,189	0	-1,224

Other considerations

- 3.5.11 The cost of transitional care may vary, depending on how it is arranged locally.
- 3.5.12 The avoidance of admissions to neonatal units may increase breastfeeding rates in women with diabetes, with associated benefits for these mothers and babies.
- 3.5.13 If babies are cared for, with their mothers, on a postnatal ward with additional midwife support, then the savings resulting from this recommendation will increase.

3.6 *Benefits and savings*

- 3.6.1 Implementing the updated Antenatal care and Diabetes in pregnancy guidelines will bring the following benefits:
- better identification of women for whom additional care is necessary
 - increased detection of fetal anomalies
 - increased detection of Down's syndrome, and a reduction in cases of Down's syndrome incorrectly identified leading to further tests and distress
 - increased detection and treatment of gestational diabetes, leading to improved care for the mother and a reduction in complications during pregnancy and labour
 - a possible reduction in caesarean section rates

- a reduction in unnecessary admissions to neonatal care, with a possible increase in breastfeeding rates, and the associated benefits, for these mothers and babies
- compliance with NICE guidance is one of the criteria indicating good risk reduction strategies, and in combination with meeting other criteria could lead to a discount on contributions to the NHS Litigation Authority schemes, including CNST.

4 Sensitivity analysis

4.1 Methodology

- 4.1.1 There are a number of assumptions in the model for which no empirical evidence exists. Because of the limited data, the model developed is based mainly on discussions of typical values and predictions of how things might change as a result of implementing the guidance and is therefore subject to a degree of uncertainty.
- 4.1.2 As part of discussions with practitioners, we discussed possible minimum and maximum values of variables, and calculated their impact on costs across this range.
- 4.1.3 Wherever possible we have used the national tariff plus MFF to determine cost. We used the variation of costs for the 25th and 75th percentiles from reference costs compared with the reference cost national average as a guide to inform the maximum and minimum range of costs.
- 4.1.4 It is not possible to arrive at an overall range for total cost because the minimum or maximum of individual lines would not occur simultaneously. We undertook one-way simple sensitivity analysis, altering each variable independently to identify those that have greatest impact on the calculated total cost.
- 4.1.5 Appendix B contains a table detailing all variables modified and the key conclusions drawn are discussed below.

4.2 *Impact of sensitivity analysis on costs*

Proportion of women receiving combined test for Down's syndrome

- 4.2.1 The proportion of women having their booking appointment earlier than 12 weeks, and hence receiving the combined test, was varied by 10%, between 52% and 64%.
- 4.2.2 The cost of implementation of the guideline then varies by £1.9 million, from £10.7 to £12.6 million.
- 4.2.3 This is the assumption that has the largest effect on the final cost, and so should be assessed locally.

Cost of neonatal care

- 4.2.4 The costs of neonatal care and transitional care are varied between the 25th and 75th percentiles from reference costs. This affects the estimated savings from the avoidance of unnecessary admissions to neonatal care by £1.3 million.
- 4.2.5 As critical care is currently outside the scope of 'Payment by results', these assumptions are likely to have the widest variation nationally. Local organisations should therefore update the local template with local information.

5 Impact of guidance for commissioners

- 5.1.1 Depending on where routine antenatal care is provided, the costs associated with this guideline may fall within the scope of 'Payment by results'. If routine antenatal care is provided outside of a hospital setting, it will not fall within the scope of 'Payment by results'. The majority of the costs associated with diabetes in pregnancy are likely to be within secondary care and hence within the scope of 'Payment by results'; however, the annual fasting plasma glucose test for women who have been diagnosed with gestational diabetes may take place in other settings.

- 5.1.2 Routine antenatal care falls within programme budgeting category 18X, maternity and reproductive health. Expenditure on diabetes in pregnancy may fall into category 4A, endocrine, nutritional and metabolic problems – diabetes, or category 18X, maternity and reproductive health. Expenditure on routine antenatal care or diabetes in pregnancy in primary care falls into category 23, other.

6 Conclusion

6.1 *Total national cost for England*

- 6.1.1 Using the significant resource impact recommendations shown in table 1 and assumptions specified in section 3 we have estimated the annual cost impact of fully implementing both guidelines in England to be £11.7 million in year 1. Table 16 shows the breakdown of cost of each significant resource-impact recommendation.

Table 16 Summary of costs of implementation

Recurrent costs for England	Year 1 £000s	Year 2 £000s	Year 3 £000s
Screening for fetal anomalies	6,908	6,908	6,908
Screening for Down's syndrome	3,528	3,528	3,528
Screening and testing for gestational diabetes	1,596	1,596	1,596
Treatment for gestational diabetes	840	897	953
Avoidance of neonatal care	-1,224	-1,224	-1,224
Total movement in resources	11,648	11,705	11,762

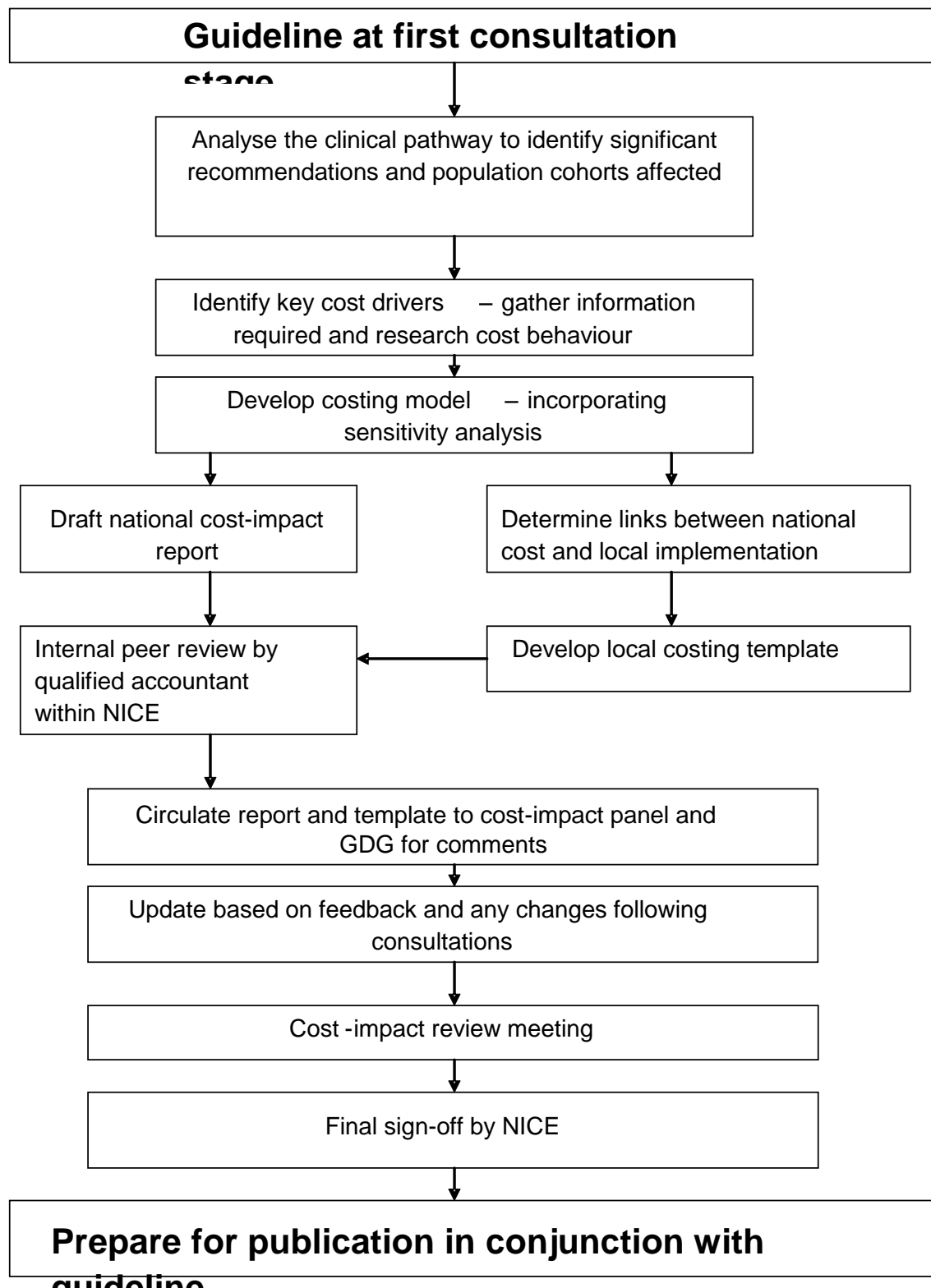
- 6.1.2 We applied reality tests against existing data wherever possible, but this was limited by the availability of detailed data. We consider this assessment to be reasonable, given the limited detailed data regarding diagnosis and treatment paths and the time available. However, the costs presented are estimates and should not be taken as the full cost of implementing the guideline.
- 6.1.3 It is not expected that there will be a significant delay in implementing this guideline; however, this will depend on individual circumstances and training needs and so should be assessed locally.

- 6.1.4 The treatment of gestational diabetes includes a recommendation for annual fasting plasma glucose tests following a diagnosis of gestational diabetes. It will take time for this recommendation to be fully implemented, and the costs for the first 3 years have been included above.

6.2 *Next steps*

- 6.2.1 The local costing template produced to support this guideline enables organisations such as PCTs or health boards in Wales and Northern Ireland to estimate the impact locally and replace variables with ones that depict the current local position. A sample calculation using this template showed that a population of 100,000 could expect to incur additional costs of £21,000 in the first year.
- 6.2.2 Use this template to calculate the cost of implementing this guidance in your area.

Appendix A. Approach to costing guidelines



Appendix B. Maternal and child nutrition costing statement

Background

The guidance on maternal and child nutrition (NICE public health guidance 11) is for NHS and other professionals who have a direct or indirect role in – and responsibility for – the nutrition of pregnant and breastfeeding mothers and pre-school children.

The guidance complements and supports, but does not replace, NICE clinical guidelines on: antenatal care (CG062), intrapartum care (CG055) and postnatal care (CG037).

The guidance is not considered to have significant resource implications.

Guidance recommendations

The guidance has 22 recommendations covering 15 topics. Six recommendations are considered key priorities and cover the following topics:

- Healthy Start
- training
- vitamin D
- breastfeeding
- folic acid.

The other 10 areas covered are as follows:

- allergies
- child health promotion
- diet in pregnancy
- family nutrition.
- infant formula
- link workers
- obesity
- oral health

- pre-school settings
- prescribing

Resource impact

Healthy Start (recommendation 4)

NHS professionals are already asked, under the 'National service framework for children, young people and maternity services', to advise women about the availability of Healthy Start vouchers and vitamin supplements. So this is not a significant change in practice.

Approximately 95,000 women are eligible for Healthy Start vitamins, based on the number of households receiving Healthy Start vouchers for a pregnant woman or a child aged under 1 (Department of Health). The number eligible through receipt of certain benefits is unknown.

The number of women taking these free supplements is believed to be fairly low. The cost to the NHS of increasing uptake is not likely to be significant (52 weeks supplementation costs £3.83 per woman, totalling less than £400,000 annually, based on 95,000 eligible women). However, if local organisations extend the provision of maternal supplements, as suggested (to all women who may be planning a pregnancy and who receive Healthy Start benefit for a child aged under 4), this will have an impact on local resources.

Training (recommendation 1)

Many of the training needs can be met as part of the continuing professional development of health professionals. Any additional costs will depend on the local training infrastructure already in place.

The cost of training support workers to manage breastfeeding (using the Baby Friendly Initiative training as a minimum standard) is included in the costing work for postnatal care (NICE clinical guideline 37). Additional resources may be required to train breastfeeding support workers and to train healthcare professionals to give advice on infant formula and how to weigh infants, particularly within community settings.

Vitamin D (recommendation 3)

The majority of women who are not eligible for Healthy Start vitamins will be able to purchase Healthy Start supplements for women, containing vitamin D, over the counter, so the vitamin D recommendation will not have a significant impact on national resources.

Breastfeeding (recommendations 7–12)

The resources needed to encourage mothers to breastfeed babies during their first 6 weeks of life is included in the costing report for postnatal care. Extending this support to all mothers with babies up to 7 months old may have a resource impact in those areas that do not already have peer support programmes in place. The additional costs may include: salaries for paid supporters, expenses (including childcare) for volunteer supporters and administration.

Folic acid (recommendation 2)

The Department of Health has already recommended that women who are planning a pregnancy and are at risk of having a baby with a neural tube defect (NTD) should receive a prescription for 5 milligrams of folic acid daily. It is estimated that the additional NICE recommendation to extend this to women with diabetes who are planning a pregnancy or who may become pregnant will cost less than £250,000 nationally.

Link workers (recommendation 13)

Depending on local circumstances, additional resources may be needed to train link workers to provide information and support for mothers whose first language is not English. This should include training in cultural and language issues.

Child health promotion (recommendations 16–17)

Health visitors and the child health promotion programme team can meet the recommendations as a routine part of their consultations with mothers, parents and carers. There may be additional equipment and maintenance costs associated with the weighing of infants in the community.

Pre-school settings (recommendations 20–21)

Children's services are commissioned and provided by the NHS, local authorities or jointly between the two. The providers and commissioners of pre-school childcare may incur additional costs when providing refrigeration facilities to store breast milk. However, this will depend on local circumstances.

Family nutrition (recommendation 22)

The recommendation on healthy eating programmes for those on a low income may have a significant impact on local resources, depending on the type of programmes that are developed.

Savings and benefits

Implementing this guidance may bring the following benefits:

- A reduction in childhood illnesses such as gastroenteritis, otitis media and upper respiratory tract infections, and reduced hospital admissions due to the protective effects of breastfeeding on children.
- A reduction in forecasted obesity rates among adults and children, following family nutrition programmes and an increase in breastfeeding rates.
- A reduced risk of some cancers among mothers who breastfeed due to the protective effects of breastfeeding on mothers.

Conclusion

The recommendations on 'Maternal and child nutrition' are unlikely to have a significant impact on national resources. Costs are most likely to be incurred locally for the provision of Healthy Start vitamins, training (for both health professionals and support workers), breastfeeding peer support, link workers and family nutrition programmes.

Appendix C. Results of sensitivity analysis on year 1 costs

				Baseline	Minimum	Maximum	
Parameter varied	Baseline value	Minimum value	Maximum value	costs £000s	costs £000s	costs £000s	Change £000s
Prevalence of type 1 diabetes amongst pregnant women	0.3%	0.27%	0.3%	11,648	11,648	11,660	12
Prevalence of type 2 diabetes amongst pregnant women	0.2%	0.11%	0.2%	11,648	11,648	11,683	35
Incidence of gestational diabetes	3.5%	1.7%	8.0%	11,648	11,307	11,785	478
Cost per hour of patient contact for nursing assistant/midwifery assistant	£21.31	£17.82	£25.19	11,648	11,355	11,973	618
Proportion of combined tests carried out at same time as dating scan	85%	80%	90%	11,648	11,383	11,913	530
Proportion of women receiving booking appointment earlier than 12 weeks	58%	52%	64%	11,648	10,711	12,585	1,874
Prevalence of risk factors for gestational diabetes	44%	40%	44%	11,648	11,452	11,648	196
Proportion of units screening and testing for gestational diabetes via diagnostic test offered to all pregnant women with risk factors	40%	36%	44%	11,648	11,483	11,813	330
Proportion of units screening and testing for gestational diabetes via biochemical test offered to all pregnant women with risk factors, followed by diagnostic test where indicated	32%	29%	35%	11,648	11,560	11,736	176
Proportion of units screening and testing for gestational diabetes via biochemical test offered to all pregnant women, followed by diagnostic test where indicated	17%	15%	19%	11,648	11,630	11,666	36
Additional cases of gestational diabetes diagnosed	6,132	5,519	6,745	11,648	11,570	11,727	157
Proportion controlled by diet and lifestyle changes	65%	65%	70%	11,648	11,640	11,648	8
Proportion controlled by oral medication	20%	10%	20%	11,648	11,648	11,683	35
Cost of transitional care for babies of women with diabetes	£433.95	£350.59	£522.70	11,648	11,291	12,029	738
Cost of neonatal unit bed day for babies of women with diabetes	£719.18	£568.49	£874.80	11,648	10,981	12,295	1,314

Appendix D. References

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