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# **Hypertension in pregnancy**

**The management of hypertensive disorders  
during pregnancy**

## **NICE clinical guideline 107**

### **Hypertension in pregnancy: the management of hypertensive disorders during pregnancy**

#### **Ordering information**

You can download the following documents from

[www.nice.org.uk/guidance/CG107](http://www.nice.org.uk/guidance/CG107)

- The NICE guideline (this document) – all the recommendations.
- A quick reference guide – a summary of the recommendations for healthcare professionals.
- ‘Understanding NICE guidance’ – a summary for patients and carers.
- The full guideline – all the recommendations, details of how they were developed, and reviews of the evidence they were based on.

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# Contents

Introduction .....	3
Woman-centred care.....	5
Key priorities for implementation.....	6
1 Guidance .....	8
1.1 Reducing the risk of hypertensive disorders in pregnancy.....	9
1.2 Management of pregnancy with chronic hypertension.....	11
1.3 Assessment of proteinuria in hypertensive disorders of pregnancy .	14
1.4 Management of pregnancy with gestational hypertension .....	15
1.5 Management of pregnancy with pre-eclampsia .....	19
1.6 Fetal monitoring.....	24
1.7 Intrapartum care .....	26
1.8 Medical management of severe hypertension or severe pre-eclampsia in a critical care setting.....	27
1.9 Breastfeeding.....	31
1.10 Advice and follow-up care at transfer to community care .....	32
2 Notes on the scope of the guidance .....	34
3 Implementation.....	34
4 Research recommendations.....	35
4.1 Reducing the risk of hypertensive disorders in pregnancy.....	35
4.2 Assessment of proteinuria in hypertensive disorders of pregnancy .	36
4.3 Haematological and biochemical monitoring in women with gestational hypertension.....	36
4.4 Timing of birth in women with pre-eclampsia.....	37
4.5 Antihypertensive agents and breastfeeding .....	38
5 Other versions of this guideline .....	38
5.1 Full guideline.....	38
5.2 Quick reference guide.....	39
5.3 'Understanding NICE guidance' .....	39
6 Related NICE guidance .....	39
7 Updating the guideline.....	40
Appendix A: The Guideline Development Group and NICE project team .....	41
Appendix B: The Guideline Review Panel.....	43
Appendix C: The algorithms.....	44
Appendix D: Drug information .....	45

## Introduction

Hypertensive disorders during pregnancy occur in women with pre-existing primary or secondary chronic hypertension, and in women who develop new-onset hypertension in the second half of pregnancy.

Hypertensive disorders during pregnancy carry risks for the woman and the baby. Although the rate of eclampsia in the United Kingdom (UK) appears to have fallen, hypertension in pregnancy remains one of the leading causes of maternal death in the UK. Hypertensive disorders during pregnancy may also result in substantial maternal morbidity. A UK study reported that one-third of severe maternal morbidity was a consequence of hypertensive conditions. A study from one region of the UK reported that 1 in 20 (5%) women with severe pre-eclampsia or eclampsia were admitted to intensive care. More recently, the long-term consequences for women with a diagnosis of hypertension during pregnancy have become clear, in particular chronic hypertension and an increase in lifetime cardiovascular risk.

Hypertensive disorders also carry a risk for the baby. In the most recent UK perinatal mortality report, 1 in 20 (5%) stillbirths in infants without congenital abnormality occurred in women with pre-eclampsia. The contribution of pre-eclampsia to the overall preterm birth rate is substantial; 1 in 250 (0.4%) women in their first pregnancy will give birth before 34 weeks as a consequence of pre-eclampsia and 8–10% of all preterm births result from hypertensive disorders. Half of women with severe pre-eclampsia give birth preterm.

Small-for-gestational-age babies (mainly because of fetal growth restriction arising from placental disease) are common, with 20–25% of preterm births and 14–19% of term births in women with pre-eclampsia being less than the tenth centile of birth weight for gestation.

There is national guidance on the care of women with severe pre-eclampsia or eclampsia and on screening for hypertensive disorders during pregnancy<sup>1</sup>. However, there has been no guidance on the assessment and care of women and their babies after a diagnosis of hypertension (including the use of antihypertensive treatment) or on maternity care for women with chronic hypertension.

This clinical guideline contains recommendations for the diagnosis and management of hypertensive disorders during pregnancy in the antenatal, intrapartum and postnatal periods. It includes recommendations for women with chronic hypertension who wish to conceive and recommendations for advice to women after a pregnancy complicated by hypertension.

This guideline assumes that prescribers will use a drug's summary of product characteristics (SPC) to inform decisions made with individual patients. Drugs for which particular attention should be paid to the contraindications and special warnings during pregnancy and lactation are marked with † and detailed in appendix D.

This guideline recommends some drugs for indications for which they do not have a UK marketing authorisation at the date of publication, if there is good evidence to support that use. Many drugs do not have a license for use specifically in pregnant women, reflecting the fact that this group is often excluded from studies. Unlicensed drugs are marked with an asterisk.

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<sup>1</sup> Royal College of Obstetricians and Gynaecologists (2006) The management of severe pre-eclampsia/eclampsia; National Institute for Health and Clinical Excellence (2008) Antenatal care. NICE clinical guideline 62. London: National Institute for Health and Clinical Excellence. Available from [www.nice.org.uk/guidance/CG62](http://www.nice.org.uk/guidance/CG62)

## Woman-centred care

This guideline offers best practice advice on the care of women with hypertensive disorders in pregnancy.

Treatment and care should take into account women's needs and preferences. Women with hypertensive disorders in pregnancy should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals. If women do not have the capacity to make decisions, healthcare professionals should follow the Department of Health's advice on consent (available from [www.dh.gov.uk/consent](http://www.dh.gov.uk/consent)) and the code of practice that accompanies the Mental Capacity Act (summary available from [www.publicguardian.gov.uk](http://www.publicguardian.gov.uk)). In Wales, healthcare professionals should follow advice on consent from the Welsh Assembly Government (available from [www.wales.nhs.uk/consent](http://www.wales.nhs.uk/consent)).

Good communication between healthcare professionals and women is essential. It should be supported by evidence-based written information tailored to women's needs. Treatment and care, and the information women are given about it, should be culturally appropriate. It should also be accessible to people with additional needs such as physical, sensory or learning disabilities, and to people who do not speak or read English.

## Key priorities for implementation

### Reducing the risk of hypertensive disorders in pregnancy

- Advise women at high risk of pre-eclampsia to take 75 mg of aspirin\* daily from 12 weeks until the birth of the baby. Women at high risk are those with any of the following:
  - hypertensive disease during a previous pregnancy
  - chronic kidney disease
  - autoimmune disease such as systemic lupus erythematosus or antiphospholipid syndrome
  - type 1 or type 2 diabetes
  - chronic hypertension. **[1.1.2.1]**

### Management of pregnancy with chronic hypertension

- Tell women who take angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs):
  - that there is an increased risk of congenital abnormalities if these drugs are taken during pregnancy
  - to discuss other antihypertensive treatment with the healthcare professional responsible for managing their hypertension, if they are planning pregnancy. **[1.2.1.1]**
- In pregnant women with uncomplicated chronic hypertension aim to keep blood pressure lower than 150/100 mmHg. **[1.2.3.1]**

### Assessment of proteinuria in hypertensive disorders of pregnancy

- Use an automated reagent-strip reading device or a spot urinary protein:creatinine ratio for estimating proteinuria in a secondary care setting. **[1.3.1.1]**

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\* In this guideline, drug names are marked with an asterisk if they do not have UK marketing authorisation for the indication in question at the time of publication (August 2010). Informed consent should be obtained and documented.

### **Management of pregnancy with gestational hypertension**

- Offer women with gestational hypertension an integrated package of care covering admission to hospital, treatment, measurement of blood pressure, testing for proteinuria and blood tests as indicated in [Table 1](#). [1.4.1.3]

### **Management of pregnancy with pre-eclampsia**

- Offer women with pre-eclampsia an integrated package of care covering admission to hospital, treatment, measurement of blood pressure, testing for proteinuria and blood tests as indicated in [Table 2](#). [1.5.1.2]
- Consultant obstetric staff should document in the woman's notes the maternal (biochemical, haematological and clinical) and fetal thresholds for elective birth before 34 weeks in women with pre-eclampsia. [1.5.2.2]
- Offer all women who have had pre-eclampsia a medical review at the postnatal review (6–8 weeks after the birth). [1.5.3.10]

### **Advice and follow-up care at transfer to community care**

- Tell women who had pre-eclampsia that their risk of developing:
  - gestational hypertension in a future pregnancy ranges from about 1 in 8 (13%) pregnancies to about 1 in 2 (53%) pregnancies
  - pre-eclampsia in a future pregnancy is up to about 1 in 6 (16%) pregnancies
  - pre-eclampsia in a future pregnancy is about 1 in 4 (25%) pregnancies if their pre-eclampsia was complicated by severe pre-eclampsia, HELLP syndrome or eclampsia and led to birth before 34 weeks, and about 1 in 2 (55%) pregnancies if it led to birth before 28 weeks. [1.10.4.2]



# 1 Guidance

The following guidance is based on the best available evidence. The full guideline ([www.nice.org.uk/guidance/CG107](http://www.nice.org.uk/guidance/CG107)) gives details of the methods and the evidence used to develop the guidance.

## Definitions

For the purposes of this guideline, the following definitions apply:

- **Chronic hypertension** is hypertension that is present at the booking visit or before 20 weeks or if the woman is already taking antihypertensive medication when referred to maternity services. It can be primary or secondary in aetiology.
- **Eclampsia** is a convulsive condition associated with pre-eclampsia.
- **HELLP syndrome** is haemolysis, elevated liver enzymes and low platelet count.
- **Gestational hypertension** is new hypertension presenting after 20 weeks without significant proteinuria.
- **Pre-eclampsia** is new hypertension presenting after 20 weeks with significant proteinuria.
- **Severe pre-eclampsia** is pre-eclampsia with severe hypertension and/or with symptoms, and/or biochemical and/or haematological impairment.
- **Significant proteinuria** is defined in recommendation [1.3.1.3](#)

In addition, the Guideline Development Group (GDG) has defined mild, moderate and severe hypertension to help with implementation of this guidance as follows:

- **Mild hypertension** diastolic blood pressure 90–99 mmHg, systolic blood pressure 140–149 mmHg.
- **Moderate hypertension** diastolic blood pressure 100–109 mmHg, systolic blood pressure 150–159 mmHg.
- **Severe hypertension** diastolic blood pressure 110 mmHg or greater, systolic blood pressure 160 mmHg or greater.

NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

Techniques for the measurement of blood pressure in pregnancy are described in 'Antenatal care' (NICE clinical guideline 62).

In this guideline, offer birth means to offer elective early birth through induction of labour or by elective caesarean section if indicated.

## **1.1 *Reducing the risk of hypertensive disorders in pregnancy***

### **1.1.1 Symptoms of pre-eclampsia**

1.1.1.1 Pregnant women should be made aware of the need to seek immediate advice from a healthcare professional if they experience symptoms of pre-eclampsia. Symptoms include:

- severe headache
- problems with vision, such as blurring or flashing before the eyes
- severe pain just below the ribs
- vomiting
- sudden swelling of the face, hands or feet.

[This recommendation is adapted from 'Antenatal care' (NICE clinical guideline 62)].

### **1.1.2 Antiplatelet agents**

1.1.2.1 Advise women at high risk of pre-eclampsia to take 75 mg of aspirin\* daily from 12 weeks until the birth of the baby. Women at high risk are those with any of the following:

- hypertensive disease during a previous pregnancy
- chronic kidney disease

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\* In this guideline, drug names are marked with an asterisk if they do not have UK marketing authorisation for the indication in question at the time of publication (August 2010). Informed consent should be obtained and documented.

- autoimmune disease such as systemic lupus erythematosus or antiphospholipid syndrome
- type 1 or type 2 diabetes
- chronic hypertension.

1.1.2.2 Advise women with more than one moderate risk factor for pre-eclampsia to take 75 mg of aspirin\* daily from 12 weeks until the birth of the baby. Factors indicating moderate risk are:

- first pregnancy
- age 40 years or older
- pregnancy interval of more than 10 years
- body mass index (BMI) of 35 kg/m<sup>2</sup> or more at first visit
- family history of pre-eclampsia
- multiple pregnancy.

### **1.1.3 Other pharmaceutical agents**

1.1.3.1 Do not use the following to prevent hypertensive disorders during pregnancy:

- nitric oxide donors
- progesterone
- diuretics
- low molecular weight heparin.

### **1.1.4 Nutritional supplements**

1.1.4.1 Do not recommend the following supplements solely with the aim of preventing hypertensive disorders during pregnancy:

- magnesium
- folic acid
- antioxidants (vitamins C and E)
- fish oils or algal oils
- garlic.

### **1.1.5 Diet**

1.1.5.1 Do not recommend salt restriction during pregnancy solely to prevent gestational hypertension or pre-eclampsia.

### **1.1.6 Lifestyle**

1.1.6.1 Advice on rest, exercise and work for women at risk of hypertensive disorders during pregnancy should be the same as for healthy pregnant women (see 'Antenatal care', NICE clinical guideline 62).

## **1.2 *Management of pregnancy with chronic hypertension***

Women with chronic hypertension should be given advice and treatment in line with 'Hypertension: the management of hypertension in adults in primary care' (NICE clinical guideline 34), unless it specifically differs from recommendations in this guideline.

### **1.2.1 Pre-pregnancy advice**

1.2.1.1 Tell women who take angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs):

- that there is an increased risk of congenital abnormalities if these drugs are taken during pregnancy
- to discuss other antihypertensive treatment with the healthcare professional responsible for managing their hypertension, if they are planning pregnancy.

1.2.1.2 Stop antihypertensive treatment in women taking ACE inhibitors or ARBs if they become pregnant (preferably within 2 working days of notification of pregnancy) and offer alternatives.

1.2.1.3 Tell women who take chlorothiazide diuretics:

- that there may be an increased risk of congenital abnormality and neonatal complications if these drugs are taken during pregnancy

NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

- to discuss other antihypertensive treatment with the healthcare professional responsible for managing their hypertension, if they are planning pregnancy.

1.2.1.4 Tell women who take antihypertensive treatments other than ACE inhibitors, ARBs or chlorothiazide diuretics that the limited evidence available has not shown an increased risk of congenital malformation with such treatments.

## **1.2.2 Diet**

1.2.2.1 Encourage women with chronic hypertension to keep their dietary sodium intake low, either by reducing or substituting sodium salt, because this can reduce blood pressure. [This recommendation is adapted from 'Hypertension: management of hypertension in adults in primary care' (NICE clinical guideline 34).]

## **1.2.3 Treatment of hypertension**

1.2.3.1 In pregnant women with uncomplicated chronic hypertension aim to keep blood pressure lower than 150/100 mmHg.

1.2.3.2 Do not offer pregnant women with uncomplicated chronic hypertension treatment to lower diastolic blood pressure below 80 mmHg.

1.2.3.3 Offer pregnant women with target-organ damage secondary to chronic hypertension (for example, kidney disease) treatment with the aim of keeping blood pressure lower than 140/90 mmHg.

1.2.3.4 Offer pregnant women with secondary chronic hypertension referral to a specialist in hypertensive disorders.

1.2.3.5 Offer women with chronic hypertension antihypertensive treatment dependent on pre-existing treatment, side-effect profiles and teratogenicity.

## **1.2.4 Antenatal consultations**

1.2.4.1 In women with chronic hypertension, schedule additional antenatal consultations based on the individual needs of the woman and her baby.

## **1.2.5 Timing of birth**

1.2.5.1 Do not offer birth to women with chronic hypertension whose blood pressure is lower than 160/110 mmHg, with or without antihypertensive treatment, before 37 weeks.

1.2.5.2 For women with chronic hypertension whose blood pressure is lower than 160/110 mmHg after 37 weeks, with or without antihypertensive treatment, timing of birth and maternal and fetal indications for birth should be agreed between the woman and the senior obstetrician.

1.2.5.3 Offer birth to women with refractory severe chronic hypertension, after a course of corticosteroids (if required) has been completed.

## **1.2.6 Postnatal investigation, monitoring and treatment**

1.2.6.1 In women with chronic hypertension who have given birth, measure blood pressure:

- daily for the first 2 days after birth
- at least once between day 3 and day 5 after birth
- as clinically indicated if antihypertensive treatment is changed after birth.

1.2.6.2 In women with chronic hypertension who have given birth, aim to keep blood pressure lower than 140/90 mmHg.

1.2.6.3 In women with chronic hypertension who have given birth:

- continue antenatal antihypertensive treatment.

- review long-term antihypertensive treatment 2 weeks after the birth.
- 1.2.6.4 If a woman has taken methyldopa<sup>†</sup> to treat chronic hypertension during pregnancy, stop within 2 days of birth and restart the antihypertensive treatment the woman was taking before she planned the pregnancy.
- 1.2.6.5 Offer women with chronic hypertension a medical review at the postnatal review (6–8 weeks after the birth) with the pre-pregnancy care team.

### **1.3 *Assessment of proteinuria in hypertensive disorders of pregnancy***

- 1.3.1.1 Use an automated reagent-strip reading device or a spot urinary protein:creatinine ratio for estimating proteinuria in a secondary care setting.
- 1.3.1.2 If an automated reagent-strip reading device is used to detect proteinuria and a result of 1+ or more is obtained, use a spot urinary protein:creatinine ratio or 24-hour urine collection to quantify proteinuria.
- 1.3.1.3 Diagnose significant proteinuria if the urinary protein:creatinine ratio is greater than 30 mg/mmol or a validated 24-hour urine collection result shows greater than 300 mg protein.
- 1.3.1.4 Where 24-hour urine collection is used to quantify proteinuria, there should be a recognised method of evaluating completeness of the sample.

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<sup>†</sup> This guideline assumes that prescribers will use a drug's summary of product characteristics (SPC) to inform decisions made with individual patients. Drugs for which particular attention should be paid to the contraindications and special warnings during pregnancy and lactation are marked with <sup>†</sup> and detailed in appendix D.

## **1.4      *Management of pregnancy with gestational hypertension***

### **1.4.1      Treatment of hypertension**

1.4.1.1      In women with gestational hypertension full assessment should be carried out in a secondary care setting by a healthcare professional who is trained in the management of hypertensive disorders.

1.4.1.2      In women with gestational hypertension, take account of the following risk factors that require additional assessment and follow-up:

- nulliparity
- age 40 years or older
- pregnancy interval of more than 10 years
- family history of pre-eclampsia
- multiple pregnancy
- BMI of 35 kg/m<sup>2</sup> or more
- gestational age at presentation
- previous history of pre-eclampsia or gestational hypertension
- pre-existing vascular disease
- pre-existing kidney disease.

1.4.1.3      Offer women with gestational hypertension an integrated package of care covering admission to hospital, treatment, measurement of blood pressure, testing for proteinuria and blood tests as indicated in [Table 1](#).



**Table 1 Management of pregnancy with gestational hypertension**

Degree of hypertension	Mild hypertension (140/90 to 149/99 mmHg)	Moderate hypertension (150/100 to 159/109 mmHg)	Severe hypertension (160/110 mmHg or higher)
<b>Admit to hospital</b>	No	No	Yes (until blood pressure is 159/109 mmHg or lower)
<b>Treat</b>	No	With oral labetalol <sup>†</sup> as first-line treatment to keep: <ul style="list-style-type: none"> <li>• diastolic blood pressure between 80–100 mmHg</li> <li>• systolic blood pressure less than 150 mmHg</li> </ul>	With oral labetalol <sup>†</sup> as first-line treatment to keep: <ul style="list-style-type: none"> <li>• diastolic blood pressure between 80–100 mmHg</li> <li>• systolic blood pressure less than 150 mmHg</li> </ul>
<b>Measure blood pressure</b>	Not more than once a week	At least twice a week	At least four times a day
<b>Test for proteinuria</b>	At each visit using automated reagent-strip reading device or urinary protein:creatinine ratio	At each visit using automated reagent-strip reading device or urinary protein:creatinine ratio	Daily using automated reagent-strip reading device or urinary protein:creatinine ratio
<b>Blood tests</b>	Only those for routine antenatal care	Test kidney function, electrolytes, full blood count, transaminases, bilirubin  Do not carry out further blood tests if no proteinuria at subsequent visits	Test at presentation and then monitor weekly: <ul style="list-style-type: none"> <li>• kidney function, electrolytes, full blood count, transaminases, bilirubin</li> </ul>

1.4.1.4 Only offer women with gestational hypertension antihypertensive treatment other than labetalol after considering side-effect profiles for the woman, fetus and newborn baby. Alternatives include methyldopa<sup>†</sup> and nifedipine<sup>†</sup>.

1.4.1.5 In women receiving outpatient care for severe gestational hypertension, after it has been effectively controlled in hospital,

NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

measure blood pressure and test urine twice weekly and carry out weekly blood tests.

1.4.1.6 In women with mild hypertension presenting before 32 weeks, or at high risk of pre-eclampsia (see [1.1.1.1](#)), measure blood pressure and test urine twice weekly.

1.4.1.7 Do not offer bed rest in hospital as a treatment for gestational hypertension.

## **1.4.2 Timing of birth**

1.4.2.1 Do not offer birth before 37 weeks to women with gestational hypertension whose blood pressure is lower than 160/110 mmHg, with or without antihypertensive treatment.

1.4.2.2 For women with gestational hypertension whose blood pressure is lower than 160/110 mmHg after 37 weeks, with or without antihypertensive treatment, timing of birth, and maternal and fetal indications for birth should be agreed between the woman and the senior obstetrician.

1.4.2.3 Offer birth to women with refractory severe gestational hypertension after a course of corticosteroids (if required) has been completed.

## **1.4.3 Postnatal investigation, monitoring and treatment**

1.4.3.1 In women with gestational hypertension who have given birth, measure blood pressure:

- daily for the first 2 days after birth
- at least once between day 3 and day 5 after birth
- as clinically indicated if antihypertensive treatment is changed after birth.

1.4.3.2 In women with gestational hypertension who have given birth:

NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

- continue use of antenatal antihypertensive treatment
  - consider reducing antihypertensive treatment if their blood pressure falls below 140/90 mmHg
  - reduce antihypertensive treatment if their blood pressure falls below 130/80 mmHg.
- 1.4.3.3 If a woman has taken methyldopa<sup>†</sup> to treat gestational hypertension, stop within 2 days of birth.
- 1.4.3.4 For women with gestational hypertension who did not take antihypertensive treatment and have given birth, start antihypertensive treatment if their blood pressure is higher than 149/99 mmHg.
- 1.4.3.5 Write a care plan for women with gestational hypertension who have given birth and are being transferred to community care that includes all of the following:
- who will provide follow-up care, including medical review if needed
  - frequency of blood pressure monitoring needed
  - thresholds for reducing or stopping treatment
  - indications for referral to primary care for blood pressure review.
- 1.4.3.6 Offer women who have had gestational hypertension and remain on antihypertensive treatment 2 weeks after transfer to community care, a medical review.
- 1.4.3.7 Offer women who have had gestational hypertension a medical review at the postnatal review (6–8 weeks after the birth).
- 1.4.3.8 Offer women who have had gestational hypertension and who still need antihypertensive treatment at the postnatal review (6–8 weeks after the birth) a specialist assessment of their hypertension.

## 1.5 *Management of pregnancy with pre-eclampsia*

### 1.5.1 Treatment of hypertension

- 1.5.1.1 Assess women with pre-eclampsia at each consultation. Assessment should be performed by a healthcare professional trained in the management of hypertensive disorders of pregnancy.
- 1.5.1.2 Offer women with pre-eclampsia an integrated package of care covering admission to hospital, treatment, measurement of blood pressure, testing for proteinuria and blood tests as indicated in [Table 2](#).

**Table 2 Management of pregnancy with pre-eclampsia**

Degree of hypertension	Mild hypertension (140/90 to 149/99 mmHg)	Moderate hypertension (150/100 to 159/109 mmHg)	Severe hypertension (160/110 mmHg or higher)
<b>Admit to hospital</b>	Yes	Yes	Yes
<b>Treat</b>	No	With oral labetalol <sup>†</sup> as first-line treatment to keep: <ul style="list-style-type: none"> <li>• diastolic blood pressure between 80–100 mmHg</li> <li>• systolic blood pressure less than 150 mmHg</li> </ul>	With oral labetalol <sup>†</sup> as first-line treatment to keep: <ul style="list-style-type: none"> <li>• diastolic blood pressure between 80–100 mmHg</li> <li>• systolic blood pressure less than 150 mmHg</li> </ul>
<b>Measure blood pressure</b>	At least four times a day	At least four times a day	More than four times a day, depending on clinical circumstances
<b>Test for proteinuria</b>	Do not repeat quantification of proteinuria	Do not repeat quantification of proteinuria	Do not repeat quantification of proteinuria
<b>Blood tests</b>	Monitor using the following tests twice a week: kidney function, electrolytes, full blood count, transaminases, bilirubin	Monitor using the following tests three times a week: kidney function, electrolytes, full blood count, transaminases, bilirubin	Monitor using the following tests three times a week: kidney function, electrolytes, full blood count, transaminases, bilirubin

1.5.1.3 Only offer women with pre-eclampsia antihypertensive treatment other than labetalol after considering side-effect profiles for the woman, fetus and newborn baby. Alternatives include methyldopa<sup>†</sup> and nifedipine<sup>†</sup>.

## **1.5.2 Timing of birth**

1.5.2.1 Manage pregnancy in women with pre-eclampsia conservatively (that is, do not plan same-day delivery of the baby) until 34 weeks.

1.5.2.2 Consultant obstetric staff should document in the woman's notes the maternal (biochemical, haematological and clinical) and fetal thresholds for elective birth before 34 weeks in women with pre-eclampsia.

1.5.2.3 Consultant obstetric staff should write a plan for antenatal fetal monitoring during birth.

1.5.2.4 Offer birth to women with pre-eclampsia before 34 weeks, after discussion with neonatal and anaesthetic teams and a course of corticosteroids has been given if:

- severe hypertension develops refractory to treatment
- maternal or fetal indications develop as specified in the consultant plan (see [1.5.2.2](#)).

1.5.2.5 Recommend birth for women who have pre-eclampsia with severe hypertension after 34 weeks when their blood pressure has been controlled and a course of corticosteroids has been completed (if appropriate).

1.5.2.6 Offer birth to women who have pre-eclampsia with mild or moderate hypertension at 34<sup>+0</sup> to 36<sup>+6</sup> weeks depending on maternal and fetal condition, risk factors and availability of neonatal intensive care.

1.5.2.7 Recommend birth within 24–48 hours for women who have pre-eclampsia with mild or moderate hypertension after 37<sup>+0</sup> weeks.

### **1.5.3 Postnatal investigation, monitoring and treatment (including after discharge from critical care)**

#### **Blood pressure**

1.5.3.1 In women with pre-eclampsia who did not take antihypertensive treatment and have given birth, measure blood pressure:

- at least four times a day while the woman is an inpatient
- at least once between day 3 and day 5 after birth
- on alternate days until normal if blood pressure was abnormal on days 3–5.

1.5.3.2 In women with pre-eclampsia who did not take antihypertensive treatment and have given birth, start antihypertensive treatment if blood pressure is 150/100 mmHg or higher.

1.5.3.3 Ask women with pre-eclampsia who have given birth about severe headache and epigastric pain each time blood pressure is measured.

1.5.3.4 In women with pre-eclampsia who took antihypertensive treatment and have given birth, measure blood pressure:

- at least four times a day while the woman is an inpatient
- every 1–2 days for up to 2 weeks after transfer to community care until the woman is off treatment and has no hypertension.

1.5.3.5 For women with pre-eclampsia who have taken antihypertensive treatment and have given birth:

- continue antenatal antihypertensive treatment
- consider reducing antihypertensive treatment if their blood pressure falls below 140/90 mmHg

- reduce antihypertensive treatment if their blood pressure falls below 130/80 mmHg.
- 1.5.3.6 If a woman has taken methyldopa<sup>†</sup> to treat pre-eclampsia, stop within 2 days of birth.
- 1.5.3.7 Offer women with pre-eclampsia who have given birth transfer to community care if all of the following criteria have been met:
- there are no symptoms of pre-eclampsia
  - blood pressure, with or without treatment, is 149/99 mmHg or lower
  - blood test results are stable or improving.
- 1.5.3.8 Write a care plan for women with pre-eclampsia who have given birth and are being transferred to community care that includes all of the following:
- who will provide follow-up care, including medical review if needed
  - frequency of blood pressure monitoring
  - thresholds for reducing or stopping treatment
  - indications for referral to primary care for blood pressure review
  - self-monitoring for symptoms.
- 1.5.3.9 Offer women who have pre-eclampsia and are still on antihypertensive treatment 2 weeks after transfer to community care a medical review.
- 1.5.3.10 Offer all women who have had pre-eclampsia a medical review at the postnatal review (6–8 weeks after the birth).
- 1.5.3.11 Offer women who have had pre-eclampsia and who still need antihypertensive treatment at the postnatal review (6–8 weeks after the birth) a specialist assessment of their hypertension.

## **Haematological and biochemical monitoring**

- 1.5.3.12 In women who have pre-eclampsia with mild or moderate hypertension, or after step-down from critical care:
- measure platelet count, transaminases and serum creatinine 48–72 hours after birth or step-down
  - do not repeat platelet count, transaminases or serum creatinine measurements if results are normal at 48–72 hours.
- 1.5.3.13 If biochemical and haematological indices are improving but stay within the abnormal range in women with pre-eclampsia who have given birth, repeat platelet count, transaminases and serum creatinine measurements as clinically indicated and at the postnatal review (6–8 weeks after the birth).
- 1.5.3.14 If biochemical and haematological indices are not improving relative to pregnancy ranges in women with pre-eclampsia who have given birth, repeat platelet count, transaminases and serum creatinine measurements as clinically indicated.
- 1.5.3.15 In women with pre-eclampsia who have given birth, carry out a urinary reagent-strip test at the postnatal review (6–8 weeks after the birth).
- 1.5.3.16 In women with pre-eclampsia who have given birth and have stepped down from critical care level 2, do not measure fluid balance if creatinine is within the normal range.
- 1.5.3.17 Offer women who had pre-eclampsia and still have proteinuria (1+ or more) at the postnatal review (6–8 weeks after the birth) a further review at 3 months after the birth to assess kidney function and consider offering them a referral for specialist kidney assessment.



## **1.6**      ***Fetal monitoring***

### **1.6.1**      **Chronic hypertension**

1.6.1.1      In women with chronic hypertension, carry out ultrasound fetal growth and amniotic fluid volume assessment and umbilical artery doppler velocimetry between 28 and 30 weeks and between 32 and 34 weeks. If results are normal, do not repeat at more than 34 weeks, unless otherwise clinically indicated.

1.6.1.2      In women with chronic hypertension, only carry out cardiotocography if fetal activity is abnormal.

### **1.6.2**      **Mild or moderate gestational hypertension**

1.6.2.1      In women with mild or moderate gestational hypertension, carry out ultrasound fetal growth and amniotic fluid volume assessment and umbilical artery doppler velocimetry if diagnosis is confirmed at less than 34 weeks. If results are normal, do not repeat at more than 34 weeks, unless otherwise clinically indicated.

1.6.2.2      In women with mild or moderate gestational hypertension, do not carry out ultrasound fetal growth and amniotic fluid volume assessment and umbilical artery doppler velocimetry if diagnosis is confirmed after 34 weeks, unless otherwise clinically indicated.

1.6.2.3      In women with mild or moderate gestational hypertension, only carry out cardiotocography if fetal activity is abnormal.

### **1.6.3**      **Severe gestational hypertension or pre-eclampsia**

1.6.3.1      Carry out cardiotocography at diagnosis of severe gestational hypertension or pre-eclampsia.

1.6.3.2      If conservative management of severe gestational hypertension or pre-eclampsia is planned, carry out all the following tests at diagnosis:

- ultrasound fetal growth and amniotic fluid volume assessment
  - umbilical artery doppler velocimetry.
- 1.6.3.3 If the results of all fetal monitoring are normal in women with severe gestational hypertension or pre-eclampsia, do not routinely repeat cardiotocography more than weekly.
- 1.6.3.4 In women with severe gestational hypertension or pre-eclampsia, repeat cardiotocography if any of the following occur:
- the woman reports a change in fetal movement
  - vaginal bleeding
  - abdominal pain
  - deterioration in maternal condition.
- 1.6.3.5 In women with severe gestational hypertension or pre-eclampsia, do not routinely repeat ultrasound fetal growth and amniotic fluid volume assessment or umbilical artery doppler velocimetry more than every 2 weeks.
- 1.6.3.6 If the results of any fetal monitoring in women with severe gestational hypertension or pre-eclampsia are abnormal, tell a consultant obstetrician.
- 1.6.3.7 For women with severe gestational hypertension or pre-eclampsia, write a care plan that includes all of the following:
- the timing and nature of future fetal monitoring
  - fetal indications for birth and if and when corticosteroids should be given
  - when discussion with neonatal paediatricians and obstetric anaesthetists should take place and what decisions should be made.

## **1.6.4 Women at high risk of pre-eclampsia**

1.6.4.1 Carry out ultrasound fetal growth and amniotic fluid volume assessment and umbilical artery doppler velocimetry starting at between 28 and 30 weeks (or at least 2 weeks before previous gestational age of onset if earlier than 28 weeks) and repeating 4 weeks later in women with previous:

- severe pre-eclampsia
- pre-eclampsia that needed birth before 34 weeks
- pre-eclampsia with a baby whose birth weight was less than the 10th centile
- intrauterine death
- placental abruption.

1.6.4.2 In women who are at high risk of pre-eclampsia (see [1.1.2.2](#)), only carry out cardiotocography if fetal activity is abnormal.

## **1.7 Intrapartum care**

Women with hypertensive disorders during pregnancy should be given advice and treatment in line with 'Intrapartum care: management and delivery of care to women in labour' (NICE clinical guideline 55), unless it specifically differs from recommendations in this guideline.

### **1.7.1 Blood pressure**

1.7.1.1 During labour, measure blood pressure:

- hourly in women with mild or moderate hypertension
- continually in women with severe hypertension.

1.7.1.2 Continue use of antenatal antihypertensive treatment during labour.

### **1.7.2 Haematological and biochemical monitoring**

1.7.2.1 Determine the need for haematological and biochemical tests during labour in women with mild or moderate hypertension using

NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

the same criteria as in the antenatal period even if regional analgesia is being considered.

### **1.7.3 Care during epidural analgesia**

1.7.3.1 Do not preload women who have severe pre-eclampsia with intravenous fluids before establishing low-dose epidural analgesia and combined spinal epidural analgesia.

### **1.7.4 Management of the second stage of labour**

1.7.4.1 Do not routinely limit the duration of the second stage of labour:

- in women with stable mild or moderate hypertension **or**
- if blood pressure is controlled within target ranges in women with severe hypertension.

1.7.4.2 Recommend operative birth in the second stage of labour for women with severe hypertension whose hypertension has not responded to initial treatment.

## **1.8 *Medical management of severe hypertension or severe pre-eclampsia in a critical care setting***

### **1.8.1 Anticonvulsants**

1.8.1.1 If a woman in a critical care setting who has severe hypertension or severe pre-eclampsia has or previously had an eclamptic fit, give intravenous magnesium sulphate\*.

1.8.1.2 Consider giving intravenous magnesium sulphate\* to women with severe pre-eclampsia who are in a critical care setting if birth is planned within 24 hours.

1.8.1.3 If considering magnesium sulphate\* treatment, use the following as features of severe pre-eclampsia:

- severe hypertension and proteinuria **or**

- mild or moderate hypertension and proteinuria with one or more of the following:
  - symptoms of severe headache
  - problems with vision, such as blurring or flashing before the eyes
  - severe pain just below the ribs or vomiting
  - papilloedema
  - signs of clonus ( $\geq 3$  beats)
  - liver tenderness
  - HELLP syndrome
  - platelet count falling to below  $100 \times 10^9$  per litre
  - abnormal liver enzymes (ALT or AST rising to above 70 iu/litre).

1.8.1.4 Use the Collaborative Eclampsia Trial<sup>2</sup> regimen for administration of magnesium sulphate\*:

- loading dose of 4 g should be given intravenously over 5 minutes, followed by an infusion of 1 g/hour maintained for 24 hours
- recurrent seizures should be treated with a further dose of 2–4 g given over 5 minutes.

1.8.1.5 Do not use diazepam, phenytoin or lytic cocktail as an alternative to magnesium sulphate\* in women with eclampsia.

## 1.8.2 Antihypertensives

1.8.2.1 Treat women with severe hypertension who are in critical care during pregnancy or after birth immediately with one of the following:

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<sup>2</sup> The Eclampsia Trial Collaborative Group (1995) Which anticonvulsant for women with eclampsia? Evidence from the Collaborative Eclampsia Trial. *Lancet* 345:1455–63

- labetalol<sup>†</sup> (oral or intravenous)
- hydralazine (intravenous)
- nifedipine<sup>†</sup> (oral).

1.8.2.2 In women with severe hypertension who are in critical care, monitor their response to treatment:

- to ensure that their blood pressure falls
- to identify adverse effects for both the woman and the fetus
- to modify treatment according to response.

1.8.2.3 Consider using up to 500 ml crystalloid fluid before or at the same time as the first dose of intravenous hydralazine in the antenatal period.

1.8.2.4 In women with severe hypertension who are in critical care, aim to keep systolic blood pressure below 150 mmHg and diastolic blood pressure between 80 and 100 mmHg.

### **1.8.3 Corticosteroids for fetal lung maturation**

1.8.3.1 If birth is considered likely within 7 days in women with pre-eclampsia:

- give two doses of betamethasone\* 12 mg intramuscularly 24 hours apart in women between 24 and 34 weeks
- consider giving two doses of betamethasone\* 12 mg intramuscularly 24 hours apart in women between 35 and 36 weeks.

### **1.8.4 Corticosteroids to manage HELLP syndrome**

1.8.4.1 Do not use dexamethasone or betamethasone for the treatment of HELLP syndrome.

## **1.8.5 Fluid balance and volume expansion**

- 1.8.5.1 Do not use volume expansion in women with severe pre-eclampsia unless hydralazine is the antenatal antihypertensive.
- 1.8.5.2 In women with severe pre-eclampsia, limit maintenance fluids to 80 ml/hour unless there are other ongoing fluid losses (for example, haemorrhage).

## **1.8.6 Caesarean section versus induction of labour**

- 1.8.6.1 Choose mode of birth for women with severe hypertension, severe pre-eclampsia or eclampsia according to the clinical circumstances and the woman's preference.

## **1.8.7 Indications for referral to critical care levels**

- 1.8.7.1 Offer women with severe hypertension or severe pre-eclampsia referral to the appropriate critical care setting using the following criteria<sup>3</sup>:

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<sup>3</sup> Table adapted by the Guideline Development Group from Intensive Care Society, Standards and Guidelines 2002.

Level 3 care	Severe pre-eclampsia and needing ventilation
Level 2 care	Step-down from level 3 or severe pre-eclampsia with any of the following complications: <ul style="list-style-type: none"> <li>– eclampsia</li> <li>– HELLP syndrome</li> <li>– haemorrhage</li> <li>– hyperkalaemia</li> <li>– severe oliguria</li> <li>– coagulation support</li> <li>– intravenous antihypertensive treatment</li> <li>– initial stabilisation of severe hypertension</li> <li>– evidence of cardiac failure</li> <li>– abnormal neurology</li> </ul>
Level 1 care	<ul style="list-style-type: none"> <li>– Pre-eclampsia with mild or moderate hypertension</li> <li>– Ongoing conservative antenatal management of severe preterm hypertension</li> <li>– Step-down treatment after the birth</li> </ul>

## **1.9 Breastfeeding**

1.9.1.1 In women who still need antihypertensive treatment in the postnatal period, avoid diuretic treatment for hypertension if the woman is breastfeeding or expressing milk.

1.9.1.2 Tell women who still need antihypertensive treatment in the postnatal period that the following antihypertensive drugs have no known adverse effects on babies receiving breast milk:

- labetalol<sup>†</sup>
- nifedipine<sup>†</sup>
- enalapril<sup>†</sup>
- captopril<sup>†</sup>
- atenolol<sup>†</sup>
- metoprolol<sup>†</sup>.



1.9.1.3 Tell women who still need antihypertensive treatment in the postnatal period that there is insufficient evidence on the safety in babies receiving breast milk of the following antihypertensive drugs:

- ARBs
- amlodipine
- ACE inhibitors other than enalapril<sup>†</sup> and captopril<sup>†</sup>.

1.9.1.4 Assess the clinical wellbeing of the baby, especially adequacy of feeding, at least daily for the first 2 days after the birth.

## **1.10 *Advice and follow-up care at transfer to community care***

### **1.10.1 Long-term risk of cardiovascular disease**

1.10.1.1 Tell women who have had gestational hypertension or pre-eclampsia, and their primary care clinicians, that these conditions are associated with an increased risk of developing high blood pressure and its complications in later life.

### **1.10.2 Long-term risk of end-stage kidney disease**

1.10.2.1 Tell women with a history of pre-eclampsia who have no proteinuria and no hypertension at the postnatal review (6–8 weeks after the birth) that although the relative risk of end-stage kidney disease is increased the absolute risk is low and no further follow-up is necessary.

### **1.10.3 Thrombophilia and the risk of pre-eclampsia**

1.10.3.1 Do not routinely perform screening for thrombophilia in women who have had pre-eclampsia.

#### **1.10.4 Risk of recurrence of hypertensive disorders of pregnancy**

1.10.4.1 Tell women who had gestational hypertension that their risk of developing:

- gestational hypertension in a future pregnancy ranges from about 1 in 6 (16%) pregnancies to about 1 in 2 (47%) pregnancies
- pre-eclampsia in a future pregnancy ranges from 1 in 50 (2%) to about 1 in 14 (7%) pregnancies.

1.10.4.2 Tell women who had pre-eclampsia that their risk of developing:

- gestational hypertension in a future pregnancy ranges from about 1 in 8 (13%) pregnancies to about 1 in 2 (53%) pregnancies
- pre-eclampsia in a future pregnancy is up to about 1 in 6 (16%) pregnancies
- pre-eclampsia in a future pregnancy is about 1 in 4 (25%) pregnancies if their pre-eclampsia was complicated by severe pre-eclampsia, HELLP syndrome or eclampsia and led to birth before 34 weeks, and about 1 in 2 (55%) pregnancies if it led to birth before 28 weeks.

#### **1.10.5 Inter-pregnancy interval and recurrence of hypertensive disorders of pregnancy**

1.10.5.1 Tell women who have had pre-eclampsia that there is no additional risk of recurrence with inter-pregnancy interval up to 10 years.

#### **1.10.6 Body mass index and recurrence of hypertensive disorders of pregnancy**

1.10.6.1 Advise women who have had pre-eclampsia to achieve and keep a BMI within the healthy range before their next pregnancy (18.5–24.9 kg/m<sup>2</sup>, 'Obesity', NICE clinical guideline 43).

NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

## 2 Notes on the scope of the guidance

NICE guidelines are developed in accordance with a scope that defines what the guideline will and will not cover. The scope of this guideline is available from [www.nice.org.uk/guidance/CG107](http://www.nice.org.uk/guidance/CG107)

This guideline covers women who present with hypertensive disorders for the first time during pregnancy; women who have pre-existing hypertension and are planning pregnancy or are pregnant; and women who are pregnant and at increased risk of developing hypertensive disorders during pregnancy. It also covers the fetus until birth.

It does not cover women with hypertension and diabetes or babies of women who have had hypertensive disorders during pregnancy.

### **How this guideline was developed**

NICE commissioned the National Collaborating Centre for Women's and Children's Health to develop this guideline. The Centre established a guideline development group (see appendix A), which reviewed the evidence and developed the recommendations. An independent guideline review panel oversaw the development of the guideline (see appendix B).

There is more information about how NICE clinical guidelines are developed on the NICE website ([www.nice.org.uk/HowWeWork](http://www.nice.org.uk/HowWeWork)). A booklet, 'How NICE clinical guidelines are developed: an overview for stakeholders, the public and the NHS' (fourth edition, published 2009), is available from NICE publications (phone 0845 003 7783 or email [publications@nice.org.uk](mailto:publications@nice.org.uk) and quote reference N1739).

## 3 Implementation

NICE has developed tools to help organisations implement this guidance (see [www.nice.org.uk/guidance/CG107](http://www.nice.org.uk/guidance/CG107)).

NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

## 4 Research recommendations

The Guideline Development Group has made the following recommendations for research, based on its review of evidence, to improve NICE guidance and patient care in the future. The Guideline Development Group's full set of research recommendations is detailed in the full guideline (see section 5).

### 4.1 *Reducing the risk of hypertensive disorders in pregnancy*

4.1.1 How clinically and cost effective is calcium supplementation (compared with placebo) for the prevention of pre-eclampsia in women at both moderate and high risk of pre-eclampsia?

#### **Why this is important**

Pre-eclampsia and gestational hypertension represent common pregnancy complications. Although large studies on the use of calcium supplementation to prevent hypertensive disorders during pregnancy have been carried out, the variation in populations and calcium status at entry to the studies has made it impossible to reach a conclusion on the value of such treatment in any setting. Calcium supplementation as a treatment is cheap, likely to be well tolerated, and likely to be safe for both the woman and the fetus, although this needs to be confirmed. Even a modest effect would be potentially important given the simplicity of the treatment. A new meta-analysis, using the technique of meta-analysis regression, is needed to clarify the roles of dietary calcium intake and underlying pre-eclampsia risk, taking advantage of subgroup data and seeking additional information from the authors of published trials where possible. Further randomised controlled trials could also be conducted to examine risk reduction in women at moderate and high risk of pre-eclampsia, and to re-examine risk reduction in women at low risk of pre-eclampsia. These trials should consider maternal diet and calcium status and they should evaluate both maternal outcomes (incidence of hypertensive diseases during pregnancy, including severe disease) and neonatal or infant outcomes (neonatal morbidity, infant growth and development).

NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

## **4.2      *Assessment of proteinuria in hypertensive disorders of pregnancy***

4.2.1      How should significant proteinuria be defined in women with hypertension during pregnancy?

### **Why this is important**

Most adverse outcomes in new-onset hypertensive disorders during pregnancy arise in women with proteinuria. However, the quality of evidence for the diagnosis of significant proteinuria is poor and the prognostic value of different quantities of urinary protein is unclear. There is a need for large, high-quality prospective studies comparing the various methods of measuring proteinuria (automated reagent-strip reading devices, urinary protein:creatinine ratio, urinary albumin:creatinine ratio, and 24-hour urine collection) in women with new-onset hypertensive disorders during pregnancy. The studies should aim to determine which method of measurement, and which diagnostic thresholds, are most accurate in predicting clinically important outcomes. Such studies would inform decisions regarding clinical management of new-onset hypertensive disorders during pregnancy. If predictive parameters were identified then interventions based on these and aimed at improving outcomes could be evaluated in randomised clinical trials.

## **4.3      *Haematological and biochemical monitoring in women with gestational hypertension***

What is the role of assessing haematological or biochemical parameters at diagnosis of gestational hypertension and during surveillance of gestational hypertension?

### **Why this is important**

Pre-eclampsia is a multisystem disorder, but it is not clear whether routine assessment of a range of haematological or biochemical parameters in women with gestational hypertension helps clinical care or is sufficiently discriminatory to allow better targeted care. Information on which

NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

assessments might be useful is incomplete and there are confusing data on whether clinical outcomes are changed.

Large prospective studies should be carried out to examine a range of parameters singly and serially (kidney function, liver function, coagulation, measurement of proteinuria) in women with gestational hypertension. These studies should use properly validated pregnancy values and examine the prediction of clinically important outcomes (severe pre-eclampsia and its maternal and fetal complications).

If parameters with sufficient prediction are identified, randomised controlled trials should be used to compare the effect of knowledge of these compared with no knowledge on clinical maternal and perinatal outcomes. Trial results should be incorporated in health economic models to assess cost effectiveness.

#### **4.4      *Timing of birth in women with pre-eclampsia***

When should women who have pre-eclampsia with mild or moderate hypertension give birth?

##### **Why this is important**

There is a 'grey' zone for women who have pre-eclampsia with mild or moderate hypertension between 34 and 37 weeks when the optimal timing of birth is not clear.

Women who have pre-eclampsia with mild or moderate hypertension may progress to severe disease with its risks, but it is not clear whether these risks outweigh or should outweigh the risks of planned late preterm birth for the baby. Neonatal services are under constant pressure and planned preterm birth without clear benefit to either woman or baby would have costs.

Randomised controlled trials should be carried out that compare policies of immediate planned birth between 34<sup>+0</sup> and 36<sup>+6</sup> weeks in women who have pre-eclampsia with mild or moderate hypertension with expectant management and birth for clinical progression. Outcomes should include

NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

severe pre-eclampsia and its complications, need for critical care, maternal satisfaction, neonatal morbidity and mortality, and health economics. Trials need to be large enough to examine less common complications in the woman.

## **4.5      *Antihypertensive agents and breastfeeding***

4.5.1      How safe are commonly used antihypertensive agents when used by women who are breastfeeding?

### **Why this is important**

With the increasing incidence of hypertensive disorders during pregnancy, more pregnant and breastfeeding women will potentially be exposed to antihypertensive medication. Most of the relevant drugs are not licensed for use in pregnancy. For most drugs there is no information on their presence in human breast milk, or if such a presence has any clinical effect. As a result, women may either be denied effective treatment in the postnatal period or advised against breastfeeding. Studies should measure the concentration of relevant drugs and their metabolites in breast milk, taking account of drug pharmacokinetics (peak levels and elimination) and comparing neonatal behaviour and physiological variables in women using each drug with those in women who choose not to breastfeed. Studies should follow women and their babies for long enough to exclude cumulative effects and they should be large enough to provide reassurance to licensing and drug regulating authorities.

## **5            Other versions of this guideline**

### **5.1        *Full guideline***

The full guideline, ‘Hypertension in pregnancy’ contains details of the methods and evidence used to develop the guideline. It is published by the National Collaborating Centre for Women’s and Children’s Health, and is available from [www.ncc-wch.org.uk](http://www.ncc-wch.org.uk) and our website ([www.nice.org.uk/guidance/CG107/Guidance](http://www.nice.org.uk/guidance/CG107/Guidance)).

## **5.2 Quick reference guide**

A quick reference guide for healthcare professionals is available from [www.nice.org.uk/guidance/CG107/QuickRefGuide](http://www.nice.org.uk/guidance/CG107/QuickRefGuide)

For printed copies, phone NICE publications on 0845 003 7783 or email [publications@nice.org.uk](mailto:publications@nice.org.uk) (quote reference number N2139).

## **5.3 'Understanding NICE guidance'**

A summary for patients and carers ('Understanding NICE guidance') is available from [www.nice.org.uk/guidance/CG107/PublicInfo](http://www.nice.org.uk/guidance/CG107/PublicInfo)

For printed copies, phone NICE publications on 0845 003 7783 or email [publications@nice.org.uk](mailto:publications@nice.org.uk) (quote reference number N2140).

We encourage NHS and voluntary sector organisations to use text from this booklet in their own information about hypertension in pregnancy.

## **6 Related NICE guidance**

- Weight management before, during and after pregnancy. NICE public health guidance 27 (2010). Available from [www.nice.org.uk/guidance/PH27](http://www.nice.org.uk/guidance/PH27)
- How to stop smoking in pregnancy and following childbirth. NICE public health guidance 26 (2010). Available from [www.nice.org.uk/guidance/PH26](http://www.nice.org.uk/guidance/PH26)
- Prevention of cardiovascular disease at population level. NICE public health guidance 25 (2010). Available from [www.nice.org.uk/guidance/PH25](http://www.nice.org.uk/guidance/PH25)
- Chronic kidney disease. NICE clinical guideline 73 (2008). Available from [www.nice.org.uk/guidance/CG73](http://www.nice.org.uk/guidance/CG73)
- Induction of labour. NICE clinical guideline 70 (2008). Available from [www.nice.org.uk/guidance/CG70](http://www.nice.org.uk/guidance/CG70)
- Diabetes in pregnancy. NICE clinical guideline 63 (2008). Available from [www.nice.org.uk/guidance/CG63](http://www.nice.org.uk/guidance/CG63)
- Antenatal care. NICE clinical guideline 62 (2008). Available from [www.nice.org.uk/guidance/CG62](http://www.nice.org.uk/guidance/CG62)

NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy



- Maternal and child nutrition. NICE public health guidance 11 (2008). Available from [www.nice.org.uk/guidance/PH11](http://www.nice.org.uk/guidance/PH11)
- Smoking cessation services. NICE public health guidance 10 (2008). Available from [www.nice.org.uk/guidance/PH10](http://www.nice.org.uk/guidance/PH10)
- Intrapartum care. NICE clinical guideline 55 (2007). Available from [www.nice.org.uk/guidance/CG55](http://www.nice.org.uk/guidance/CG55)
- Obesity. NICE clinical guideline 43 (2006). Available from [www.nice.org.uk/guidance/CG43](http://www.nice.org.uk/guidance/CG43)
- Postnatal care. NICE clinical guideline 37 (2006). Available from [www.nice.org.uk/guidance/CG37](http://www.nice.org.uk/guidance/CG37)
- Hypertension. NICE clinical guideline 34 (2006). Available from [www.nice.org.uk/guidance/CG34](http://www.nice.org.uk/guidance/CG34)
- Caesarean section. NICE clinical guideline 13 (2004). Available from [www.nice.org.uk/guidance/CG13](http://www.nice.org.uk/guidance/CG13)

## **7            Updating the guideline**

NICE clinical guidelines are updated so that recommendations take into account important new information. New evidence is checked 3 years after publication, and healthcare professionals and patients are asked for their views; we use this information to decide whether all or part of a guideline needs updating. If important new evidence is published at other times, we may decide to do a more rapid update of some recommendations.

## **Appendix A: The Guideline Development Group and NICE project team**

### ***Guideline development group***

#### **Chris Barry**

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#### **David James (from December 2009)**

Clinical Co-Director, National Collaborating Centre for Women's and Children's Health

#### **Rajesh Khanna (until May 2009)**

Senior Research Fellow, National Collaborating Centre for Women's and Children's Health

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Patient and carer representative, Action on Pre-eclampsia

#### **Susan Mitchinson**

Patient and carer representative

#### **Moira Mugglestone (from May 2009)**

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NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

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NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

## **Appendix B: The Guideline Review Panel**

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring adherence to NICE guideline development processes. In particular, the panel ensures that stakeholder comments have been adequately considered and responded to. The panel includes members from the following perspectives: primary care, secondary care, lay, public health and industry.

### **Professor Mike Drummond (Chair)**

Professor of Health Economics, Centre for Health Economics, University of York

### **Dr Graham Archard**

General Practitioner, Christchurch, Dorset

### **Dr Ruth Stephenson**

Department of Anaesthetics, Aberdeen Royal Infirmary

### **Dr David Gillen**

Medical Director, Pfizer Ltd

### **Catherine Arkley**

Lay member

## **Appendix C: The algorithms**

There are care pathways for the management of hypertensive disorders during pregnancy in the quick reference guide, available from

[www.nice.org.uk/guidance/CG107/QuickRefGuide](http://www.nice.org.uk/guidance/CG107/QuickRefGuide)

## **Appendix D: Drug information**

Atenolol is licensed for the treatment of hypertension and is already used widely in UK postnatal obstetric practice, but the SPC (August 2010) advises that anticipated benefit be weighed against the possible risks of its use in the first and second trimesters of pregnancy, and in women who may become pregnant or who are breastfeeding. Informed consent on the use of atenolol in these situations should be obtained and documented.

Captopril is licensed for the treatment of hypertension and is already used in UK postnatal obstetric practice, but the SPC (August 2010) advises that it is contraindicated in the second and third trimesters of pregnancy and in lactation, and that it is not recommended during the first trimester of pregnancy. Informed consent on the use of captopril in these situations should be obtained and documented.

Enalapril is licensed for the treatment of hypertension and is already used widely in UK postnatal obstetric practice, but the SPC (August 2010) advises that it is contraindicated in the second and third trimesters of pregnancy and that it is not recommended during the first trimester of pregnancy or in breastfeeding for preterm infants and for the first few weeks after delivery. Informed consent on the use of enalapril in these situations should be obtained and documented.

Labetalol is licensed for the treatment of hypertension, including during pregnancy and is already used widely in UK obstetric practice, but the SPC (August 2010) advises that it should only be used during the first trimester of pregnancy if the potential benefit outweighs the potential risk, and that breastfeeding is not recommended. Informed consent on the use of labetalol in these situations should be obtained and documented.

Methyldopa is licensed for the treatment of hypertension and is already used widely in UK obstetric practice, but the SPC (August 2010) advises that its use in women who are, or may become, pregnant or who are breastfeeding their newborn infant requires that anticipated benefits be weighed against possible  
NICE clinical guideline 107 – Hypertension in pregnancy: the management of hypertensive disorders during pregnancy

risks. Informed consent on the use of methyldopa in these situations should be obtained and documented.

Metoprolol is licensed for the treatment of hypertension and is already used widely in UK postnatal obstetric practice, but the SPC (August 2010) advises that anticipated benefit be weighed against the possible risks of its use in women who are pregnant or breastfeeding. Informed consent on the use of metoprolol in these situations should be obtained and documented.

Nifedipine is licensed for the treatment of hypertension and is already used widely in UK obstetric practice, but the SPC (August 2010) advises that it is contraindicated in pregnancy before week 20, and that it should not be administered during the entire pregnancy or in women who may become pregnant. It also advises that nifedipine should not be used during breastfeeding. Informed consent on the use of nifedipine in these situations should be obtained and documented.