

1 **NATIONAL INSTITUTE FOR HEALTH AND CARE**
2 **EXCELLENCE**

3 **Guideline**

4 **Hypertension in pregnancy: diagnosis and**
5 **management**

6 **Draft for consultation, February 2019**
7

This guideline covers diagnosing and managing hypertension (high blood pressure), including pre-eclampsia, during pregnancy, labour, birth and immediately after birth. It also includes advice for women with hypertension who wish to conceive and women who have had a pregnancy complicated by hypertension. It aims to improve care during pregnancy, labour and birth for women and their babies.

Who is it for?

- Healthcare professionals in all care settings
- Women who develop hypertension during pregnancy, women who have hypertension and wish to conceive, and women who have had a pregnancy complicated by hypertension, and their families and carers

We have reviewed the evidence on some aspects of the management of hypertension in pregnancy, postnatal treatment of hypertension, and advice and follow-up at discharge.. You are invited to comment on the new and updated recommendations. These are marked as **[2019]**.

You are also invited to comment on recommendations that NICE proposes to delete from the 2010 guideline.

We have not reviewed the evidence for the recommendations shaded in grey, and cannot accept comments on them. In some cases, we have made minor wording changes for clarification.

See [update information](#) for a full explanation of what is being updated.

This draft guideline contains:

- the draft recommendations
- recommendations for research
- rationale and impact sections that explain why the committee made the 2019 recommendations and how they might affect practice
- the guideline context.

Full details of the evidence and the committee's discussion on the 2019 recommendations are in the [evidence reviews](#). Evidence for the 2010 recommendations is in the [full version](#) of the 2010 guideline.

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1 Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in [your care](#).

[Making decisions using NICE guidelines](#) explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

2 1.1 *Reducing the risk of hypertensive disorders in pregnancy*

3 Symptoms of pre-eclampsia

4 1.1.1 Advise pregnant women to see a healthcare professional immediately if
5 they experience symptoms of pre-eclampsia. Symptoms include:

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

11 See the NICE guideline on [antenatal care](#) for advice on risk factors and
12 symptoms of pre-eclampsia. [2010, amended 2019]

13 Antiplatelet agents

14 1.1.2 Advise women at high risk of pre-eclampsia to take 75 mg of aspirin¹ daily
15 from 12 weeks until the birth of the baby. Women at high risk are those
16 with any of the following:

- 17 • hypertensive disease during a previous pregnancy

¹ Although this use is common in UK clinical practice, at the time of publication (June 2019), aspirin 75 mg tablets did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

- 1 • chronic kidney disease
- 2 • autoimmune disease such as systemic lupus erythematosus or
- 3 antiphospholipid syndrome
- 4 • type 1 or type 2 diabetes
- 5 • chronic hypertension. **[2010]**

6 1.1.3 Advise women with more than one moderate risk factor for pre-eclampsia
7 to take 75 mg of aspirin¹ daily from 12 weeks until the birth of the baby.
8 Factors indicating moderate risk are:

- 9 • first pregnancy
- 10 • age 40 years or older
- 11 • pregnancy interval of more than 10 years
- 12 • body mass index (BMI) of 35 kg/m² or more at first visit
- 13 • family history of pre-eclampsia
- 14 • multi-fetal pregnancy. **[2010]**

15 **Other pharmaceutical agents**

16 1.1.4 Do not use the following to prevent hypertensive disorders during
17 pregnancy:

- 18 • nitric oxide donors
- 19 • progesterone
- 20 • diuretics
- 21 • low molecular weight heparin. **[2010]**

22 **Nutritional supplements**

23 1.1.5 Do not recommend the following supplements solely with the aim of
24 preventing hypertensive disorders during pregnancy:

- 25 • magnesium
- 26 • folic acid
- 27 • antioxidants (vitamins C and E)
- 28 • fish oils or algal oils
- 29 • garlic. **[2010]**

1 **Diet**

2 1.1.6 Do not recommend salt restriction during pregnancy solely to prevent
3 gestational hypertension or pre-eclampsia. **[2010]**

4 **Lifestyle**

5 1.1.7 Give the same advice on rest, exercise and work to women with chronic
6 hypertension or at risk of hypertensive disorders during pregnancy as
7 healthy pregnant women. See the NICE guideline on [antenatal care](#).
8 **[2010, amended 2019]**

9 **1.2 Assessment of proteinuria in hypertensive disorders of**
10 **pregnancy**

11 1.2.1 Interpret proteinuria measurements for pregnant women in the context of
12 a full clinical review of symptoms, signs and other investigations for pre-
13 eclampsia. **[2019]**

14 1.2.2 Use an automated reagent-strip reading device for dipstick screening for
15 proteinuria in pregnant women in secondary care settings. **[2019]**

16 1.2.3 If dipstick screening is positive (1+ or more) use albumin:creatinine ratio
17 or protein:creatinine ratio to quantify proteinuria in pregnant women.
18 **[2019]**

19 1.2.4 Do not use first morning urine void to quantify proteinuria in pregnant
20 women. **[2019]**

21 1.2.5 Do not routinely use 24-hour urine collection to quantify proteinuria in
22 pregnant women. **[2019]**

23 1.2.6 If using protein:creatinine ratio to quantify proteinuria in pregnant women:
24

- use 30 mg/mmol as a threshold for significant proteinuria
- if the result is 30 mg/mmol or above and there is still uncertainty about
25 the diagnosis of pre-eclampsia, consider re-testing on a new sample,
26 alongside clinical review. **[2019]**

1 1.2.7 If using albumin:creatinine ratio as an alternative to protein:creatinine ratio
2 to diagnose pre-eclampsia in pregnant women with hypertension:

- 3 • use 8 mg/mmol as a diagnostic threshold
- 4 • if the result is 8 mg/mmol or above and there is still uncertainty about
- 5 the diagnosis of pre-eclampsia, consider re-testing on a new sample,
- 6 alongside clinical review. [2019]

To find out why the committee made the 2019 recommendations on the assessment of proteinuria and how they might affect practice see [rationale and impact](#).

7 **1.3 Management of chronic hypertension in pregnancy**

8 **Pre-pregnancy advice**

9 1.3.1 **Advise** women who take angiotensin-converting enzyme (ACE) inhibitors
10 or angiotensin II receptor blockers² (ARBs):

- 11 • that there is an increased risk of congenital abnormalities if these
- 12 drugs are taken during pregnancy
- 13 • to discuss other antihypertensive treatment with the healthcare
- 14 professional responsible for managing their hypertension, if they are
- 15 planning pregnancy
- 16 • **to discuss other treatment with the healthcare professional**
- 17 **responsible for managing their condition, if ACE inhibitors or ARBs**
- 18 **are being taken for other conditions such as renal disease [2010,**
- 19 **amended 2019]**

20 1.3.2 Stop antihypertensive treatment in women taking ACE inhibitors or ARBs
21 if they become pregnant (preferably within 2 working days of notification of
22 pregnancy) and offer alternatives. **[2010]**

² In 2007, the MHRA issued a drug safety update on ACE inhibitors and angiotensin II receptor antagonists: not for use in pregnancy that states 'Use in women who are planning pregnancy should be avoided unless absolutely necessary, in which case the potential risks and benefits should be discussed'.

1 1.3.3 Advise women who take thiazide diuretics:

- 2
- that there may be an increased risk of congenital abnormalities and neonatal complications 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. **[2010, amended 2019]**
- 3
4
5
6

7 1.3.4 Advise women who take antihypertensive treatments other than ACE
8 inhibitors, ARBs or thiazide diuretics that the limited evidence available
9 has not shown an increased risk of congenital malformation with such
10 treatments. **[2010, amended 2019]**

11 Treatment of chronic hypertension

12 1.3.5 Offer pregnant women with chronic hypertension advice on:

- 13
- weight management
 - exercise
 - healthy eating
 - lowering the amount of salt in their diet
- 14
15
16

17 Provide this advice in line with the NICE guideline on [hypertension in](#)
18 [adults: diagnosis and treatment](#). **[2019]**

19 1.3.6 Offer pregnant women with chronic hypertension referral to a specialist in
20 hypertensive disorders of pregnancy and discuss the risks and benefits of
21 treatment. **[2010, amended 2019]**

22 1.3.7 Continue with existing antihypertensive treatment if safe in pregnancy, or
23 switch to an alternative treatment unless:

- 24
- sustained systolic blood pressure is less than 110 mmHg, or
 - sustained diastolic blood pressure is less than 70 mmHg, or
 - the woman has symptomatic hypotension. **[2019]**
- 25
26

27 1.3.8 Offer antihypertensive treatment to pregnant women who have chronic
28 hypertension and who are not already on treatment if they have:

- 1 • sustained diastolic blood pressure of 90 mmHg or higher, or
- 2 • sustained systolic blood pressure of 140 mmHg or higher. [2019]

3 1.3.9 When using medicines to treat hypertension in pregnancy, aim for a target
4 blood pressure of 135/85 mmHg. [2019]

5 1.3.10 Consider labetalol to treat chronic hypertension in pregnant women.
6 Consider nifedipine³ for women in whom labetalol is not suitable, or
7 methyldopa⁴ if both labetalol and nifedipine are not suitable. Base the
8 choice on any pre-existing treatment, side-effect profiles, risks (including
9 fetal effects) and the woman's preference. [2019]

10 1.3.11 Offer pregnant women with chronic hypertension aspirin 75 mg once daily
11 from 12 weeks. [2019]

To find out why the committee made the 2019 recommendations on the treatment of chronic hypertension and how they might affect practice see [rationale and impact](#).

12 Antenatal consultations

13 1.3.12 In women with chronic hypertension, schedule additional antenatal
14 consultations based on the individual needs of the woman and her baby.
15 [2010]

16 Timing of birth

17 1.3.13 Do not offer **planned early** birth before 37 weeks to women with chronic
18 hypertension whose blood pressure is lower than 160/110 mmHg, with or

³ Although this use is common in UK clinical practice, at the time of publication (June 2019), nifedipine did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

⁴ Although this use is common in UK clinical practice, at the time of publication (June 2019), methyldopa did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

1 without antihypertensive treatment, unless there are other medical
2 indications. [2010, amended 2019]

3 1.3.14 For women with chronic hypertension whose blood pressure is lower than
4 160/110 mmHg after 37 weeks, with or without antihypertensive
5 treatment, timing of birth and maternal and fetal indications for birth
6 should be agreed between the woman and the senior obstetrician. [2010]

7 1.3.15 If planned early birth is necessary (see recommendation 1.5.7) offer a
8 course of antenatal corticosteroids and magnesium sulfate, in line with the
9 NICE guideline on [preterm labour and birth](#). [2010, amended 2019]

10 Postnatal investigation, monitoring and treatment

11 1.3.16 In women with chronic hypertension who have given birth, measure blood
12 pressure:

- 13 • daily for the first 2 days after birth
- 14 • at least once between day 3 and day 5 after birth
- 15 • as clinically indicated if antihypertensive treatment is changed after
16 birth. [2010]

17 1.3.17 In women with chronic hypertension who have given birth:

- 18 • aim to keep blood pressure lower than 140/90 mmHg
- 19 • continue antihypertensive treatment, if required (see section 1.9 for
20 choice of antihypertensives in breastfeeding)
- 21 • review long-term antihypertensive treatment 2 weeks after the birth.
22 [2010, amended 2019]

23 1.3.18 If a woman has taken methyldopa⁵ to treat chronic hypertension during
24 pregnancy, stop within 2 days after the birth and restart the
25 antihypertensive treatment the woman was taking before the pregnancy

⁵ Although this use is common in UK clinical practice, at the time of publication (June 2019), methyldopa did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

1 (see section 1.9 for choice of antihypertensive in breastfeeding). [2010,
2 amended 2019]

3 1.3.19 Offer women with chronic hypertension a medical review 6–8 weeks after
4 the birth with their GP or specialist as appropriate. [2010, amended 2019]

5 **1.4 Management of gestational hypertension**

6 **Assessment and treatment of gestational hypertension**

7 1.4.1 In women with gestational hypertension, a full assessment should be
8 carried out in a secondary care setting by a healthcare professional who is
9 trained in the management of hypertensive disorders of pregnancy. [2010,
10 amended 2019]

11 1.4.2 In women with gestational hypertension, take account of the following risk
12 factors that require additional assessment and follow-up:

- 13 • nulliparity
- 14 • age 40 years or older
- 15 • pregnancy interval of more than 10 years
- 16 • family history of pre-eclampsia
- 17 • multi-fetal pregnancy
- 18 • BMI of 35 kg/m² or more
- 19 • gestational age at presentation
- 20 • previous history of pre-eclampsia or gestational hypertension
- 21 • pre-existing vascular disease
- 22 • pre-existing kidney disease. [2010]

23 1.4.3 Offer women with gestational hypertension the tests and treatment listed
24 in Table 1. [2019]

1 **Table 1. Management of pregnancy with gestational hypertension [2019]**

	Degree of hypertension	
	Hypertension: blood pressure of 140/90– 159/109 mmHg	Severe hypertension: blood pressure of 160/110 mmHg or more
Admission to hospital	Do not routinely admit to hospital.	Admit until BP is under 160/110 mmHg
Antihypertensive pharmacological treatment	Offer pharmacological treatment if BP remains above 140/90 mmHg	Offer pharmacological treatment to all women
Target blood pressure once on antihypertensive treatment	Aim for BP of 135/85 mmHg or less	Aim for BP of 135/85 mmHg or less
Blood pressure measurement	Once or twice a week (depending on BP) until BP is 135/85 mmHg or less	Every 15–30 minutes until BP is 160/110 mmHg or less
Dipstick proteinuria testing^a	Once or twice a week (with BP measurement)	Daily while admitted
Blood tests	Measure full blood count, liver function, urea and electrolytes at presentation and then weekly	Measure full blood count, liver function, urea and electrolytes at presentation and then weekly
Fetal assessment	Carry out an ultrasound for fetal growth and Doppler at diagnosis. Repeat if clinically indicated. Only carry out CTG if fetal activity is abnormal. (See section 1.6 for advice on fetal monitoring.)	Carry out ultrasound for fetal growth, Doppler and CTG at diagnosis and if normal repeat every 2 weeks. If fetal monitoring is normal then do not repeat CTG more than weekly unless clinically indicated. (See section 1.6 for advice on fetal monitoring)
Weekly checks	When checking the woman's BP, carry out fetal heart auscultation once a week	When checking the woman's BP, carry out fetal heart auscultation once a week
^a Use an automated reagent-strip reading device for dipstick screening for proteinuria in a secondary care setting. BP, blood pressure; CTG, cardiotocography.		

2

3 1.4.4 Offer placental growth factor (PIGF)-based testing in women presenting
4 with suspected pre-eclampsia (for example, with gestational hypertension)
5 between 20 weeks and up to 35 weeks of pregnancy. (See the NICE
6 guidance on [PIGF-based testing to help diagnose suspected pre-
7 eclampsia](#)). [2019]

- 1 1.4.5 Consider labetalol to treat gestational hypertension. Consider nifedipine⁶
2 for women in whom labetalol is not suitable, and methyldopa⁷ if labetalol
3 or nifedipine are not suitable. Base the choice on side-effect profiles, risk
4 (including fetal effects) and the woman's preferences. [2010, amended
5 2019]
- 6 1.4.6 Do not offer bed rest in hospital as a treatment for gestational
7 hypertension. [2010]

8

To find out why the committee made the 2019 recommendations on the monitoring and treatment of gestational hypertension and how they might affect practice see [rationale and impact](#).

9 Timing of birth

- 10 1.4.7 Do not offer planned early birth before 37 weeks to women with
11 gestational hypertension whose blood pressure is lower than
12 160/110 mmHg, with or without antihypertensive treatment, unless there
13 are other medical indications. [2010, amended 2019]
- 14 1.4.8 For women with gestational hypertension whose blood pressure is lower
15 than 160/110 mmHg after 37 weeks, with or without antihypertensive
16 treatment, timing of birth, and maternal and fetal indications for birth
17 should be agreed between the woman and the senior obstetrician. [2010]
- 18 1.4.9 If planned early birth is necessary (see recommendation 1.5.7) offer a
19 course of antenatal corticosteroids and magnesium sulfate if indicated, in

⁶ Although this use is common in UK clinical practice, at the time of publication (June 2019), nifedipine did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

⁷ Although this use is common in UK clinical practice, at the time of publication (June 2019), methyldopa 75 mg tablets did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

1 line with the NICE guideline on [preterm labour and birth](#). [2010, amended
2 2019]

3 Postnatal investigation, monitoring and treatment

- 4 • In women with gestational hypertension who have given birth,
5 measure blood pressure:
- 6 • daily for the first 2 days after birth
- 7 • at least once between day 3 and day 5 after birth
- 8 • as clinically indicated if antihypertensive treatment is changed after
9 birth. [2010]

10 1.4.10 In women with gestational hypertension who have given birth:

- 11 • continue antihypertensive treatment if required (see section 1.9 for
12 choice of antihypertensives in breastfeeding)
- 13 • advise women that the duration of their postnatal antihypertensive
14 treatment will usually be similar to the duration of their antenatal
15 treatment (but may be longer)
- 16 • reduce antihypertensive treatment if their blood pressure falls below
17 130/80 mmHg. [2010, amended 2019]

18 1.4.11 If a woman has taken methyldopa to treat gestational hypertension, stop
19 within 2 days after the birth. [2010, amended 2019]

20 1.4.12 For women with gestational hypertension who did not take
21 antihypertensive treatment and have given birth, start antihypertensive
22 treatment if their blood pressure is 150/100 mmHg or higher. [2010,
23 amended 2019]

24 1.4.13 Write a care plan for women with gestational hypertension who have
25 given birth and are being transferred to community care that includes all of
26 the following:

- 27 • who will provide follow-up care, including medical review if needed
- 28 • frequency of blood pressure monitoring needed
- 29 • thresholds for reducing or stopping treatment

- 1 • indications for referral to primary care for blood pressure review.
2 **[2010]**

3 1.4.14 Offer women who have had gestational hypertension and **who** remain on
4 antihypertensive treatment, a medical review **with their GP or specialist**
5 2 weeks after transfer to community care. **[2010, amended 2019]**

6 1.4.15 Offer **all** women who have had gestational hypertension a medical review
7 **with their GP or specialist** 6–8 weeks after the birth. **[2010, amended**
8 **2019]**

9 **1.5 Management of pre-eclampsia**

10 **Assessing pre-eclampsia**

11 1.5.1 Assessment of women with pre-eclampsia should be performed by a
12 healthcare professional trained in the management of hypertensive
13 disorders of pregnancy. **[2010, amended 2019]**

14 1.5.2 For women with pre-eclampsia, use either the [fullPIERS](#) or [PREP-S](#)
15 validated risk prediction models to guide decisions about the most
16 appropriate place of care (such as the need for in utero transfer), and
17 thresholds for intervention. When choosing which model to use, take into
18 account:

- 19 • fullPIERS is intended for use at any time during pregnancy
20 • PREP-S is intended for use only up to 34 weeks of pregnancy. **[2019]**

21 1.5.3 Be aware that the fullPIERS and PREP-S models do not predict outcomes
22 for babies. **[2019]**

23 1.5.4 Offer admission to hospital for surveillance and any interventions needed
24 to women with pre-eclampsia if there are concerns for the wellbeing of the
25 woman or baby. For example:

- 26 • a predicted high risk of complications using fullPIERS or PREP-S
27 (such as 30% or more)
28 • sustained systolic blood pressure of 160 mmHg or higher

- 1 • any maternal biochemical or haematological investigations that cause
2 concern, for example a new and persistent:
3 – rise in creatinine (90 µmol/L or more, 1 mg/dL or more)
4 – rise in alanine transaminase (over 70 IU/L, or twice upper limit of
5 normal range)
6 – fall in platelet count (under 150,000/µL)
7 • any clinical signs that cause concern, for example:
8 – signs of impending eclampsia
9 – pulmonary oedema
10 – other signs of severe pre-eclampsia
11 • suspected fetal compromise. **[2019]**

To find out why the committee made the 2019 recommendations on assessment of women with pre-eclampsia and how they might affect practice see [rationale and impact](#).

12 **Treatment of pre-eclampsia**

- 13 1.5.5 Offer women with pre-eclampsia the tests and treatments listed in Table
14 2. **[2019]**

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

	Degree of hypertension	
	Hypertension: blood pressure of 140/90– 159/109 mmHg	Severe hypertension: blood pressure of 160/110 mmHg or more
Admission to hospital	Yes, if high risk prediction from fullPIERS or PREP-S, or other clinical concerns (see recommendation 1.5.4)	Yes, but if BP falls below 160/110 mmHg then manage as for hypertension
Antihypertensive pharmacological treatment	Offer pharmacological treatment if BP remains above 140/90 mmHg	Offer pharmacological treatment to all women
Target blood pressure once on antihypertensive treatment	Aim for BP of 135/85 mmHg or less	Aim for BP of 135/85 mmHg or less
Blood pressure measurement	At least every 48 hours	More than 4 times a day, depending on clinical circumstances
Dipstick proteinuria testing^a	Twice a week	Daily while admitted
Blood tests	Measure full blood count, liver function, urea and electrolytes twice a week	Measure full blood count, liver function, urea and electrolytes 3 times a week
Fetal assessment	Carry out ultrasound for fetal growth, Doppler and CTG at diagnosis and if normal repeat every 2 weeks. If ultrasound is normal then do not repeat CTG more than weekly unless clinically indicated. (See section 1.6 for advice on fetal monitoring.)	Carry out ultrasound for fetal growth, Doppler and CTG at diagnosis and if normal repeat every 2 weeks. If ultrasound is normal then do not repeat CTG more than weekly unless clinically indicated. (See section 1.6 for advice on fetal monitoring.)
^a Use an automated reagent-strip reading device for dipstick screening for proteinuria in a secondary care setting. BP, blood pressure; CTG, cardiotocography		

2

3 1.5.6 Offer labetalol to treat hypertension in pregnant women with pre-
4 eclampsia. Offer nifedipine⁸ for women in whom labetalol is not suitable,

⁸ Although this use is common in UK clinical practice, at the time of publication (June 2019), nifedipine did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

1 and methyldopa⁹ if labetalol or nifedipine are not suitable. Base the choice
2 on any pre-existing treatment, side-effect profiles, risks (including fetal
3 effects) and the woman's preference. [2010, amended 2019]

4 **Timing of birth**

5 1.5.7 Record maternal and fetal thresholds for planned early birth before
6 37 weeks in women with pre-eclampsia. Thresholds for considering
7 planned early birth include one or more of the following:

- 8 • inability to control maternal BP despite using ≥ 3 classes of
- 9 antihypertensives in appropriate doses
- 10 • maternal pulse oximetry $< 90\%$
- 11 • progressive deterioration in liver function, creatinine, haemolysis, or
- 12 platelet count
- 13 • ongoing neurological features, such as severe intractable headache,
- 14 repeated visual scotomata, or eclampsia
- 15 • placental abruption
- 16 • reversed end-diastolic flow in the umbilical artery Doppler velocimetry,
- 17 a non-reassuring cardiotocograph, or stillbirth. [2019]

18 1.5.8 **Involve a senior obstetrician in any decisions on timing of birth for women**
19 **with pre-eclampsia. [2010, amended 2019]**

20 1.5.9 **Discuss with the anaesthetic team if birth is planned in a woman with pre-**
21 **eclampsia. [2010, amended 2019]**

22 1.5.10 **Discuss with the neonatal team if birth is planned in a woman with pre-**
23 **eclampsia and neonatal complications are anticipated. [2010, amended**
24 **2019]**

⁹ Although this use is common in UK clinical practice, at the time of publication (June 2019), methyldopa did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

1 1.5.11 Offer intravenous magnesium sulfate and a course of antenatal
 2 corticosteroids to women with preterm pre-eclampsia if birth is planned
 3 within 7 days, in line with the NICE guideline on [preterm labour and birth](#).
 4 [2010, amended 2019]

5 1.5.12 Decide on timing of birth in women with pre-eclampsia as recommended
 6 in Table 3. [2019]

7 **Table 3. Timing of birth in women with pre-eclampsia**

Weeks of pregnancy	Timing of birth
Before 34 weeks	Continue surveillance unless there are indications (see 1.5.7) for planned early birth. Offer intravenous magnesium sulfate and a course of antenatal corticosteroids in line with the NICE guideline on preterm labour and birth.
From 34 to 36⁺⁶ weeks:	Continue surveillance unless there are indications (see 1.5.7) for planned early birth. When considering the option of planned early birth take into account the woman's and baby's condition, risk factors (such as maternal comorbidities, multi-fetal pregnancy) and availability of neonatal unit beds. Consider a course of antenatal corticosteroids in line with the NICE guideline on preterm labour and birth.
37 weeks onwards	Offer planned birth within 24–48 hours.

8 To find out why the committee made the 2019 recommendations on the monitoring and
 treatment of pre-eclampsia and timing of birth and how they might affect practice see
 9 [rationale and impact](#).

10 **Postnatal investigation, monitoring and treatment (including after discharge**
 11 **from critical care)**

12 ***Blood pressure***

13 1.5.13 In women with pre-eclampsia who did not take antihypertensive treatment
 14 and have given birth, measure blood pressure:

- at least 4 times a day while the woman is an inpatient
- at least once between day 3 and day 5 after birth

- 1 • on alternate days until normal if blood pressure was abnormal on
2 days 3–5. **[2010]**

3 1.5.14 In women with pre-eclampsia who did not take antihypertensive treatment
4 and have given birth, start antihypertensive treatment if blood pressure is
5 150/100 mmHg or higher. **[2010]**

6 1.5.15 Ask women with pre-eclampsia who have given birth about severe
7 headache and epigastric pain each time blood pressure is measured.
8 **[2010]**

9 1.5.16 In women with pre-eclampsia who took antihypertensive treatment and
10 have given birth, measure blood pressure:

- 11 • at least 4 times a day while the woman is an inpatient
12 • every 1–2 days for up to 2 weeks after transfer to community care
13 until the woman is off treatment and has no hypertension. **[2010]**

14 1.5.17 For women with pre-eclampsia who have taken antihypertensive
15 treatment and have given birth:

- 16 • continue antihypertensive treatment
17 • consider reducing antihypertensive treatment if their blood pressure
18 falls below 140/90 mmHg
19 • reduce antihypertensive treatment if their blood pressure falls below
20 130/80 mmHg. **[2010]**

21 1.5.18 If a woman has taken methyldopa to treat pre-eclampsia, stop within
22 2 days **after the** birth. **[2010, amended 2019]**

23 1.5.19 Offer women with pre-eclampsia who have given birth transfer to
24 community care if all of the following criteria have been met:

- 25 • there are no symptoms of pre-eclampsia
26 • blood pressure, with or without treatment, is **150/100 mmHg or less**
27 • blood test results are stable or improving. **[2010, amended 2019]**

1 1.5.20 Write a care plan for women with pre-eclampsia who have given birth and
2 are being transferred to community care that includes all of the following:

- 3 • who will provide follow-up care, including medical review if needed
- 4 • frequency of blood pressure monitoring
- 5 • thresholds for reducing or stopping treatment
- 6 • indications for referral to primary care for blood pressure review
- 7 • self-monitoring for symptoms. **[2010]**

8 1.5.21 Offer women who have had pre-eclampsia and **who remain on**
9 antihypertensive treatment, a medical review **with their GP or specialist**
10 2 weeks after transfer to community care. **[2010, amended 2019]**

11 1.5.22 Offer all women who have had pre-eclampsia a medical review **with their**
12 **GP or specialist** 6–8 weeks after the birth. **[2010, amended 2019]**

13 ***Haematological and biochemical monitoring***

14 1.5.23 In women who have pre-eclampsia with mild or moderate hypertension, or
15 after step-down from critical care:

- 16 • measure platelet count, transaminases and serum creatinine 48–
17 72 hours after birth or step-down
- 18 • do not repeat platelet count, transaminases or serum creatinine
19 measurements if results are normal at 48–72 hours. **[2010]**

20 1.5.24 If biochemical and haematological indices are **outside the reference range**
21 in women with pre-eclampsia who have given birth, repeat platelet count,
22 transaminases and serum creatinine measurements as clinically indicated
23 **until results return to normal**. **[2010, amended 2019]**

24 1.5.25 In women with pre-eclampsia who have given birth, carry out a urinary
25 reagent-strip test 6–8 weeks after the birth. **[2010]**

26 1.5.26 Offer women who had pre-eclampsia and still have proteinuria (1+ or
27 more) at 6–8 weeks after the birth a further review at 3 months after the
28 birth to assess kidney function. **[2010]**.

1 1.5.27 Consider referring **these women** for a specialist kidney assessment **in line**
2 **with the [NICE guidance on chronic kidney disease in adults](#) [2010,**
3 **amended 2019].**

4 **1.6 Fetal monitoring**

5 **Fetal monitoring in chronic hypertension**

6 1.6.1 In women with chronic hypertension, carry out an ultrasound for fetal
7 growth and amniotic fluid volume assessment, and umbilical artery
8 Doppler velocimetry **at 28 weeks, 32 weeks and 36 weeks.** [2010,
9 **amended 2019]**

10 1.6.2 In women with chronic hypertension, only carry out cardiotocography if
11 fetal activity is abnormal. [2010]

12 **Fetal monitoring in gestational hypertension**

13 1.6.3 In women with gestational hypertension, carry out an ultrasound for fetal
14 growth and amniotic fluid volume assessment and umbilical artery
15 Doppler velocimetry at diagnosis. [2010, amended 2019]

16 1.6.4 In women with gestational hypertension, only carry out cardiotocography if
17 fetal activity is abnormal. [2010]

18 **Fetal monitoring in pre-eclampsia or severe gestational hypertension**

19 1.6.5 Carry out cardiotocography at diagnosis of pre-eclampsia or severe
20 gestational hypertension. [2010]

21 1.6.6 If conservative management of pre-eclampsia or severe gestational
22 hypertension is planned, carry out all the following tests at diagnosis:

- 23 • ultrasound for fetal growth and amniotic fluid volume assessment
- 24 • umbilical artery Doppler velocimetry. [2010]

25 1.6.7 If the results of all fetal monitoring are normal in women with pre-
26 eclampsia or severe gestational hypertension, do not routinely repeat
27 cardiotocography more than weekly. [2010]

1 1.6.8 In women with pre-eclampsia or severe gestational hypertension, repeat
2 cardiocography if any of the following occur:

- 3 • the woman reports a change in fetal movement
- 4 • vaginal bleeding
- 5 • abdominal pain
- 6 • deterioration in maternal condition. **[2010]**

7 1.6.9 In women with pre-eclampsia or severe gestational hypertension , repeat
8 ultrasound for fetal growth and amniotic fluid volume assessment or
9 umbilical artery Doppler velocimetry **every 2 weeks**. **[2010, amended**
10 **2019]**

11 1.6.10 For women with pre-eclampsia or severe gestational hypertension, write a
12 care plan that includes all of the following:

- 13 • the timing and nature of future fetal monitoring
- 14 • fetal indications for birth and if and when antenatal corticosteroids
15 should be given
- 16 • **plans for** discussion with neonatal paediatricians and obstetric
17 anaesthetists **[2010, amended 2019]**

18 **Women who need additional fetal monitoring**

19 1.6.11 Carry out an ultrasound for fetal growth and amniotic fluid volume
20 assessment and umbilical artery Doppler velocimetry starting at between
21 28 and 30 weeks (or at least 2 weeks before previous gestational age of
22 onset if earlier than 28 weeks) and repeating 4 weeks later in women with
23 previous:

- 24 • severe pre-eclampsia
- 25 • pre-eclampsia that resulted in birth before 34 weeks
- 26 • pre-eclampsia with a baby whose birth weight was less than the 10th
27 centile
- 28 • intrauterine death
- 29 • placental abruption. **[2010]**

1 1.6.12 In women who **need additional fetal monitoring** (see 1.6.11) carry out
2 cardiocography if fetal activity is abnormal. **[2010, amended 2019]**

3 **1.7 Intrapartum care**

4 1.7.1 **Give advice and treatment** to women with hypertensive disorders **of**
5 pregnancy in line with the NICE guideline on [intrapartum care](#), unless
6 there are recommendations in this guideline on the same topic. **[2010,**
7 **amended 2019]**

8 1.7.2 Give women with chronic hypertension advice and care in line with the
9 [NICE guideline on intrapartum care for women with existing medical](#)
10 [conditions or obstetric complications and their babies](#). **[2019]**

11 **Blood pressure**

12 1.7.3 During labour, measure blood pressure:

- 13 • hourly, in women with hypertension
- 14 • **every 15–30 minutes until blood pressure is less than 160/110 mmHg**
15 in women with severe hypertension. **[2010, amended 2019]**

16 1.7.4 Continue use of antenatal antihypertensive treatment during labour.
17 **[2010]**

18 **Haematological and biochemical monitoring**

19 1.7.5 Determine the need for haematological and biochemical tests during
20 labour in women with hypertension using the same criteria as in the
21 antenatal period even if regional analgesia is being considered. **[2010]**

22 **Care during epidural analgesia**

23 1.7.6 Do not preload women who have severe pre-eclampsia with intravenous
24 fluids before establishing low-dose epidural analgesia **or** combined spinal
25 epidural analgesia. **[2010, amended 2019]**

26 **Management of second stage of labour**

27 1.7.7 Do not routinely limit the duration of the second stage of labour in women
28 with **controlled** hypertension. **[2010, amended 2019]**

1 1.7.8 Consider operative or assisted birth in the second stage of labour for
2 women with severe hypertension whose hypertension has not responded
3 to initial treatment. [2010, amended 2019]

4 **1.8 Medical management of severe hypertension, severe pre-**
5 **eclampsia or eclampsia in a critical care setting**

6 **Anticonvulsants**

7 1.8.1 If a woman in a critical care setting who has severe hypertension or
8 severe pre-eclampsia has or previously had an eclamptic fit, give
9 intravenous magnesium sulfate. [2010]

10 1.8.2 Consider giving intravenous magnesium sulfate to women with severe
11 pre-eclampsia who are in a critical care setting if birth is planned within 24
12 hours. [2010]

13 1.8.3 If considering magnesium sulfate treatment, use the following as features
14 of severe pre-eclampsia:

- 15 • ongoing or recurring severe headaches
- 16 • visual scotomata
- 17 • nausea or vomiting
- 18 • epigastric pain
- 19 • oliguria and severe hypertension
- 20 • progressive deterioration in laboratory blood tests (such as rising
21 creatinine or liver transaminases, or falling platelet count)
- 22 • failure of fetal growth
- 23 • abnormal Doppler findings. [2010, amended 2019]

24 1.8.4 Use the Collaborative Eclampsia Trial regimen for administration of
25 magnesium sulfate:

- 26 • a loading dose of 4 g should be given intravenously over 5 minutes,
27 followed by an infusion of 1 g/hour maintained for 24 hours. If the
28 woman has had an eclamptic fit the infusion should be continued for
29 24 hours after the last fit

- 1 • recurrent fits should be treated with a further dose of 2–4 g given over
2 5 minutes. **[2010, amended 2019]**

3 1.8.5 Do not use diazepam, phenytoin or **other anticonvulsants** as an alternative
4 to magnesium sulfate in women with eclampsia. **[2010, amended 2019]**

5 **Antihypertensives**

6 1.8.6 Treat women with severe hypertension who are in critical care during
7 pregnancy or after birth immediately with one of the following:

- 8 • labetalol (oral or intravenous)
9 • **oral nifedipine¹⁰**
10 • **intravenous hydralazine.** **[2010, amended 2019]**

11 1.8.7 In women with severe hypertension who are in critical care, monitor their
12 response to treatment:

- 13 • to ensure that their blood pressure falls
14 • to identify adverse effects for both the woman and the **baby**
15 • to modify treatment according to response. **[2010]**

16 1.8.8 Consider using up to 500 ml crystalloid fluid before or at the same time as
17 the first dose of intravenous hydralazine in the antenatal period. **[2010]**

18 **Corticosteroids for fetal lung maturation**

19 1.8.9 If **early** birth is considered likely within 7 days in women with pre-
20 eclampsia, **offer a course of antenatal corticosteroids in line with the NICE**
21 **guideline on [preterm labour and birth](#).** **[2010, amended 2019].**

¹⁰ Although this use is common in UK clinical practice, at the time of publication (June 2019), nifedipine did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

1 **Corticosteroids to manage HELLP syndrome**

2 1.8.10 Do not use dexamethasone or betamethasone for the treatment of HELLP
3 syndrome. **[2010]**

4 **Fluid balance and volume expansion**

5 1.8.11 Do not use volume expansion in women with severe pre-eclampsia unless
6 hydralazine is the antenatal antihypertensive. **[2010]**

7 1.8.12 In women with severe pre-eclampsia, limit maintenance fluids to
8 80 ml/hour unless there are other ongoing fluid losses (for example,
9 haemorrhage). **[2010]**

10 **Caesarean section versus induction of labour**

11 1.8.13 Choose mode of birth for women with severe hypertension, severe pre-
12 eclampsia or eclampsia according to the clinical circumstances and the
13 woman's preference. **[2010]**

14 **Referral to critical care**

15 1.8.14 Refer women with severe hypertension or severe pre-eclampsia to the
16 appropriate critical care setting using the criteria in Table 4. **[2010]**

17 **Table 4. Clinical criteria for choice of critical care level**

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: eclampsia HELLP syndrome haemorrhage hyperkalaemia severe oliguria

	coagulation support intravenous antihypertensive treatment initial stabilisation of severe hypertension evidence of cardiac failure abnormal neurology
Level 1 care	Pre-eclampsia with hypertension Ongoing conservative antenatal management of severe preterm hypertension Step-down treatment after the birth

1

2 **1.9 Antihypertensive treatment during the postnatal period,** 3 **including during breastfeeding**

4 1.9.1 All antihypertensive agents have the potential to transfer into breast milk,
5 therefore consider monitoring the blood pressure of babies, especially
6 those born preterm, for the first few weeks.

7 1.9.2 Consider enalapril^{11,12} for treating hypertension in women during the
8 postnatal period, with appropriate monitoring of maternal renal function
9 and maternal serum potassium. **[2019]**

¹¹ Although this use is common in UK clinical practice, at the time of publication (June 2019), enalapril did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

¹² In 2009, the MHRA issued a drug safety update on ACE inhibitors and angiotensin II receptor antagonists: recommendations on how to use during breastfeeding and a subsequent clarification was issued in 2014. This states that although ACE inhibitors and angiotensin II receptor antagonists are generally not recommended for use by breastfeeding mothers, they are not absolutely contraindicated. Healthcare professionals may prescribe these medicines during breastfeeding if they consider that this treatment is essential for the lactating mother. In mothers who are breastfeeding older infants, the use of captopril, enalapril, or quinapril may be considered if an ACE inhibitor is

1 1.9.3 For women of African or Caribbean family origin with hypertension during
2 the postnatal period, consider antihypertensive treatment with:

- 3 • nifedipine¹³, **or**
4 • amlodipine¹⁴ if the woman has previously used this to successfully
5 control her blood pressure. **[2019]**

6 1.9.4 For women with hypertension in the postnatal period, if blood pressure is
7 not controlled with a single medicine consider a combination of nifedipine
8 (or amlodipine) and enalapril. If this combination is not tolerated or is
9 ineffective, consider either:

- 10 • adding atenolol¹⁵ to the combination treatment, **or**
11 • swapping one of the medicines already being used for atenolol¹⁵.
12 **[2019]**

13 1.9.5 Avoid using diuretics **or angiotensin receptor blockers**¹⁶ to treat
14 hypertension in women in the postnatal period who are breastfeeding or
15 expressing milk. **[2010, amended 2019]**

necessary for the mother. Careful follow-up of the infant for possible signs of hypotension is recommended.

¹³ Although this use is common in UK clinical practice, at the time of publication (June 2019), nifedipine did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

¹⁴ Although this use is common in UK clinical practice, at the time of publication (June 2019), amlodipine did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

¹⁵ Although this use is common in UK clinical practice, at the time of publication (Jun 2019), atenolol did not have a UK marketing authorisation for this indication. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's [Prescribing guidance: prescribing unlicensed medicines](#) for further information.

¹⁶ In 2009, the MHRA issued a drug safety update on ACE inhibitors and angiotensin II receptor antagonists: recommendations on how to use during breastfeeding and a subsequent clarification was issued in 2014. This states that although ACE inhibitors and angiotensin II receptor antagonists are generally not recommended for use by breastfeeding mothers, they are not absolutely contraindicated. Healthcare professionals may prescribe these medicines during breastfeeding if they consider that this treatment is essential for the lactating mother. In mothers who are breastfeeding

- 1 1.9.6 Explain to women with hypertension who wish to breastfeed that:
- 2
- 3 • antihypertensive medicines can pass into breast milk
 - 4 • most antihypertensive medicines taken while breastfeeding only lead
 - 5 to very low levels in breast milk, so the amounts taken in by babies
 - 6 are very small and would be unlikely to have any clinical effect
 - 7 • most medicines are not tested in pregnant or breastfeeding women,
 - 8 so disclaimers in the manufacturer's information are not because of
 - any specific safety concerns or evidence of harm.

9 Make decisions on treatment together with the woman, based on her

10 preferences. **[2019]**

- 11 1.9.7 Treat women with hypertension in the postnatal period who are not
- 12 breastfeeding and who are not planning to breastfeed in line with the
- 13 [NICE guideline on hypertension in adults](#) **[2019]**

To find out why the committee made the 2019 recommendations on antihypertensive treatment during breastfeeding and how they might affect practice see [rationale and impact](#).

14 **1.10 Advice and follow-up at transfer to community care**

15 **Risk of recurrence of hypertensive disorders of pregnancy**

- 16 1.10.1 Advise women with hypertensive disorders of pregnancy that the overall
- 17 risk of recurrence in future pregnancies is approximately 1 in 5 (see Table
- 18 5). **[2019]**

older infants, the use of captopril, enalapril, or quinapril may be considered if an ACE inhibitor is necessary for the mother. Careful follow-up of the infant for possible signs of hypotension is recommended.

1 **Table 5. Likelihood of recurrence of hypertensive disorders of pregnancy**

Prevalence of hypertensive disorder in a future pregnancy	Type of hypertension in previous or current pregnancy		
	Any hypertension in pregnancy	Pre-eclampsia	Gestational hypertension
Any hypertension	Approximately 21% (1 in 5 women)	Approximately 20% (1 in 5 women)	Approximately 22% (1 in 5 women)
Pre-eclampsia	Approximately 14% (1 in 7 women)	Up to approximately 16% (1 in 6 women) If birth was at 28–34 weeks ^a : approximately 33% (1 in 3 women) If birth was at 34–37 weeks: approximately 23% (1 in 4 women)	Approximately 7% (1 in 14 women)
Gestational hypertension	Approximately 9% (1 in 11 women)	Between approximately 6 and 12% (up to 1 in 8 women)	Between approximately 11 and 15% (up to 1 in 7 women)
Chronic hypertension	Not applicable	Approximately 2% (up to 1 in 50 women)	Approximately 3% (up to 1 in 34 women)
^a No evidence was identified for women who gave birth at <28 weeks, but the committee agreed that the risk was likely to be at least as high, if not higher, than that for women who gave birth between 28 and 34 weeks.			

2 **Long-term risk of cardiovascular disease**

- 3 1.10.2 Advise women who have had a hypertensive disorder of pregnancy that
4 this is associated with an increased risk of hypertension and
5 cardiovascular disease in later life (see Table 6). **[2019]**

1 **Table 6. Cardiovascular risk in women who have had a hypertensive disorder**
 2 **of pregnancy**

	Type of hypertension in current or previous pregnancy			
Risk of future cardiovascular disease ^{a,b}	Any hypertension in pregnancy	Pre-eclampsia	Gestational hypertension	Chronic hypertension
Major adverse cardiovascular event	Risk increased (up to approximately 2 times)	Risk increased (approximately 1.5–3 times)	Risk increased (approximately 1.5–3 times)	Risk increased (approximately 1.7 times)
Cardiovascular mortality	Risk increased (up to approximately 2 times)	Risk increased (approximately 2 times)	(no data)	(no data)
Stroke	Risk increased (up to approximately 1.5 times)	Risk increased (approximately 2–3 times)	Risk may be increased	Risk increased (approximately 1.8 times)
Hypertension	Risk increased (approximately 2–4 times)	Risk increased (approximately 2–5 times)	Risk increased (approximately 2–4 times)	(not applicable)

^a Risks described are overall estimates, summarised from risk ratios, odds ratios and hazard ratios.
^b Increased risk is compared to the background risk in women who did not have hypertensive disorders during pregnancy. Absolute risks are not reported, as these will vary considerably, depending on the follow up time (range from 1 to 40 years postpartum).

- 3
- 4 1.10.3 Advise women who have had a hypertensive disorder of pregnancy to
- 5 discuss how to reduce their risk of cardiovascular disease, including
- 6 hypertensive disorders, with their GP or specialist. This may include:
- 7
- 8 • maintaining a healthy lifestyle, as recommended in the NICE guideline
 - 9 on [cardiovascular disease](#)
 - 10 • maintaining a healthy weight, as recommended in the NICE guideline
 - 11 on [obesity](#). [2019]
- 12 1.10.4 In women who have had pre-eclampsia or hypertension with early birth
- before 34 weeks consider pre-pregnancy counselling to discuss possible

1 risks of recurrent hypertensive disorders of pregnancy, and how to lower
2 them for any future pregnancies. **[2019]**

To find out why the committee made the 2019 recommendations on risk of recurrence of hypertensive disorders of pregnancy and long-term cardiovascular disease, and how they might affect practice see [rationale and impact](#).

3 **Body mass index and recurrence of hypertensive disorders of pregnancy**

4 1.10.5 Advise women who have had pre-eclampsia to achieve and keep a BMI
5 within the healthy range before their next pregnancy (18.5–24.9 kg/m²).
6 See also the NICE guideline on [obesity: identification, assessment and](#)
7 [management](#). **[2010, amended 2019]**

8 **Inter-pregnancy interval and recurrence of hypertensive disorders of** 9 **pregnancy**

10 1.10.6 Advise women who have had pre-eclampsia that the likelihood of
11 recurrence increases with an inter-pregnancy interval greater than 10
12 years. **[2010, amended 2019]**

13 **Long-term risk of end-stage kidney disease**

14 1.10.7 Tell women with a history of pre-eclampsia who have no proteinuria and
15 no hypertension at the postnatal review (6–8 weeks after the birth) that
16 although the relative risk of end-stage kidney disease is increased, the
17 absolute risk is low and no further follow-up is necessary. **[2010]**

18 **Thrombophilia and the risk of pre-eclampsia**

19 1.10.8 Do not routinely perform screening for thrombophilia in women who have
20 had pre-eclampsia. **[2010]**

21 ***Terms used in this guideline***

22 **Chronic hypertension**

23 Hypertension that is present at the booking visit, or before 20 weeks, or if the woman
24 is already taking antihypertensive medication when referred to maternity services. It
25 can be primary or secondary in aetiology.

1 **Eclampsia**

2 A convulsive condition associated with pre-eclampsia.

3 **HELLP syndrome**

4 Haemolysis, elevated liver enzymes and low platelet count.

5 **Hypertension**

6 Blood pressure of 140 mmHg systolic or higher, or 90 mmHg diastolic or higher.

7 **[2019]**

8 **Multi-fetal pregnancy**

9 A pregnancy with more than one baby (such as twins, triplets) **[2019]**

10 **Pre-eclampsia**

11 New onset of hypertension (over 140 mmHg systolic or over 90 mmHg diastolic)
12 after 20 weeks of pregnancy and the coexistence of 1 or more of the following new-
13 onset conditions:

- 14 • proteinuria (urine protein:creatinine ration over 30 mg/mmol or albumin:creatinine
15 ration above 2 mg/mmol, or at least 1 g/L ['2 + '] on dipstick testing) **or**
- 16 • other maternal organ dysfunction:
 - 17 – renal insufficiency (creatinine 90 umol/L or more, 1.02 mg/dL)
 - 18 – liver involvement (elevated transaminases [ALT or AST over 40 IU/L] with or
19 without right upper quadrant or epigastric abdominal pain)
 - 20 – neurological complications such as eclampsia, altered mental status, blindness,
21 stroke, clonus, severe headaches or persistent visual scotomata
 - 22 – haematological complications such as thrombocytopenia (platelet count below
23 150,000/ μ L), disseminated intravascular coagulation or haemolysis
- 24 • uteroplacental dysfunction such as fetal growth restriction, abnormal umbilical
25 artery Doppler waveform analysis, or stillbirth. **[2019]**

26 **Severe hypertension**

27 Blood pressure over 160 mmHg systolic or over 110 mmHg diastolic.

1 **Severe pre-eclampsia**

2 Pre-eclampsia with severe hypertension that does not respond to treatment or is
3 associated with ongoing or recurring severe headaches, visual scotomata, nausea or
4 vomiting, epigastric pain, oliguria and severe hypertension as well as progressive
5 deterioration in laboratory blood tests such as rising creatinine or liver transaminases
6 or falling platelet count, or failure of fetal growth or abnormal Doppler findings. [2019]

7 **Recommendations for research**

8 As part of the 2019 update, the guideline committee made 6 research
9 recommendations on the management of pregnancy with chronic hypertension and
10 the use of antihypertensives in breastfeeding. A research recommendation from the
11 2010 guideline which was superseded by these new research recommendations was
12 deleted, and 3 research recommendations where research was now underway or
13 had been completed were also deleted.

14 ***Key recommendations for research***

15 **1. Management of chronic hypertension in pregnancy**

16 In women who need treatment for chronic hypertension in pregnancy, what is the
17 effectiveness and safety of antihypertensive agents (compared in head-to-head
18 trials) in improving maternal and perinatal outcomes? [2019]

19 **2. Management of chronic hypertension in pregnancy**

20 In women who need treatment for hypertension in pregnancy, what are the adverse
21 neonatal outcomes associated with maternal use of beta blockers (or mixed alpha-
22 beta blockers)? [2019]

23 To find out why the committee made these research recommendations on chronic
24 hypertension see [rationale and impact](#).

25 **3. Management of pre-eclampsia**

26 In which women with pre-eclampsia is inpatient management associated with better
27 outcomes for women and babies?

1 To find out why the committee made the research recommendation on pre-
2 eclampsia see [rationale and impact](#).

3 **4. Antihypertensive treatment during the postnatal period**

4 In women who need treatment for high blood pressure after birth, what is the
5 effectiveness and safety (including in breastfeeding women) of antihypertensive
6 agents in achieving adequate blood pressure control? **[2019]**

7 To find out why the committee made the research recommendation on
8 antihypertensive treatment during breastfeeding see [rationale and impact](#).

9 **5. Fetal monitoring**

10 In women with hypertensive disorders of pregnancy, what is the optimal fetal
11 monitoring strategy to detect small for gestational age infants? **[2019]**

12 To find out why the committee made the research recommendation on fetal
13 monitoring see [rationale and impact](#).

14 **6. Advice and follow-up at transfer to community care**

15 In women who have had hypertension during pregnancy, what interventions reduce
16 the risk of a) recurrent hypertensive disorders of pregnancy and b) subsequent
17 cardiovascular disease?

18 To find out why the committee made the research recommendation on follow-up
19 after hypertensive disorders of pregnancy see [rationale and impact](#).

20 ***Other recommendations for research (from 2010 guideline)***

21 **Haematological and biochemical monitoring in women with gestational** 22 **hypertension**

23 What is the role of assessing haematological or biochemical parameters at diagnosis
24 of gestational hypertension and during surveillance of gestational hypertension?
25 **[2010]**

1 **Rationale and impact**

2 These sections briefly explain why the committee made the recommendations and
3 how they might affect practice. They link to details of the evidence and a full
4 description of the committee's discussion.

5 ***Assessment of proteinuria***

6 Recommendations [1.2.1 to 1.2.7](#)

7 **Why the committee made the recommendations**

8 The committee were aware that there is often over-reliance on a proteinuria result in
9 the diagnosis of pre-eclampsia, and agreed that healthcare professionals should use
10 the results of a full clinical review, including severity of hypertension and other signs
11 and symptoms, before making a diagnosis of pre-eclampsia.

12 The committee amended the recommendation on automated dipstick tests from the
13 2010 guideline to emphasise that this should be used as a screening tool for
14 proteinuria. The committee highlighted the importance of using automated dipstick
15 analysis in secondary care rather than visual analysis, which they were aware from
16 their experience has a higher error rate.

17 Protein:creatinine ratio (PCR) and albumin:creatinine ratio (ACR) were both shown
18 to have high specificity and high sensitivity at the chosen thresholds (30mg/mmol
19 and 8 mg/mmol respectively), and therefore either could be used depending on local
20 availability. The committee agreed that using both tests together did not have any
21 additional diagnostic benefit.

22 There was some evidence that using the first morning urine void in assessment of
23 proteinuria can lead to lower diagnostic accuracy, and so the committee
24 recommended against using this.

25 As PCR and ACR show very high diagnostic accuracy they should be used in place
26 of 24-hour urine collection, which is awkward for women and could delay
27 identification of proteinuria. However, there are rare occasions when it might be
28 more appropriate to use 24-hour collection (for example, women with renal
29 complications), and so the committee agreed it should not be ruled out entirely.

1 There was good evidence that a PCR of 30 mg/mmol had good diagnostic accuracy,
2 showing high sensitivity and specificity and should be used as the threshold for
3 significant proteinuria. However, the committee recommended retesting for results
4 above 30mg/mmol if there is still diagnostic uncertainty (for example the woman has
5 no other clinical signs or symptoms of pre-eclampsia) because there is large
6 variation in protein excretion during the day and from day to day. The committee
7 agreed that this would prevent women being diagnosed with pre-eclampsia on the
8 basis of a single raised PCR result.

9 Evidence from a single study showed high sensitivity and specificity for an ACR
10 result of 8mg/mmol to diagnose proteinuria. However, the committee were also
11 aware of further results from a large, UK-based study (Waugh 2017) which provided
12 further evidence for the efficacy of a threshold of 8 mg/mmol in the diagnosis of
13 severe pre-eclampsia.

14 As with PCR, the committee were aware that women are sometimes diagnosed with
15 pre-eclampsia on the basis of a single raised ACR, and that this may lead to over-
16 diagnosis. Therefore they made a recommendation to consider repeating the ACR
17 measurement if there was ongoing clinical uncertainty about the diagnosis.

18 No evidence was reviewed that examined the timing of repeat testing for either ACR
19 or PCR, and so no recommendations could be made regarding this.

20 **How the recommendations might affect practice**

21 The recommendation to take account of other clinical features when assessing
22 women for suspected pre-eclampsia might lead to an increased need for follow-up
23 and surveillance. However, this will also reduce the chance that a diagnosis of pre-
24 eclampsia is missed by raising awareness of the multi-system nature of the disease,
25 and so could reduce the number of women who go on to develop complications from
26 undiagnosed pre-eclampsia.

27 Not all secondary care units currently use automated dipstick analysis to screen for
28 proteinuria, so the recommendations might increase the need for automated
29 reagent-strip reading devices. However, the accuracy and reliability of screening will
30 be improved, reducing the need for further investigations for some women and
31 correctly identifying more women who need further testing or investigations.

1 Moving from 24-hour urine collection to spot urine ACR or PCR will save time, with
2 potential for faster diagnosis, and a reduction in inaccuracies because of incomplete
3 samples. It is also likely to improve quality of life, as the process of completing a 24-
4 hour urine collection is time consuming and awkward.

5 A PCR of 30 mg/mmol is already used routinely as a diagnostic threshold and
6 therefore should not change practice. Currently units may use different ACR levels
7 for diagnosis and so the recommendation to use 8mg/mmol will standardise practice.

8 Recommendations have been made for the use of either ACR or PCR allowing local
9 decisions to use whichever test is available, so this should not affect practice.

10 Repeating the PCR or ACR test may incur a small additional cost. However this
11 should reduce the false positive rate, and mean some women will avoid unnecessary
12 follow up or intensive monitoring (such as hospital admission) if their proteinuria
13 resolves and is shown to be transient.

14 Full details of the evidence and the committee's discussion are in [evidence review G:
15 assessment of proteinuria.](#)

16 [Return to recommendations](#)

17 ***Treatment of chronic hypertension***

18 Recommendations [1.3.5 and 1.3.7 to 1.3.11](#)

19 **Why the committee made the recommendations**

20 The committee agreed that pregnant woman with chronic hypertension should be
21 offered lifestyle advice similar to other adults with hypertension, and in line with the
22 NICE guideline on hypertension in adults.

23 There was very little evidence available on treatment initiation thresholds for chronic
24 hypertension in pregnancy, so the committee based their recommendations on the
25 values specified in the recent Control of Hypertension in Pregnancy Study (CHIPS)
26 and the NICE guideline on hypertension in adults. There was evidence for target
27 blood pressure levels from the large CHIPS trial, so the committee made
28 recommendations based on this.

1 There was some very limited evidence of both benefits and harms for different
2 antihypertensive medicines. However, there was not enough evidence to
3 recommend one treatment over another. As labetalol, nifedipine and methyldopa,
4 had been recommended in the previous guideline (for gestational hypertension and
5 pre-eclampsia), and these medicines had been used for many years in pregnancy,
6 the committee agreed they should be preferred treatment options for chronic
7 hypertension in pregnancy. Labetalol is licensed for use in pregnancy and so is
8 suggested as the first-line option, with nifedipine as the next alternative, and
9 methyldopa as the third option (as it may lead to more side-effects and be the least
10 effective option of the three).

11 There was some evidence for the benefits of aspirin in reducing preterm births and
12 neonatal unit admissions so the committee retained the recommendation on aspirin
13 from the previous guideline, but incorporated it into the section on the treatment of
14 chronic hypertension in pregnancy.

15 As currently there is a lack of evidence on the difference in outcomes between
16 different antihypertensive medications, and concerns about possible adverse
17 neonatal events from beta blockers, the committee made 2 research
18 recommendations on these topics.

19 **How the recommendations might affect practice**

20 Based on these recommendations, a clear blood pressure target should now be set
21 for women with chronic hypertension in pregnancy who need antihypertensive
22 treatment to improve consistency of treatment targets.

23 Starting treatment for hypertension and offering aspirin to women with chronic
24 hypertension who are pregnant are standard care so these recommendations are not
25 expected to change practice significantly.

26 Full details of the evidence and the committee's discussion are in [evidence review A:
27 interventions for chronic hypertension.](#)

28 [Return to recommendations](#)

1 ***Monitoring and treatment of gestational hypertension***

2 Recommendations [1.4.3 to 1.4.4](#)

3 **Why the committee made the recommendations**

4 The committee updated the table from the previous guideline on the management of
5 pregnancy with gestational hypertension. There was very little evidence available on
6 treatment initiation thresholds for gestational hypertension in pregnancy, so the
7 committee made recommendations using the values specified in the recent Control
8 of Hypertension in Pregnancy Study (CHIPS). There was evidence for target blood
9 pressure levels from the large CHIPS trial, so the committee made recommendations
10 based on this. The committee made a new recommendation referring to the NICE
11 guidance on placental growth factor testing as this is applicable to women with
12 gestational hypertension.

13 There was no evidence on fetal monitoring in gestational hypertension so the
14 committee made a research recommendation.

15 **How the recommendations might affect practice**

16 The recommendations reflect current clinical practice in many units, but may help
17 standardise practice across the NHS for units that currently use other blood pressure
18 targets.

19 Full details of the evidence and the committee's discussion are in [evidence review B:
20 monitoring in gestational hypertension.](#)

21 [Return to recommendations](#)

22 ***Assessment of women with pre-eclampsia***

23 Recommendations [1.5.2 to 1.5.4](#)

24 **Why the committee made the recommendations**

25 There was good evidence that the fullPIERS and PREP-S models are useful tools to
26 identify women at different risks of adverse outcomes because of pre-eclampsia.

27 There was more extensive validation of the fullPIERS model, but some of the
28 validation studies were conducted in populations from lower income settings. In

1 contrast, the PREP-S model had been developed using a UK population, and
2 validated using data from similar settings. It was noted that further validation of
3 PREP-S was unlikely to be conducted, due to the cost of conducting these studies.
4 The committee therefore agreed that both models should be considered as options.

5 Using the fullPIERS model, a predicted risk of 30% or more correlated strongly with
6 a high actual risk of an adverse outcome. The committee therefore agreed that a risk
7 of 30% or more would be a strong indication to offer admission into hospital for
8 surveillance and appropriate intervention. The high risk threshold was not as well-
9 defined for the PREP-S model - the developers of the model suggest that a risk of
10 50% at 48 hours might be a suitable threshold to identify women who need transfer
11 to tertiary units. The committee agreed that for the sake of simplicity, and to err on
12 the side of caution, they would prefer to use a suggested high risk of 30% for both
13 models, when considering place of care. However, the committee also agreed that
14 the models should not be used in isolation. Admission to hospital for monitoring
15 might be recommended for women with pre-eclampsia for other reasons, such as
16 severe hypertension or other severe features of pre-eclampsia, even if their risk does
17 not reach the 30% threshold.

18 The tools predict adverse outcomes in women, but are not designed to predict
19 outcomes for babies. The committee agreed it was important to highlight this.

20 **How the recommendations might affect practice**

21 The use of models to predict risk will improve consistency in current practice with
22 regard to admission to hospital for women with pre-eclampsia. Some centres offer
23 admission to all women with pre-eclampsia, while others only offer it to a small
24 proportion of women. The guidance might increase the number of women who are
25 admitted to hospital in some centres if admission is not currently routine, but might
26 decrease admission in other centres, thus standardising practice.

27 Full details of the evidence and the committee's discussion are in [evidence review C:
28 prediction of complications in pre-eclampsia.](#)

29 [Return to recommendations](#)

1 ***Monitoring and treatment of pre-eclampsia and timing of birth***

2 Recommendations [1.5.5](#), [1.5.7](#) and [1.5.12](#)

3 **Why the committee made the recommendations**

4 The committee updated the table from the previous guideline on the management of
5 pregnancy with pre-eclampsia. There was limited evidence on the best place of
6 treatment for women with pre-eclampsia. Because of this, the committee made
7 recommendations based on other evidence they reviewed (see evidence review C)
8 which showed that a women's risk of severe complications of pre-eclampsia could be
9 predicted using the fullPIERS or PREP-S model, and that women with a high risk of
10 (for example 30% or above) may need to be admitted for more intensive surveillance
11 while other women could have their pre-eclampsia managed as outpatients. The
12 committee used the features of severe disease that should indicate that a woman
13 with pre-eclampsia may need to be admitted for more intensive surveillance even if
14 her fullPIERS or PREP-S risk is less than 30%. Please see the section of the
15 guideline on Assessing pre-eclampsia and evidence review C for more details on the
16 use of the fullPIERS and PREP-S models.

17 There was no evidence on treatment initiation thresholds or target blood pressure
18 levels for pre-eclampsia, so the committee based their recommendations on the
19 NICE guideline on hypertension in adults and the values specified in the Control of
20 Hypertension In Pregnancy Study (CHIPS; see evidence review A), which included
21 women with chronic or gestational hypertension.

22 There was some very limited evidence of both benefits and harms for different
23 pharmacological interventions. However, as there was not enough evidence to
24 recommend one treatment over another, the committee adopted the choices from
25 the previous guideline and recommended choosing a treatment based on previous
26 treatments, side-effect profiles and the woman's preferences. Labetalol is licensed
27 for use in pregnancy and so is suggested as the first-line option, with nifedipine as
28 the next alternative, and methyldopa as the third option (as it may lead to more side-
29 effects and be the least effective option of the three).

30 There was limited evidence on the benefits and harms of planned early birth
31 compared with expectant management of pregnancy in women with pre-eclampsia,

1 so the committee recommended that decisions about timing of birth should be based
2 on whether the woman and baby are at risk of adverse outcomes if pregnancy is
3 prolonged. These recommendations were based on those from the previous
4 guideline, and expanded based on international guidelines which were used by the
5 committee in their clinical practice. Based on the data from HYPITAT-II study, the
6 committee also agreed that pregnancies in women with pre-eclampsia could be
7 managed with continued surveillance to 37 weeks, unless there were specific
8 concerns or indications to offer a planned early birth before then.

9 There was limited evidence to guide the best place of care for women with pre-
10 eclampsia and their babies so the committee made a research recommendation.

11 **How the recommendations might affect practice**

12 The recommendations are in line with current best clinical practice, so are unlikely to
13 cause a significant change in practice.

14 Currently, some units admit all women with pre-eclampsia routinely, some only admit
15 women who they believe to be at a high risk of complications, and some admit very
16 few. Standardising practice could therefore increase or reduce the number of women
17 who will be admitted, depending on a unit's current practice, but is likely to reduce
18 unwanted variance between units

19 Full details of the evidence and the committee's discussion are in [evidence review D:
20 interventions for pre-eclampsia](#).

21 [Return to recommendations](#)

22 ***Antihypertensive treatment during the postnatal period, including 23 during breastfeeding***

24 Recommendations [1.9.1 to 1.9.4 and 1.9.6 to 1.9.7](#)

25 **Why the committee made the recommendations**

26 There was very little evidence on the efficacy and safety of antihypertensive agents
27 in postnatal women, so the committee made recommendations based on the NICE
28 guideline on hypertension in adults, with consideration of the potential effects of
29 medicines on the baby. The committee therefore recommended the use of an

1 angiotensin converting enzyme (ACE) inhibitor as first line treatment, except in
2 women of African or Caribbean family origin, in whom a calcium-channel blocker
3 would be used first-line. The choice of second-line medicine was modified from the
4 NICE guideline on hypertension in adults as angiotensin receptor blockers and
5 thiazide diuretics are not recommended during breastfeeding. Therefore the
6 committee agreed that beta-blockers should be used as the second-line
7 antihypertensive agent. The committee also agreed that the medicines with the most
8 convenient administration schedule should be used wherever possible and for this
9 reason the committee recommended enalapril and atenolol, both of which are taken
10 once daily, in preference to captopril and labetalol respectively (as these both require
11 tablets to be taken three times daily).

12 As there was very little evidence on the effectiveness and safety of antihypertensives
13 for postnatal use, the committee revised the research recommendation made in the
14 2010 guideline.

15 **How the recommendations might affect practice**

16 There is currently wide variation in practice over use of antihypertensive treatment in
17 the postnatal period, and these recommendations may reduce variation in practice.
18 The recommendations could lead to a decrease in the use of labetalol in the
19 postnatal period.

20 Full details of the evidence and the committee's discussion are in [evidence review E:
21 postnatal management of hypertension.](#)

22 [Return to recommendations](#)

23 ***Risk of recurrence of hypertensive disorders of pregnancy and 24 long-term cardiovascular disease***

25 Recommendations [1.10.1 to 1.10.4](#)

26 **Why the committee made the recommendations**

27 Long-term follow-up studies of women who have experienced hypertensive disorders
28 during pregnancy showed an increased risk of long-term cardiovascular disease and

1 a higher prevalence of hypertensive disorders in subsequent pregnancies compared
2 to women unaffected by hypertensive disorders.

3 There was no evidence on which interventions could reduce the risk of recurrence of
4 hypertensive disorders of pregnancy or future cardiovascular disease, so the
5 committee made a research recommendation.

6 **How the recommendations might affect practice**

7 Providing guidance and advice to women on future risks and signposting appropriate
8 care and lifestyle advice may be an additional activity for some healthcare
9 professionals, compared to current practice.

10 Full details of the evidence and the committee's discussion are in [evidence review F:
11 advice at discharge](#).

12 [Return to recommendations](#)

13 **Context**

14 Hypertensive disorders during pregnancy affect around 8–10% of all pregnant
15 women and can be associated with substantial complications for the woman and the
16 baby. Women can have hypertension before pregnancy or it can be diagnosed in the
17 first 20 weeks (known as chronic hypertension), new onset of hypertension occurring
18 in the second half of pregnancy (gestational hypertension) or new hypertension with
19 features of multi-organ involvement (pre-eclampsia).

20 While the proportion of women with pregnancy hypertensive disorders overall
21 appears to have stayed reasonably stable, maternal mortality from hypertensive
22 causes has fallen dramatically: less than 1 woman in every million who gives birth
23 now dies from pre-eclampsia. There is consensus that introduction of the 2010 NICE
24 evidence-based guidelines, together with the findings from the confidential enquiry
25 into maternal deaths, has made a pivotal contribution to this fall in maternal mortality.
26 However, hypertension in pregnancy continues to cause substantial maternal
27 morbidity, stillbirths and neonatal deaths, and perinatal morbidity. Women with
28 hypertension in pregnancy are also at increased risk of cardiovascular disease later
29 in life.

1 Variations in care contribute to inequity in adverse outcomes. Adoption and
2 implementation of evidence-based national guidelines have a central role in reducing
3 this variance and improving care and outcomes across the maternity service.
4 Research that has been done since publication of the previous guideline has
5 addressed areas of uncertainty and highlighted where the recommendations can be
6 updated. A surveillance report from 2017 identified new studies in the following
7 areas:

- 8 • management of pregnancy with chronic hypertension
- 9 • management of pregnancy with gestational hypertension
- 10 • management of pregnancy with pre-eclampsia
- 11 • breastfeeding
- 12 • advice and follow-up care at transfer to community care.

13 The scope of this update was limited to these sections; it did not include other areas
14 being looked at by other groups (for example screening strategies for pre-eclampsia,
15 which is being evaluated by the UK National Screening Committee), and did not look
16 into alternative approaches to categorisation of hypertension in pregnancy (for
17 example, looking at treatment for all types of pregnancy hypertension together,
18 rather than within the subdivisions of chronic hypertension, gestational hypertension
19 and pre-eclampsia). This update has also clarified the basis for the current definition
20 of pre-eclampsia, in order to better align with the stated aims of the 2010 guideline to
21 be consistent with those agreed by the International Society for the Study of
22 Hypertension in Pregnancy (ISSHP).

23 The aim of the 2019 guideline is to present updated evidence-based
24 recommendations, relevant to practising clinicians, while identifying outstanding
25 areas of uncertainty that need further research. There is a strong argument for
26 uptake of these new guidelines into clinical practice, in order to minimise
27 unnecessary variance and provide optimal care for women and their babies. In doing
28 this, low rates of maternal mortality should be maintained, and progress on reduction
29 of maternal morbidity and perinatal morbidity and mortality can be pursued.

1 **Finding more information and resources**

2 To find out what NICE has said on topics related to this guideline, see our web page
3 on [cardiovascular conditions](#). [\[change link to relevant topic page\]](#)

4 **Update information**

5 **June 2019:** This guideline is an update of NICE guideline CG107 (published August
6 2010) and will replace it.

7 We have reviewed the evidence on the assessment of proteinuria and the treatment
8 of women with chronic and gestational hypertension and pre-eclampsia.

9 Recommendations are marked **[2019]** if the evidence has been reviewed.

10 ***Recommendations that have been deleted or changed***

11 We propose to delete some recommendations from the 2010 guideline. [Table 1](#) sets
12 out these recommendations and includes details of replacement recommendations.
13 If there is no replacement recommendation, an explanation for the proposed deletion
14 is given.

15 In recommendations shaded in grey and ending **[2010, amended 2019]**, we have
16 made changes that could affect the intent without reviewing the evidence. Yellow
17 shading is used to highlight these changes, and reasons for the changes are given in
18 [table 2](#).

19 In recommendations shaded in grey and ending **[2010]**, we have not reviewed the
20 evidence. In some cases minor changes have been made – for example, to update
21 links, or bring the language and style up to date – without changing the intent of the
22 recommendation. Minor changes are listed in [table 3](#).

23 See also the [previous NICE guideline and supporting documents](#). [\[update hyperlink
24 with guideline number\]](#)

25 **Table 1 Recommendations that have been deleted**

26

Recommendation in 2010 guideline	Comment
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] [replaced by 'Hypertension: clinical management of primary hypertension in adults {NICE clinical guideline 127}].)	Replaced by: 1.3.5 Offer pregnant women with chronic hypertension advice on: <ul style="list-style-type: none"> • weight • exercise • healthy eating • lowering the amount of salt in their diet (either by lowering their salt intake or using a salt substitute). Provide advice in line with the NICE guideline on hypertension in adults: diagnosis and treatment .
1.4.1.5 In women receiving outpatient care for severe gestational hypertension, after it has been effectively controlled in hospital, measure blood pressure and test urine twice weekly and carry out weekly blood tests.	This recommendation has been deleted because this information is contained in Table 1 in the guideline and does not need to be repeated.
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.	This recommendation has been deleted because this information is contained in Table 1 in the guideline and does not need to be repeated.
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 birth) a specialist assessment of their hypertension.	This recommendation has been deleted because if problems are detected by the GP at the 6-8 week check then a referral to secondary care should be made only if required, in accordance with normal referral guidelines.
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	This recommendation has been replaced by recommendation 1.5.12 Decide on timing of birth as recommended in Table 3.
1.5.2.3 Consultant obstetric staff should write a plan for antenatal fetal monitoring during birth.	This recommendation has been stood down as fetal monitoring is covered by the NICE guideline on intrapartum care and it is not necessary to have a separate recommendation about planning for this during birth in a guideline on managing pre-eclampsia.
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.	This recommendation has been deleted because if problems are detected by the GP at the 6-8 week check then a referral to secondary care should be made only if required, in accordance with normal referral guidelines.

<p>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.</p>	<p>This recommendation has been merged into a simplified recommendation about what to do if indices are not improving or are improving but stay in abnormal range:</p> <p>1.5.24 If biochemical and haematological indices are outside the reference range in women with pre-eclampsia who have given birth, repeat platelet count, transaminases and serum creatinine measurements as clinically indicated until results return to normal. [2010, amended 2019]</p>
<p>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.</p>	<p>This recommendation has been deleted because fluid balance would not be routinely recorded outside a critical care setting.</p>
<p>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.</p>	<p>This recommendation has been merged into a simplified recommendation about what fetal monitoring should be carried out in gestational hypertension, and has been rephrased as a positive recommendation:</p> <p>1.6.3 In women with gestational hypertension, carry out ultrasound fetal growth and amniotic fluid volume assessment and umbilical artery Doppler velocimetry at diagnosis. [2010, amended 2019]</p>
<p>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.</p>	<p>The recommendation has been deleted as any problems seen when fetal monitoring would always be referred to a consultant obstetrician and it is unnecessary to have a recommendation stating this.</p>
<p>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.</p>	<p>This recommendation has been deleted because blood pressure targets for women who are in critical care should be the same as for all other women with pre-eclampsia, as already specified in the guideline, that is <135/85 mmHg</p>
<p>1.9.1.4. Assess the clinical wellbeing of the baby, especially adequacy of feeding, at least daily for the first days after birth.</p>	<p>This recommendation has been deleted because the clinical wellbeing of the baby and the adequacy of feeding would be monitored in all babies for the first few days after birth and so it is unnecessary to have a recommendation stating this.</p>
<p>Recommendations for research:</p>	

<p>Reducing the risk of hypertensive disorders in pregnancy 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? (2010)</p>	<p>This research recommendation has been removed as this research has been commissioned (but the successful bidder and study title are not yet known)</p>
<p>Assessment of proteinuria in hypertensive disorders of pregnancy How should significant proteinuria be defined in women with hypertension during pregnancy? (2010)</p>	<p>This research recommendation has been removed as this study is now completed. (Study name = DAPPA)</p>
<p>Timing of birth in women with pre-eclampsia When should women who have pre-eclampsia with mild or moderate hypertension give birth? (2010)</p>	<p>This research recommendation has been removed as this study is now ongoing. (Study name = PHOENIX)</p>
<p>Antihypertensive agents and breastfeeding How safe are commonly used antihypertensive agents when used by women who are breastfeeding? (2010)</p>	<p>This research recommendation has been removed as it has been superseded by a new research recommendation made by the committee: In women who need treatment for high blood pressure after birth, what is the effectiveness and safety (including in breastfeeding women) of antihypertensive agents in achieving adequate blood pressure control?</p>

- 1 **Table 2 Amended recommendation wording (change to intent) without an**
- 2 **evidence review**

Recommendation in [2010] guideline	Recommendation in current guideline	Reason for change
<p>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.</p> <p>Symptoms include:</p> <ul style="list-style-type: none"> • 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. <p>[This recommendation is adapted from 'Antenatal care' (NICE clinical guideline 62)].</p>	<p>1.1.1 Advise pregnant women to see a healthcare professional immediately if they experience symptoms of pre-eclampsia. Symptoms include:</p> <ul style="list-style-type: none"> • 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. <p>See the NICE guideline on antenatal care for advice on risk factors and symptoms of pre-eclampsia [2010 amended 2019]</p>	<p>The reference to the new NICE guideline on antenatal care has been included as this includes a whole section on 'screening for pre-eclampsia'.</p>
<p>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).</p>	<p>1.1.7 Give the same advice on rest, exercise and work to women with hypertension or at risk of hypertensive disorders during pregnancy as healthy pregnant women. See the NICE guideline on antenatal care. [2010, amended 2019]</p>	<p>The wording and the link have been updated.</p>

<p>1.2.1.1 Tell women who take angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARBs):</p> <ul style="list-style-type: none"> • 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. 	<p>1.3.1 Advise women who take angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARBs)²:</p> <ul style="list-style-type: none"> • 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. • to discuss these treatments with their specialist if used for other conditions such as renal disease [2010, amended 2019] <p>2. In 2007, the MHRA issued a drug safety update on ACE inhibitors and angiotensin II receptor antagonists: not for use in pregnancy that states 'Use in women who are planning pregnancy should be avoided unless absolutely necessary, in which case the potential risks and benefits should be discussed'.</p>	<p>There was concern that in women receiving ACE inhibitors for renal protection, it may be beneficial to carry on with the ACE inhibitors, and so the committee added this new recommendation to highlight this. Footnote was also added so as to be consistent with Hypertension in adults guideline.</p>
<p>1.2.1.3 Tell women who take chlorothiazide:</p> <ul style="list-style-type: none"> • that there may be an increased risk of congenital abnormality and neonatal complications 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. 	<p>1.3.3 Advise women who take thiazide diuretics:</p> <ul style="list-style-type: none"> • that there may be an increased risk of congenital abnormalities and neonatal complications 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. [2010, amended 2019] 	<p>This recommendation has been broadened out to include all thiazides, as this warning applies to all thiazides, and chlorothiazide is not widely used.</p>

1.2.1.4. Tell women who take antihypertensive treatments other than ACE inhibitors, ARBs or chlorothiazide that the limited evidence available has not shown an increased risk of congenital malformation with such treatments.	1.3.4 Advise women who take antihypertensive treatments other than ACE inhibitors, ARBs or thiazide diuretics that there is limited evidence available on the safety of these medicines taken during pregnancy. [2010, amended 2019]	Chlorothiazide has been changed to thiazides in general (see above)
1.2.3.4 Offer pregnant women with secondary chronic hypertension referral to a specialist in hypertensive disorders.	1.3.6 Offer pregnant women with chronic hypertension referral to a specialist in hypertensive disorders of pregnancy and discuss the risks and benefits of treatment.[2010, amended 2019]	The words ‘..of pregnancy’ have been added to make it clear this is not a cardiologist, and it has been clarified that the risks and benefits of continuing or initiating treatment should be discussed.
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.	1.3.13 Do not offer planned early birth before 37 weeks to women with chronic hypertension whose blood pressure is lower than 160/110 110 mmHg, with or without antihypertensive treatment, unless there are other medical indications. [2010, amended 2019]	This is to reflect the change in terminology used throughout the guideline to ‘planned early birth’, and to clarify that hypertension is not the only determinant of when a planned early birth should be offered.

<p>1.2.5.3 Offer birth to women with refractory severe chronic hypertension, after a course of corticosteroids (if required) has been completed.</p>	<p>1.3.15 If planned early birth is necessary (see recommendation 1.5.7) offer a course of antenatal corticosteroids and magnesium sulfate to women, in line with the NICE guideline on preterm labour and birth. [2010, amended 2019]</p>	<p>This recommendation was amended as women with refractory severe chronic hypertension should not be immediately offered birth, especially if this would lead to the preterm birth of a baby. The part of the recommendation relating to corticosteroids is still the 'offer' part of the recommendation as this is relevant if a preterm birth is needed. Magnesium sulfate has been added and a link to the preterm labour and birth guidelines.</p>
<p>1.2.6.2 In women with chronic hypertension who have given birth, aim to keep blood pressure lower than 140/90 mmHg. and 1.2.6.3 In women with chronic hypertension who have given birth:</p> <ul style="list-style-type: none"> • continue antenatal antihypertensive treatment. • review long-term antihypertensive treatment 2 weeks after the birth. 	<p>1.3.17 In women with chronic hypertension who have given birth:</p> <ul style="list-style-type: none"> • aim to keep blood pressure lower than 140/90 mmHg • continue antenatal antihypertensive treatment, if required. (see section 1.9 on antihypertensives in breastfeeding). • review long-term antihypertensive treatment 2 weeks after the birth. [2010, amended 2019] 	<p>As these 2 recs in the old guideline had a similar stem they have been merged. The words 'if required' have been included as antihypertensive treatment should only be used if required. A cross reference to the section on breastfeeding has also been added.</p>
<p>1.2.6.4 If a woman has taken methyldopa 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.</p>	<p>1.3.18 If a woman has taken methyldopa to treat chronic hypertension during pregnancy, stop within 2 days after the birth and restart the antihypertensive treatment the woman was taking before the pregnancy. (see section 1.9 on breastfeeding). [2010, amended 2019]</p>	<p>The timing in relation to the birth has been clarified and a cross reference to the section on breastfeeding has been added.</p>

<p>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.</p>	<p>1.3.19 Offer women with chronic hypertension a medical review 6–8 weeks after the birth with their GP or specialist as appropriate. [2010, amended 2019]</p>	<p>The words ‘with the pre-pregnancy care team’ has been removed because it’s not a term usually used and may be unclear. Instead the review can be carried out by the GP or specialist so this has been added. The term postnatal review has been removed as there is not a routine defined ‘postnatal review’ of the mother.</p>
<p>1.4.1.4 Only offer women with gestational hypertension antihypertensive treatment other than labetalol after considering side-effect profiles for woman, fetus and newborn baby. Alternatives include methyldopa and nifedipine.</p>	<p>1.4.5 Consider labetalol to treat gestational hypertension. Consider nifedipine for women in whom labetalol is not suitable, and methyldopa if labetalol or nifedipine are not suitable. Base the choice on side-effect profiles, risk (including fetal effects) and the woman’s preferences. [2010, amended 2019]</p>	<p>This recommendation has been updated to bring it in line with the wording of the new recommendation for treatment of chronic hypertension, so there is continuity throughout the guideline.</p>
<p>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.</p>	<p>1.4.7 Do not offer planned early birth before 37 weeks to women with gestational hypertension whose blood pressure is lower than 160/110 mmHg, with or without antihypertensive treatment, unless there are other medical indications [2010, amended 2019]</p>	<p>This is to reflect the change in terminology to ‘planned early birth’ and to clarify that hypertension is not the only determinant of when a planned early birth should be offered.</p>

<p>1.4.2.3 Offer birth to women with refractory severe gestational hypertension after a course of corticosteroids (if required) has been completed.</p>	<p>1.4.9 If planned early birth is necessary (see recommendation 1.5.7) offer a course of antenatal corticosteroids to women, in line with the NICE guideline on preterm labour and birth. [2010, amended 2019]</p>	<p>This recommendation was amended as women with refractory severe gestational hypertension should not be immediately offered birth, especially if this would lead to the preterm birth of a baby. The part of the recommendation relating to corticosteroids is still the 'offer' part of the recommendation as this is relevant if a preterm birth is required. Magnesium sulfate has been added and a link to the preterm labour and birth guidelines.</p>
<p>1.4.3.2 In women with gestational hypertension who have given birth:</p> <ul style="list-style-type: none"> • continue use of antenatal antihypertensive treatment • consider reducing antihypertensive treatment if their blood pressure falls below 140/0 mmHg • reduce antihypertensive treatment if their blood pressure falls below 130/80 mmHg. 	<p>1.4.11 In women with gestational hypertension who have given birth:</p> <ul style="list-style-type: none"> • continue use of antenatal antihypertensive treatment if required (see section 1.9 on breastfeeding). • advise women that the duration of postnatal antihypertensive treatment is usually similar to the antenatal treatment duration • reduce antihypertensive treatment if their blood pressure falls below 130/80 mmHg. [2010, amended 2019] 	<p>Antihypertensive treatment should only be continued if required so this has been added to the recommendation and the caveat to consider reducing has been removed. A link to the section on breastfeeding has been included. As gestational hypertension is likely to resolve after birth, women should be advised that they are unlikely to need to receive antihypertensive therapy long-term and that the usual course of treatment mirrors the antenatal period.</p>

1.4.3.3. If a woman has taken methyldopa to treat gestational hypertension, stop within 2 days of birth	1.4.12 If a woman has taken methyldopa to treat gestational hypertension, stop within 2 days after the birth. [2010, amended 2019]	Clarification of the time to stop methyldopa.
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.	1.4.13 For women with gestational hypertension who did not take antihypertensive treatment and have given birth, start antihypertensive treatment if their blood pressure is 150/100 mmHg or higher. [2010, amended 2019]	This has been reworded to provide a more easily read BP cut-off.
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.	1.4.15 Offer women who have had gestational hypertension and who remain on antihypertensive treatment, a medical review with their GP or specialist 2 weeks after transfer to community care. [2010, amended 2019]	The timing and who should do this review have been clarified.
1.4.3.7 Offer women who have had gestational hypertension a medical review at the postnatal review (6–8 weeks after the birth).	1.4.16 Offer all women who have had gestational hypertension a medical review with their GP 6–8 weeks after the birth. [2010, amended 2019]	The words ‘with their GP’ have been added to clarify who should be doing this check. The term postnatal review has been removed as there is not a defined ‘postnatal review’ of the mother.
1.5.1.1 Assess women with pre-eclampsia at each consultation. Assessment of women with pre-eclampsia should be performed by a healthcare professional trained in the management of hypertensive disorders of pregnancy.	1.5.1 Assessment of women with pre-eclampsia should be performed by a healthcare professional trained in the management of hypertensive disorders of pregnancy. [2010, amended 2019]	The first sentence has been removed as women would always be assessed at every consultation.

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<p>1.5.1.3 Only offer women with pre-eclampsia antihypertensive treatment other than labetalol after considering side-effect profiles for woman, fetus and newborn baby. Alternatives include methyldopa and nifedipine.</p>	<p>1.5.6 1.1.1 Offer labetalol to treat hypertension in pregnant women with pre-eclampsia. Offer nifedipine for women in whom labetalol is not suitable, and methyldopa if labetalol or nifedipine are not suitable. Base the choice on any pre-existing treatment, side-effect profiles, risks (including fetal effects) and the woman's preference. [2010, amended 2019]</p>	<p>This recommendation has been updated to bring it in line with the wording of the new recommendation for treatment of chronic hypertension and to ensure uniformity throughout the guideline.</p>
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<p>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.</p> <p>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:</p> <ul style="list-style-type: none"> • severe hypertension develops refractory to treatment • maternal or fetal indications develop as specified in the consultant plan (see 1.5.22). <p>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).</p>	<p>1.5.7 Record maternal and fetal thresholds for planned early birth before 37 weeks in women with pre-eclampsia. Thresholds for considering planned early birth include one or more of the following:</p> <ul style="list-style-type: none"> • inability to control maternal BP despite using ≥ 3 classes of antihypertensives in appropriate doses • maternal pulse oximetry $< 90\%$ • progressive deterioration in liver function, creatinine, haemolysis, or platelet count • ongoing neurological features, such as severe intractable headache, repeated visual scotomata, or eclampsia • placental abruption • reversed end-diastolic flow in the umbilical artery Doppler velocimetry, a non-reassuring cardiotocograph, or stillbirth. [2019] <p>1.5.8 Involve a senior obstetrician in any decisions on timing of birth for women with pre-eclampsia. [2010, amended 2019]</p> <p>1.5.9 Discuss with the anaesthetic team if birth is planned in a woman with pre-eclampsia. [2010, amended 2019]</p> <p>1.5.10 Discuss with the neonatal team if birth is planned in a woman with pre-eclampsia and neonatal complications are anticipated. [2010, amended 2019]</p> <p>1.5.11 Offer intravenous magnesium sulfate and a course of antenatal corticosteroids to women with preterm pre-eclampsia if</p>	<p>These 3 recommendations from the 2010 guideline have been amended to make them clearer, easier to follow, and so that each recommendation is only 1 action. The list of thresholds for early planned birth have been expanded (more detail of this is given in the committee's discussion of the evidence), and the part of the recommendation relating to corticosteroids has been updated, magnesium sulfate has been added and a link to the preterm labour and birth guidelines has been included.</p>
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	birth is planned within 7 days, in line with the NICE guideline on preterm labour and birth. [2010, amended 2019]	
1.5.3.6. If a woman has taken methyldopa to treat pre-eclampsia, stop within 2 days of birth	1.5.18 If a woman has taken methyldopa to treat pre-eclampsia, stop within 2 days after the birth. [2010, amended 2019]	Clarification of the time to stop methyldopa.
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: <ul style="list-style-type: none"> • 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. 	1.5.19 Offer women with pre-eclampsia who have given birth transfer to community care if all of the following criteria have been met: <ul style="list-style-type: none"> • there are no symptoms of pre-eclampsia • blood pressure, with or without treatment, is 150/100 mmHg or less • blood test results are stable or improving. [2010, amended 2019] 	This has been reworded to provide a more easily read BP cut-off.
1.5.3.9 Offer all women who have had pre-eclampsia and are still on antihypertensive treatment 2 weeks after transfer to community care a medical review.	1.5.21 Offer women who have had pre-eclampsia and who remain on antihypertensive treatment, a medical review with their GP or specialist 2 weeks after transfer to community care. [2010, amended 2019]	The timing and who should do this review have been clarified.
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).	1.5.22 Offer all women who have had pre-eclampsia a medical review with their GP or specialist 6–8 weeks after the birth. [2010, amended 2019]	The words ‘with their GP or specialist’ have been added to clarify who should be doing this check. The term postnatal review has been removed as there is not a defined ‘postnatal review’ of the mother.

<p>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).</p>	<p>1.5.24 If biochemical and haematological indices are outside the reference range, in women with pre-eclampsia who have given birth, repeat platelet count, transaminases and serum creatinine measurements as clinically indicated until results return to normal. [2010, amended 2019]</p>	<p>1.5.3.13. and 1.5.3.14 have been combined (see notes in table 1 on deleted 1.5.3.14) to create one simpler recommendation. The results should be repeated until they return to normal and not just stopped after the 6-8 week review so the recommendation has been amended to say this.</p>
<p>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.</p>	<p>1.6.1 In women with chronic hypertension, carry out ultrasound fetal growth and amniotic fluid volume assessment, and umbilical artery Doppler velocimetry at 28 weeks, 32 weeks and 36 weeks. [2010, amended 2019]</p>	<p>The scan times have been updated to more definitive time-points and to add in a late scan at 36 weeks to detect late problems such as growth restriction.</p>
<p>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.</p>	<p>1.6.3 In women with gestational hypertension, carry out ultrasound fetal growth and amniotic fluid volume assessment and umbilical artery Doppler velocimetry at diagnosis [2010, amended 2019]</p>	<p>This recommendation has been combined with 1.6.2.2 (old guideline, see notes on this in table 1) to create one simplified recommendation about fetal monitoring in this group, as the 34 weeks cut-off for diagnosis is an arbitrary figure not based on any evidence.</p>
<p>1.6.2 Fetal monitoring Mild or moderate gestational hypertension (section heading)</p>	<p>Fetal monitoring in gestational hypertension</p>	<p>The definition of mild and moderate hypertension has been removed (see changes to 'Terms used in this guideline').</p>

<p>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.</p>	<p>1.6.9 In women with pre-eclampsia or severe gestational hypertension , repeat ultrasound for fetal growth and amniotic fluid volume assessment or umbilical artery Doppler velocimetry every 2 weeks. [2010, amended 2019]</p>	<p>The timing has been clarified from ‘do not routinely repeat ...more than every 2 weeks’ to ‘repeat every 2 weeks’ as the previous wording was confusing and it is carried out every 2 weeks in practice.</p>
<p>1.6.3.7 For women with pre-eclampsia or severe gestational hypertension, write a care plan that includes all of the following:</p> <ul style="list-style-type: none"> • the timing and nature of future fetal monitoring • fetal indications for birth and if and when antenatal corticosteroids should be given • when discussion with neonatal paediatricians and obstetric anaesthetists should take place and what should be discussed. 	<p>1.6.10 For women with pre-eclampsia or severe gestational hypertension, write a care plan that includes all of the following:</p> <ul style="list-style-type: none"> • the timing and nature of future fetal monitoring • fetal indications for birth and if and when antenatal corticosteroids should be given • plans for discussion with neonatal paediatricians and obstetric anaesthetists [2010, amended 2019] 	<p>This recommendation has been clarified to indicate that the plan should include a plan about discussing with the paediatricians and anaesthetists , but that no decisions need to be taken at this planning stage</p>
<p>1.6.4 Fetal monitoring Women at high risk of pre-eclampsia (section heading)</p>	<p>Women who need additional fetal monitoring</p>	<p>The recommendations in this section do not just relate to women who are at high risk of pre-eclampsia, but to other women too, who have other risk factors such as previous intrauterine death.</p>
<p>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.</p>	<p>1.6.12 In women who need additional fetal monitoring (see 1.6.11) carry out cardiotocography if fetal activity is abnormal. [2010, amended 2019]</p>	<p>The wording has been changed to women who need additional fetal monitoring as may be women with severe gestational hypertension or pre-eclampsia. The word ‘only’ has been taken out as there may be other reasons to carry out cadiotocography.</p>

<p>General statement at start of intrapartum care section: 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.</p>	<p>1.7.1 Give advice and treatment to women with hypertensive disorders of pregnancy in line with the NICE guideline on intrapartum care unless there are recommendations in this guideline on the same topic. [2010, amended 2019]</p>	<p>This was a 'statement' in the previous guideline, not a recommendation so has been reworded into a recommendation</p>
<p>1.7.1.1 During labour, measure blood pressure:</p> <ul style="list-style-type: none"> • hourly in women with mild or moderate hypertension • continually in women with severe hypertension. 	<p>1.7.3 During labour, measure blood pressure:</p> <ul style="list-style-type: none"> • hourly, in women with hypertension • every 15–30 minutes until blood pressure is less than 160/110 mmHg in women with severe hypertension. [2010, amended 2019] 	<p>The terms mild and moderate have been removed, as per the changes to definitions elsewhere in the guideline. Women with severe hypertension should be actively treated and their blood pressure measured every 15 to 30 minutes so the wording has been changed to reflect this active process.</p>
<p>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.</p>	<p>1.7.6 Do not preload women who have severe pre-eclampsia with intravenous fluids before establishing low-dose epidural analgesia or combined spinal epidural analgesia. [2010, amended 2019]</p>	<p>'And' has been changed to 'or' for clarification</p>
<p>1.7.4.1 Do not routinely limit the duration of the second stage of labour:</p> <ul style="list-style-type: none"> • in women with stable mild or moderate hypertension or • if blood pressure is controlled within target ranges in women with severe hypertension. 	<p>1.7.7 Do not routinely limit the duration of the second stage of labour in women with controlled hypertension. [2010, amended 2019]</p>	<p>The second bullet has been removed as blood pressure controlled within target is the same as 'stable hypertension'.</p>

<p>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.</p>	<p>1.7.8 Consider operative or assisted birth in the second stage of labour for women with severe hypertension whose hypertension has not responded to initial treatment. [2010, amended 2019]</p>	<p>The word recommend has been amended to 'consider' as this was the wording used in the in the full version of the 2010 guideline (p147, 9.5). The recommendation has been clarified to state operative (C-section) or assisted (ventouse, forceps) birth.</p>
<p>1.8 Medical management of severe hypertension or severe pre-eclampsia in a critical care setting</p>	<p>1.8 Medical management of severe hypertension, severe pre-eclampsia or eclampsia in a critical care setting</p>	<p>Section covers management of eclampsia too so heading has been updated to reflect this.</p>
<p>1.8.1.3 If considering magnesium sulphate treatment, use the following as features of severe pre-eclampsia:</p> <ul style="list-style-type: none"> • 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 (≥ 3 beats) • liver tenderness • HELLP syndrome • platelet count falling to below 100×10^9 per litre • abnormal liver enzymes (ALT or AST rising to above 70 iu/litre). 	<p>1.8.3 If considering magnesium sulfate treatment, use the following as features of severe pre-eclampsia:</p> <ul style="list-style-type: none"> • ongoing or recurring severe headaches • visual scotomata • nausea or vomiting • epigastric pain • oliguria and severe hypertension • progressive deterioration in laboratory blood tests (such as rising creatinine or liver transaminases, or falling platelet count • failure of fetal growth • abnormal Doppler findings. [2010, amended 2019] 	<p>The list of signs and symptoms of severe pre-eclampsia has been edited to match the revised definition of severe pre-eclampsia (see 'Terms used in this guideline' section)</p>

<p>1.8.1.4 Use the Collaborative Eclampsia Trial regimen for administration of magnesium sulphate:</p> <ul style="list-style-type: none"> • 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. 	<p>1.8.4 Use the Collaborative Eclampsia Trial regimen for administration of magnesium sulfate:</p> <ul style="list-style-type: none"> • a loading dose of 4 g should be given intravenously over 5 minutes, followed by an infusion of 1 g/hour maintained for 24 hours. If the woman has had an eclamptic fit this should be for 24 hours after the last fit. • recurrent fits should be treated with a further dose of 2–4 g given over 5 minutes. [2010, amended 2019] 	<p>The words ‘if the woman has had an eclamptic fit, this should be for 24 hours after the last fit’ have been added in accordance with the approved dosing recommendations (and as requested by surveillance)</p>
<p>1.8.1.5 Do not use diazepam, phenytoin or lytic cocktail as an alternative to magnesium sulphate in women with eclampsia.</p>	<p>1.8.5 Do not use diazepam, phenytoin or other anticonvulsants as an alternative to magnesium sulfate in women with eclampsia. [2010, amended 2019]</p>	<p>The term ‘lytic cocktail’ is used to describe a regimen used for sedation and would not usually be considered to be an anti-convulsant so this has been changed to ‘other anti-convulsants’.</p>
<p>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:</p> <ul style="list-style-type: none"> • labetalol (oral or intravenous) • hydralazine (intravenous) • nifedipine (oral). 	<p>1.8.6 Treat women with severe hypertension who are in critical care during pregnancy or after birth immediately with one of the following:</p> <ul style="list-style-type: none"> • labetalol (oral or intravenous) • nifedipine (oral). • hydralazine (intravenous). <p>[2010, amended 2019]</p>	<p>The order of the drug options was changed to reflect the fact that the clinical evidence seen for the treatment of pre-eclampsia was better for nifedipine than for hydralazine.</p>

<p>1.8.3.1 If birth is considered likely within 7 days in women with pre-eclampsia:</p> <ul style="list-style-type: none"> • 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. 	<p>1.8.9 If early birth is considered likely within 7 days in women with pre-eclampsia, offer a course of corticosteroids to women, in line with the NICE guideline on preterm labour and birth. [2010, amended 2019].</p>	<p>The recommendation was amended to cross-reference to the preterm labour and birth guideline, instead of giving specific doses which may not correspond to the latest NICE guideline. The word 'early' has been added as this would only be applicable for a preterm birth.</p>
<p>1.8.7 Indications for referral to critical care levels (sub-section heading)</p>	<p>Referral to critical care</p>	<p>The heading was revised as the table below is about choice of levels, not indications for referral</p>
<p>1.9 Breastfeeding (section heading)</p>	<p>1.9 Antihypertensive treatment during the postnatal period, including during breastfeeding</p>	<p>The heading has been revised as it relates to all women, not just those who are breastfeeding.</p>
<p>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.</p>	<p>1.9.4 Avoid using diuretics or angiotensin receptor blockers to treat hypertension in woman women in the postnatal period who are breastfeeding or expressing milk. [2010, amended 2019]</p>	<p>This recommendation has been amended to include angiotensin receptor blockers as there is an MHRA warning not to use angiotensin receptor blockers during breastfeeding. The MHRA warning has been added as a footnote.</p>
<p>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/m², 'Obesity', NICE clinical guideline 43).</p>	<p>1.10.5 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/m²). See also the NICE guideline on obesity: identification, assessment and management. [2010, amended 2019]</p>	<p>The hyperlink wording and link has been amended to the latest NICE guideline on obesity.</p>

<p>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.</p>	<p>1.10.6 Advise women who have had pre-eclampsia that the likelihood of recurrence increases with an inter-pregnancy interval greater than 10 years. [2010, amended 2019]</p>	<p>The wording has been amended to make this a 'positive' recommendation rather than a negative one, as this is easier to understand.</p>
<p>Definitions section: Mild hypertension – diastolic blood pressure 90-99 mmHg, systolic blood pressure 150-159 mmHg and Moderate hypertension – diastolic blood pressure 100-109 mmHg, systolic blood pressure 150-159 mmHg</p>	<p>Terms used in this guideline section: Blood pressure of 140 mmHg systolic or higher, or 90 mmHg diastolic or higher.</p>	<p>Two definitions of mild and moderate blood pressure have been combined into a single definition as this separation not used in clinical practice</p>

<p>Definitions section: Pre-eclampsia is new hypertension presenting after 20 weeks with significant proteinuria.</p>	<p>Terms used in this guideline section: New onset of hypertension (over 140 mmHg systolic or over 90 mmHg diastolic) after 20 weeks of pregnancy and the coexistence of 1 or more of the following new-onset conditions:</p> <ul style="list-style-type: none"> • proteinuria (spot urine protein/creatinine over 30 mg/mmol [0.3 mg/mg] or over 300 mg/day or at least 1 g/L ['2 + '] on dipstick testing) or • other maternal organ dysfunction: <ul style="list-style-type: none"> <input type="checkbox"/> renal insufficiency (creatinine 90 umol/L or more, 1.02 mg/dL) <input type="checkbox"/> liver involvement (elevated transaminases [ALT or AST over 40 IU/L] with or without right upper quadrant or epigastric abdominal pain) <input type="checkbox"/> neurological complications such as eclampsia, altered mental status, blindness, stroke, clonus, severe headaches or persistent visual scotomata <input type="checkbox"/> haematological complications such as thrombocytopenia (platelet count below 150,000 cells/μL), disseminated intravascular coagulation or haemolysis • uteroplacental dysfunction such as fetal growth restriction, abnormal umbilical artery Doppler waveform analysis, or stillbirth. [2019] 	<p>The definition of pre-eclampsia has been revised to bring it more in line with internationally accepted definitions. The process behind changing this definition is explained in the Methods chapter.</p>
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<p>Definitions section: Severe pre-eclampsia is pre-eclampsia with severe hypertension and/or symptoms, and/or biochemical and/or haematological impairment.</p>	<p>Terms used in this guideline section: Pre-eclampsia with severe hypertension that does not respond to treatment or is associated with ongoing or recurring severe headaches, visual scotomata, nausea or vomiting, epigastric pain, oliguria and severe hypertension as well as progressive deterioration in laboratory blood tests such as rising creatinine or liver transaminases or falling platelet count, or failure of fetal growth or abnormal Doppler findings.[2019]</p>	<p>The definition of severe pre-eclampsia has been revised to bring it more in line with internationally accepted definitions. The process behind changing this definition is explained in the Methods chapter.</p>
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2 **Table 3 to be completed by the NICE guideline editor**

3 **Table 3 Minor changes to recommendation wording (no change to intent)**

Recommendation numbers in current guideline	Comment
<p>All recommendations except those labelled [20XX] (year of expected publication) [Do not include this row if recs in previous guideline were already in direct style]</p>	<p>Recommendations have been edited into the direct style (in line with current NICE style for recommendations in guidelines) where possible. Yellow highlighting has not been applied to these changes.</p>

4

5 **[add month and year of update or post-publication change]: [If the original**
 6 **guideline has information about earlier updates or post-publication changes**
 7 **listed that are still relevant, leave them here - most recent at the top. Delete**
 8 **any ‘minor maintenance’ changes. Repeat for each major change]**

9 **Minor changes since publication**

10 **[Month year]:** [list minor changes that are still relevant here]

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