Lothian NHS Board

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Date 18/03/2026
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Dear

FREEDOM OF INFORMATION – GROWTH SURVEILLANCE

I write in response to your request for information in relation to Growth surveillance in pregnancy.

Question:

- Can you release copies of current and previous (from 2016) written guidelines on:
  1. Growth surveillance in pregnancy (use of uterine artery Dopplers, serial growth scans, thresholds for extra scans).
  2. Induction timing for women with hypertension, suspected growth restriction or abnormal Dopplers.

Answer:

Please see enclosed.

Question:

- Number of obstetric ultrasound scans per year (last 5 years), broken down by:
  1. Gestation bands (e.g. 28–31, 32–35, 36–37, 38+ weeks).
  2. Indication category: routine pathway vs clinician-requested for concern (reduced movements, SFH static/falling, hypertension, etc.).
  3. Number and percentage of ultrasound scan requests declined or deferred in maternity services per year, with any internal audits or reviews about reasons (capacity, “not clinically indicated”, etc.).

Answer:

Please note this question cannot be answered as labs does not contain the gestation of the scan, this would require each scan to be manually matched against the pregnancy and EDD to work out the gestation.

Under the Freedom of Information Act NHS Lothian is not required to create new records to enable it to respond to your enquiry. This information is not collated or held in aggregate form and it would be necessary to review all case files relating to patients over the period you have requested to assemble the information you seek. Even if NHS Lothian did this – and there

would be significant cost implications in doing so – it would be unable to respond in full to your request. The information requested is therefore exempt under section 12.1 – Cost.

Question:

- Any internal business cases or evaluation papers for introducing routine late-pregnancy scans (e.g. universal 36-week scan) or changing scan frequency, including:
  1. Impact on stillbirth/perinatal mortality.
  2. Impact on waiting times and ability to provide other clinically indicated scans.

Answer:

Please see enclosed.

I hope the information provided helps with your request.

If you are unhappy with our response to your request, \you do have the right to request us to review it. Your request should be made within 40 working days of receipt of this letter, and we will reply within 20 working days of receipt. If our decision is unchanged following a review and you remain dissatisfied with this, you then have the right to make a formal complaint to the Scottish Information Commissioner within 6 months of receipt of our review response. You can do this by using the Scottish Information Commissioner's Office online appeals service at www.itspublicknowledge.info/Appeal. If you remain dissatisfied with the Commissioner's response you then have the option to appeal to the Court of Session on a point of law.

If you require a review of our decision to be carried out, please write to the FOI Reviewer at the email address at the head of this letter. The review will be undertaken by a Reviewer who was not involved in the original decision-making process.

FOI responses (subject to redaction of personal information) may appear on NHS Lothian's Freedom of Information website at: https://org.nhslothian.scot/FOI/Pages/default.aspx

Yours sincerely

ALISON MACDONALD
Executive Director, Nursing
Cc: Chief Executive
Enc.

HYPERTENSION IN PREGNANCY AND POSTPARTUM (excluding pre-eclampsia).

Maternity Services Lothian
Guidelines

1. INTRODUCTION:

Hypertension is the commonest medical problem encountered in pregnancy, affecting 10-15% of all pregnancies [(1)]. Hypertension in pregnancy may be divided into

- **Chronic hypertension**. Hypertension present at booking visit or before 20 weeks gestation or is being treated at the time of referral to maternity services.
- **Gestational hypertension**. New hypertension occurring after 20 weeks gestation in the absence of significant proteinuria (ACR >30) or any other clinical features of pre-eclampsia
- **Pre-eclampsia**. New hypertension occurring after 20 weeks gestation with significant proteinuria.

For pre-eclampsia please refer to *Eclampsia Severe Pre-eclampsia guideline.*

2. **AIM:** to streamline the detection, antenatal care and management of women with chronic hypertension, gestational hypertension and postpartum hypertension.

3. GUIDELINE CONTENTS:

REDUCING THE RISK OF HYPERTENSIVE DISORDERS IN PREGNANCY **Page 2**

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- **Intrapartum care** **Page 7**
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ASPIRIN ADVICE **Appendix 1**

DRUGS TO TREAT HYPERTENSION **Appendix 2**

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DRUGS AND DOSAGES FOR POSTNATAL HYPERTENSION AND BREASTFEEDING MOTHERS **Appendix 4**

This section to be completed by document control.

REDUCING THE RISK OF HYPERTENSIVE DISORDERS IN PREGNANCY

Prevention

All women should be advised to see a health care professional immediately if they experience symptoms of pre-eclampsia[2]. These include:

- Severe headache
- Problems with vision, such as blurring or flashing lights
- Severe pain just below the ribs
- Vomiting
- Sudden swelling of the face, hands or feet

ANTIPLATELET ADVICE

- **Aspirin advice**

Women with more than one moderate risk factor for pre-eclampsia or one high risk factor should be advised to take aspirin 150mg/day at night, with food from 12 weeks gestation until delivery[2]. **Chronic hypertension is a HIGH RISK FACTOR for developing pre-eclampsia.** Women should therefore be advised to take aspirin 150mg/ day at night from 12 weeks until at delivery [2]. This can be commenced anytime between 12 and 28 weeks however ideally before 16 weeks.

(See appendix 1.)

- **Nutritional supplements and dietary advice**

There is no evidence to suggest specific nutritional supplements or dietary advice with the sole aim of reducing hypertensive disorders in pregnancy.

CHRONIC HYPERTENSION

A number of women will have been diagnosed with hypertension prior to pregnancy. If hypertension is noted for the first time in the first trimester, it is likely that it is a chronic pre-existing problem. It is important to recognise chronic hypertension in pregnancy as perinatal mortality is increased in this population. The likelihood of progression to pre-eclampsia in this population is approximately 25%.

DEFINITIONS

Chronic hypertension
Hypertension present at booking visit or before 20 weeks, or that is being treated at the time of booking. Can be primary or secondary in aetiology

PRE-PREGNANCY / INITIAL ASSESSMENT

Pregnant women with chronic hypertension should be offered advice on[4]:

- Weight management
- Exercise
- Healthy eating
- Lowering the amount of salt in their diet

FOLLOWING THIS INITIAL ASSESSMENT A CLEAR OBSTETRIC MANAGEMENT PLAN SHOULD BE DOCUMENTED IN THE OBSTETRIC MANAGEMENT SECTION IN TRAK

- Documentation of BP – see below
- Timing, likely aetiology and relevant previous investigations for hypertension.
- Previous medication and dose
- Current medication and dose
- Assess proteinuria – see below

A complete history enquiring about

- Previous history of pre-eclampsia
- Previous pregnancy induced hypertension
- Pre-existing vascular or renal disease
- Moderate risk factors for pre-eclampsia
    - First pregnancy
    - Age ≥40 years
    - Pregnancy interval >10years
    - Family history of pre-eclampsia- 1st degree relative
    - Multiple pregnancy
    - BMI≥35kg/m2

- High risk factors for pre-eclampsia
    - Hypertensive disease during previous pregnancy
    - Chronic renal disease
    - Autoimmune disease such as systemic lupus erythematosis or antiphospholipid syndrome
    - Type 1 or type 2 diabetes
    - **Chronic hypertension**

Measurement of blood pressure

- An appropriate sized cuff should be used – the bladder should encompass 80% of the arm
- Korotkoff phase 5 measurements (the point at which the sound disappears) should be used to identify the diastolic blood pressure

Proteinuria assessment

- Use an automated reagent-strip reading device for dipstick screening for proteinuria in pregnancy in secondary care settings.
- If dipstick screening is positive (1+ or more) use protein:creatinine or albumin:creatinine ratio to quantify proteinuria in pregnant women.
- Do not use first morning urine void to quantify proteinuria in pregnant women.
- If using protein:creatinine ratio to quantify proteinuria
    - Use 30mg/mmol as a threshold for significant proteinuria
- If urine albumin:creatinine ratio as an alternative to protein:creatinine ratio
    - use 8mg/mmol as a diagnostic threshold.

ANTENATAL CARE AND TREATMENT

Offer pregnant women with chronic hypertension referral to a specialist in hypertensive disorders of pregnancy and discuss the risks and benefits of treatment.

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

- Sustained systolic blood pressure if less than 110 mmHg, **or**
- Sustained diastolic blood pressure is less than 70 mmHg, **or**

- The woman has symptomatic hypotension.

Antihypertensive treatment should be offered to pregnant women who have chronic hypertension and who are not already on treatment if they have

- A sustained systolic BP of 140 mmHg or higher
- A sustained diastolic BP of 90 mmHg or higher.

When using medicines to treat hypertension in pregnancy, **aim for a target BP of 135/85 mmHg.**

Antihypertensive therapy

Women taking angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs) or thiazides should be informed

- That there is an increased risk of congenital abnormalities if ACE inhibitors or ARBs are taken during pregnancy (cardiovascular and neurological malformations)
- Stop antihypertensive treatment in women taking ACE inhibitors or ARBs if they become pregnant (ideally within 2 working days of notification of pregnancy) and offer alternatives.
- There may be increased risk of congenital abnormalities and neonatal complications if thiazides are taken during pregnancy. Stopping advice as above.
- There is limited evidence however this shows no increased risk of congenital abnormalities with other antihypertensive treatments
- Alternative antihypertensive treatments should be discussed with the health care professional responsible for managing their condition.

Treatment choice

Consider labetalol to treat chronic hypertension in pregnancy. Consider nifedipine for women in whom labetalol is not suitable, or methyldopa if both labetalol and nifedipine are not suitable. Base the choice on any pre-existing treatment, side-effect profiles, risks (including fetal effects) and the woman's preference.

Offer pregnant women with chronic hypertension aspirin 150mg once daily from 12 weeks.

ANTENATAL CARE

Women with essential hypertension irrespective of aetiology are at increased risk of

- Superimposed pre-eclampsia [(1)]
- Small for gestational age babies (SGA)[(1)]
- Placental abruption [(1)]

Frequency of antenatal appointments or enhanced surveillance in Day Bed Area (DBA)/Day Assessment unit (DAU) should be arranged on the individual needs of the woman and her baby.

TIMING OF BIRTH

Do not offer planned early birth before 37 weeks to women with chronic hypertension whose blood pressure is lower than 160/110 mmHg, with or without antihypertensive treatment, unless there are other medical indications.

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

If planned early birth is necessary offer a course of antenatal corticosteroids and magnesium sulphate, in line with local guidelines.

ANTIHYPERTENSIVE TREATMENT

See table 1 for drugs to treat hypertension in pregnancy. (Appendix 2)

INTRAPARTUM CARE

Third stage management
Ergometrine eg Syntometrine® containing drugs are contra-indicated in those women with underlying hypertension [4].

POST NATAL CARE

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

- Daily for the first 2 days after birth
- At least once between day 3 and 5 after birth
- As clinically indicated if antihypertensive treatment is changed after both.

In women with chronic hypertension who have given birth

- Aim to keep blood pressure lower than 140/90 mmHg
- Continue antihypertensive treatment, if required (see table for choice of antihypertensive in breast feeding)

If a woman has taken methyldopa to treat chronic hypertension during pregnancy, stop this within 2 days after the birth and restart the antihypertensive treatment the woman was taking before the pregnancy (see table for choice of antihypertensive in breast feeding).

It is recommended women with chronic hypertension have a medical review 6-8 weeks after the birth with their GP.

See postnatal hypertension – page 9.

GESTATIONAL HYPERTENSION

Gestational hypertension (GH) is hypertension in the second half of pregnancy but in the absence of proteinuria or any other features of pre-eclampsia. GH usually appears after 20 weeks gestation and resolves within six weeks of delivery. The likelihood of progression to pre-eclampsia in this group is approximately 15% and is directly correlated to the gestation at which PIH develops.

- Hypertension occurring before 30 weeks – 40% risk of pre-eclampsia
- Hypertension occurring after 38 weeks – 7% risk of pre-eclampsia

GH tends to recur on subsequent pregnancies and some women remain hypertensive following a pregnancy complicated by GH [(1)].

ANTENATAL CARE

IN WOMEN WITH GESTATIONAL HYPERTENSION, A FULL ASSESSMENT SHOULD BE CARRIED OUT IN A SECONDARY CARE SETTING BY A HEATLHCARE PROFESSIONAL TRAINED IN THE MANAGEMENT OF HYPERTENSIVE DISORDERS.

Take into account the following factors that require additional assessment and follow-up. This should include

- Nulliparity
- Age of 40 years or older
- Pregnancy interval of more than 10 years
- Family history of pre-eclampsia
- Multi-fetal pregnancy
- BMI of 35 kg/m2 or more
- Gestational age at presentation
- Previous history of pre-eclampsia or gestational hypertension
- Pre-existing vascular or renal disease

Offer women with gestational hypertension the tests and treatment in
TABLE 3 – MANAGEMENT OF PREGNANCY WITH GESTATIONAL HYPERTENSION.

TREATMENT

Consider labetalol to treat gestational hypertension. Consider nifedipine for women in whom labetalol is not suitable, or methyldopa if both labetalol and nifedipine are not suitable. Base the choice on side-effect profiles, risk (including fetal effects) and the woman's preference.

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

TIMING OF DELIVERY

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.

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

If planned early birth is necessary offer a course of antenatal corticosteroids and magnesium sulphate if indicated, in line with local guidelines.

INTRAPARTUM CARE

Third stage management
Ergometrine eg Syntometrine® containing drugs are contra-indicated in those women with underlying hypertension.

POST NATAL CARE

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

- Daily for the first 2 days after birth
- At least once between day 3 and day 5 after birth
- As clinically indicated if antihypertensive treatment if changed after birth.

In women with gestational hypertension who have given birth:

- Continue antihypertensive treatment if required
- Advise women that the duration of their postnatal antihypertensive treatment will usually be similar to the duration of their antenatal treatment (but may be longer)
- Reduce antihypertensive treatment if their blood pressure falls below 130/80 mmHg.

If a woman has taken methyldopa to treat gestational hypertension, stop within 2 days after the birth.

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.

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

- *Who will provide follow-up care, including medical review if needed*
- *Frequency of blood pressure monitoring needed*
- *Threshold for reducing or stopping treatment*
- *Indications for referral to primary care for BP review*

Offer women who have had gestational hypertension and who remain on antihypertensive treatment, a medical review with their GP 2 weeks after transfer to community care

Offer all women who have had gestational hypertension a medical review with their GP 6-8 weeks after birth.

POSTNATAL HYPERTENSION[5&6]

Blood pressure changes in pregnancy
Blood pressure falls in pregnancy due to generalised systemic vasodilatation despite an increase in cardiac output, reaching a low point in mid-pregnancy (22-24 weeks gestation). During the last trimester blood pressure gradually rises to pre-pregnancy levels.

Postnatal blood pressure changes
Immediately after delivery blood pressure usually falls, then tends to rise reaching a peak between three and six days postnatally. This occurs in both normotensive women and those with hypertension during pregnancy. Transient hypertension may occur in postpartum after uncomplicated pregnancies.

Importance of postnatal blood pressure control
The most important clinical concern is to identify women with severe hypertension or postpartum pre-eclampsia as they are at risk of life threatening complications. The triennial Confidential Enquiry into Maternal Deaths continues to identify substandard care in the management of hypertension in pregnancy, particularly the inadequate treatment of systolic hypertension [3].

Patients with chronic hypertension or pregnancy induced hypertension

Blood pressure targets
- Aim to keep blood pressure <140/90 mm Hg.

Blood pressure monitoring
- Measure BP daily for the first 2 days after birth
- Measure BP at least once in day 3-5
- Measure BP as clinically indicated if antihypertensive treatment changed

Postnatal antihypertensive treatment
- Methyldopa should be stopped and changed to an alternative agent within 2 days of delivery because of associated sedation, postural hypertension and depression.
- Consider enalapril for treating hypertension in women during the postnatal period, with appropriate monitoring of maternal renal function and maternal serum potassium.
- For women of African or Caribbean family origin with hypertension during the postnatal period, consider antihypertensive treatment with:
    - Nifedipine modified release, OR
    - Amlodipine if the woman has previously used this to successfully control her blood pressure
- For women with hypertension in the postnatal period, if blood pressure is not controlled with a single medicine consider a combination of nifedipine (or amlodipine) and enalapril. If this combination is not tolerated or is ineffective, consider either:
    - Adding atenolol to the combination treatment, OR
    - Swapping one of the medicines already being used for atenolol.
- Avoid using diuretic or ARB's to treat hypertension in women in the postnatal period who are breastfeeding or expressing milk.

New onset postpartum hypertension
- Blood pressure should be checked on the fifth or sixth day following delivery to identify women with late presentation of pre-eclampsia.

Explain to women with hypertension who wish to breast feed that:
- Antihypertensive medicines can pass into breastmilk
- Most antihypertensive medicines taken while breast feeding only lead to very low levels in breast milk, so the amounts taken in by babies are very small and would be unlikely to have any clinical effect

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- Most medicines are not tested in pregnant or breast feeding women, so disclaimers in the manufacturer's information are not because of any specific safety concerns or evidence of harm.

Make decision on treatment together with the woman, based on her preferences.

Treat women with hypertension in the postnatal period who are not breastfeeding and who are not planning to breastfeed in line with the NICE guideline on hypertension in adults.

Recurrence risks

- Advise women with hypertensive disorders of pregnancy that the overall risk of recurrence in future pregnancies is approximately 1 in 5.

Likelihood of recurrence of hypertensive disorders of pregnancy

	Types of hypertension	In previous or current	Pregnancy
Prevalence of hypertensive disorder in a future pregnancy	Any hypertension	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 20-28 weeks: approx. 40% (1 in 2 women) If birth was at 28-34 weeks: approx. 33% (1 in 3 women) If birth was at 34-37 weeks: approx 23% (1 in 4 women)	Approximately 7% (1 in 14 women)
Gestational hypertension	Approximately 9% (1 in 11women)	Between approximately 6 and 12% (up to 1 in 8 women)	
Chronic hypertension	Not applicable	Approximately 2% (up to 1 in 50 women)	

Advise women who have had a hypertensive disorder of pregnancy that this is associated with an increased risk of hypertension and cardiovascular disease later in life.

Advise women who have had a hypertensive disorder of pregnancy to discuss how to reduce their risk of cardiovascular disease, including hypertensive disorders, with their GP.

In women who have had pre-eclampsia or hypertension with early birth before 34 weeks please inform the GP pre-pregnancy counselling can be offered with an obstetrician to discuss possible risks of recurrent hypertensive disorders of pregnancy, and how to lower them for any future pregnancies.

Appendix 1

Aspirin Advice[(2)]

Advise women to take aspirin 150mg/day at night, with food from 12 weeks until delivery if there are two or more moderate risk factors or at least one high risk factor for pre-eclampsia.

Risk factors for pre-eclampsia

Moderate

- First pregnancy
- Age ≥ 40 years
- Pregnancy interval > 10 years
- Family history of pre-eclampsia
- Multiple pregnancy
- BMI ≥35 kg/m2 at first visit

High

- Hypertensive disease during previous pregnancy
- Chronic renal disease
- Autoimmune disease such as systemic lupus erythematosis or antiphospholipid syndrome
- Type 1 or type 2 diabetes
- Chronic hypertension

Appendix 2

Drugs used to treat hypertension [(1)]

DRUG	PLACE IN THERAPY	STARTING DOSE	MAXIMUM DOSE	CONTRAINDICATION	BREAST FEEDING ?
Labetalol	First-line therapy	100mg 12 hourly	600mg 6 hourly	Asthma	Yes
Nifedipine	Second-line therapy	10mg sustained release 12 hourly	40mg sustained release 12 hourly		Yes
Methyldopa	Second-line therapy	250mgs 12 hourly	1 gram 8 hourly	Depression	Yes [(a)]
Hydralazine	Second-line therapy	25mg 8 hourly	75mg 6 hourly		Yes
Enalapril	Not in pregnancy only postpartum	5mg daily.	40mg daily.		Yes

(a) Avoid postpartum

NOTE:
See Appendix 4 for drugs to treat postnatal hypertension and breast feeding mothers

Appendix 3

MANAGEMENT OF PREGNANCY WITH GESTATIONAL HYPERTENSION

	MODERATE HYPERTENSION	SEVERE HYPERTENSION
	Blood pressure of 140/90-159/109 mmHg	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 30 minutes until BP is 160/110 mmHg or less
Dipstick proteinuria*	Once or twice a week (with BP measurement)	Daily whilst 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 +/- doppler at diagnosis. Repeat if clinically indicated. Only carry out a CTG if fetal activity is abnormal.	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.
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

Use an automated reagent strip reading device for dipstick screening for proteinuria in a secondary care setting.
* Do not use first morning urine void to quantify proteinuria in pregnant women

BP- blood pressure; CTG - cardiotocography.

Appendix 4

Drugs and dosages for treatment of hypertension and breastfeeding mothers [5]

DRUG	DOSE	COMMENTS
β-blockers:		
Labetalol	100-600mg 2-3 times / day	Only small amounts in breast milk
Atenolol	25-100mg once daily	Second line use for women who require once daily formulation
Calcium antagonists:		
Nifedipine twice daily formulation (Coracten SR ®)	10-20mg twice daily	Amount in breast milk too small to be harmful; manufacturer suggests avoid but widely used without reports of neonatal effect
Nifedipine (daily formulation) (eg Coracten XL®)	20-90mg once daily	Second line use for women who require once daily formulation;
ACE Inhibitors:		
Enalapril	5-40mg once daily	Can be used in women who were previously taking an ACE inhibitor when other first choice agents cannot be used or cardiac/renal protection needed; excreted into breast milk in low concentrations but probably too small to be harmful
Contraindicated		
Other ACE inhibitors and ARBs	Not recommended	Minimal data on use during lactation; manufacturer suggest that it should be avoided
Diuretics	Not recommended	Produce excessive thirst in breastfeeding women; large doses may suppress lactation
; ARBs= angiotensin II receptor blockers;		

ASSOCIATED DOCUMENTS:

This section to be completed by document control.

1. **Lothian Maternity Services Guidelines – Eclampsia and Severe pre-eclampsia guideline**
2. **Lothian Maternity Services Guidelines – Small for gestational age guideline**
3. **Lothian Maternity Services Guidelines – Corticosteroids for fetal lung maturation**
4. **Lothian Maternity Services Guidelines – Magnesium sulphate for fetal neuroprotection**

2. REFERENCES:

1. **Handbook of obstetric medicine, Fifth Edition. Catherine Nelson-Piercy.**
2. **Hypertension in pregnancy, NICE GUIDEANCE. 2019**
3. **ACOG opinion: Low dose aspirin use during pregnancy 2018**
4. **NICE guideline: Hypertension in adults : diagnosis and treatment**
5. **Saving Mothers' Lives report: CEMACE 2006-2008**
6. **Postpartum management of hypertension. Bramham et al; British Journal of medicine. BMJ 2013; 346:f894**
7. **Management of postpartum hypertension. Smith et al; The Obstetrician & Gynaecologist. 2013; 15:45-50**

3. AUTHOR/S:

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Author 6:

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HYPERTENSION IN PREGNANCY

Classification of Hypertension in Pregnancy

(Davey & MacGillivray, 1988)

Chronic Hypertension **-**Known hypertension prior to pregnancy or hypertension diagnosed at booking prior to 20 weeks gestation

Gestational Hypertension **-** Hypertension diagnosed in pregnancy with no significant proteinuria

Pre-Eclampsia - Gestational hypertension associated with significant proteinuria

Eclampsia **-** Convulsions associated with pregnancy

Unclassifiable Hypertension **-** No information available on Blood Pressure pre-pregnancy or prior to 20 weeks gestation

Measurement of Blood Pressure

- Ensure an appropriate size cuff is used, (Bladder should encompass 80% of arm)
- Woman's arm should be resting at heart level
- Diastolic pressure should be recorded at point where sound disappears (point V Korotkoff)

Initial Diagnosis of Hypertension (a)

(SPECERH, 1997)

A diagnosis of hypertension should not be made or investigations initiated unless:

Mild Hypertension

- Diastolic BP>=110mmHg on 1 occasion
- Diastolic BP>=90mmHG on 2 or more occasions at least 4 hours apart

Moderate Hypertension

- Diastolic BP>=120mmHg on 1 occasion
- Diastolic BP>=110mmHg on 2 or more occasions at least 4 hours apart
- An increment of >=25mmHg from booking BP

Proteinuria

A diagnosis of significant proteinuria should not be made or investigations initiated unless:

- + + Protein identified on 2 clean catch specimens obtained at least 4 hours apart

OR

- + Protein with a Specific Gravity<=1.03 and Ph<=8

RISK GROUPS (b)

If a woman has **ANY** feature of a particular group, that is the risk group to which she should be assigned

Low

- Mild hypertension
- No proteinuria
- No evidence of Intra Uterine Growth Retardation

Moderate

- Moderate hypertension
- Any proteinuria
- Mild/Moderate IUGR
- Mild symptoms, eg headache responding to analgesia

High

- Mild / Moderate hypertension associated with significant proteinuria
- Abnormal blood results
- Significant IUGR or evidence of fetal compromise
- Significant compromise in maternal well-being, eg, severe headache, visual disturbance, abdominal pain

INVESTIGATIONS

Basic Surveillance (c)

Twice weekly assessment - one visit to DBA and one to community midwife

DBA

- BP profile, clinical appraisal of fetal size, CTG
- Single estimate of – Full blood count
  Platelets
  Urea and electrolytes
  Urate
  Liver Function Tests

COMMUNITY MIDWIFE

- Blood pressure and urinalysis
- Clinical appraisal of fetal size and well-being – Abdominal palpation
  Fundal height
  Enquiry re fetal movement
- Enquiry re maternal well-being – Headaches
  Visual disturbances
  Epigastric pain
  General well-being

Enhanced Surveillance (Day Bed Area) (d)

- Ensure that the woman's obstetric consultant is aware that she is attending DBA
- 3 times weekly Blood Pressure, urinalysis, cardiotocograph, enquiry re fetal movement and enquiry re headaches, visual disturbances or abdominal pain
- Weekly serum urea & electrolytes, urates, full blood count, platelets and liver function tests
- Weekly biophysical profile,
- If presenting in early third trimester consider doppler studies
- Fortnightly growth scans
- Consider anti-hypertensive drug therapy if diastolic BP>=100mmHg or if disease presents prior to 32 weeks gestation.
  Methyl dopa 250mg bd. increasing as necessary to max. 500mg q.d.s if presenting pre 32 weeks.
  If later in pregnancy Labetalol is drug of first choice100mg bd. titrating to max. 200mg q.d.s.

Inpatient Management

- Ensure that the woman's obstetric consultant is aware of the admission
- 4 hourly BP monitoring
- Daily urinalysis
- 24 hour urine collection to quantify proteinuria
- Daily Cardiotocograph and enquiry re fetal movement
- Enquiry re headaches, visual disturbances and abdominal pain
- Accurate record of fluid balance
- Continue growth scans, liquor volumes and Doppler
- Blood analysis at least twice weekly, more often if indicated
- Antihypertensives if BP consistently>/100
- Consider steroids if delivery anticipated prior to 34 weeks gestation
- Women will be managed individually depending on gestation and results of investigations in consultation with the consultant obstetrician

INDICATIONS FOR INTERVENTION

1. Rising/ unstable blood pressure despite medication
2. Increasing proteinuria
3. New maternal symptoms e.g. general malaise, headache, visual disturbance, epigastric pain.
4. Deterioration in blood results
5. Fetal compromise

Method of delivery i.e. IOL v. LUSCS is dependant on gestation and severity of disease and should be discussed with consultant.

HYPERTENSION IN PREGNANCY

CHRONIC HYPERTENSION, PIH, PRE-ECLAMPSIA AND ECLAMPSIA

Maternity Services Lothian
Guidelines

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1. INTRODUCTION:

Hypertension is the most common medical problem encountered in pregnancy, affecting 10-15% of all pregnancies [(1)]. Hypertension in pregnancy may be divided into

- **Chronic hypertension**. Hypertension present at booking visit or before 20 weeks gestation or is being treated at the time of referral to maternity services.
- **Gestational or Pregnancy induced hypertension**. New hypertension occurring after 20 weeks gestation in the absence of significant proteinuria (ACR >30) or any other clinical features of pre- eclampsia
- **Pre-eclampsia**. New hypertension occurring after 20 weeks gestation with significant proteinuria and the coexistence of 1 or more of the following new onset conditions:
  - Proteinuria (urine protein: creatinine ratio of ³30mg/mol or albumin: creatinine ratio of ³ 8mg/mmol, or at least 1g/litre (2+) on dipstick). If dipstick screening is positive (1+ or more), use albumin:creatinine ratio or protein:creatinine ratio to quantify proteinuria in pregnant women.
  - Uteroplacental dysfunction such as fetal growth restriction, abnormal umbilical artery doppler waveform analysis or stillbirth.
  - Other maternal organ dysfunction:
  - Renal insufficiency (creatinine ³ 90micromol/litre or ³ 1.02mg/100ml)
  - Liver involvement (elevated transaminases (alanine aminotransferase or aspartate aminotransferase over 40IU/litre) with or without right upper quadrant or epigastric pain.
  - Neurological complications such as eclampsia, altered mental status, blindness, stroke, clonus, severe headaches or persistent visual scotomata
  - Haematological complications such as thrombocytopenia (platelets < 150,000/microlitre), disseminated intravascular coagulation or haemolysis

- **Severe hypertension**: blood pressure over 160mmHg systolic or over 110mmHg diastolic
- **Severe pre-eclampsia**: 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 or oliguria, 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.
- **Eclampsia**: a convulsive condition associated with pre-eclampsia.

2. **AIM:** to streamline the detection, antenatal/postnatal care and management of women with chronic hypertension, pregnancy induced hypertension and pre-eclampsia.

3. GUIDELINE CONTENTS:

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REDUCING THE RISK OF HYPERTENSIVE DISORDERS IN PREGNANCY

PREVENTION

All women should be advised to see a health care professional immediately if they experience symptoms of pre-eclampsia[2]. These include:

- Severe headache
- Problems with vision, such as blurring or flashing lights
- Severe pain just below the ribs
- Vomiting
- Sudden swelling of the face, hands or feet

ANTIPLATELET ADVICE

- **Aspirin advice**

Women with more than one moderate risk factor for pre-eclampsia or one high risk factor should be advised to take aspirin 150mg/day at night, with food from 12 weeks gestation until delivery[2]. **Chronic hypertension is a HIGH RISK FACTOR for developing pre- eclampsia.** Women should therefore be advised to take aspirin 150mg/ day at night from 12 weeks until delivery [2]. This can be commenced anytime between 12 and 28 weeks however ideally before 16 weeks.

(See appendix 1.)

- **Nutritional supplements and dietary advice**

There is no evidence to suggest specific nutritional supplements or dietary advice with the sole aim of reducing hypertensive disorders in pregnancy.

CHRONIC HYPERTENSION

A number of women will have been diagnosed with hypertension prior to pregnancy. If hypertension is noted for the first time in the first trimester, it is likely that it is a chronic pre-existing problem. It is important to recognise chronic hypertension in pregnancy as perinatal mortality is increased in this population. The likelihood of progression to pre-eclampsia in this population is approximately 25%.

PRE-PREGNANCY / INITIAL ASSESSMENT

Pregnant women with chronic hypertension should be offered advice on[4] :

- Weight management
- Exercise
- Healthy eating
- Lowering the amount of salt in their diet

FOLLOWING THIS INITIAL ASSESSMENT A CLEAR OBSTETRIC MANAGEMENT PLAN SHOULD BE DOCUMENTED IN THE OBSTETRIC MANAGEMENT SECTION IN TRAK

- Documentation of BP – see below
- Timing, likely aetiology and relevant previous investigations for hypertension.
- Previous medication and dose
- Current medication and dose
- Assess proteinuria – see below

A complete history enquiring about

- Previous history of pre-eclampsia
- Previous pregnancy induced hypertension
- Pre-existing vascular or renal disease
- Note any additional risk factors for pre-eclampsia as per appendix 1.

MEASUREMENT OF BLOOD PRESSURE

- An appropriately sized cuff should be used – the bladder should encompass 80% of the arm
- Korotkoff phase 5 measurements (the point at which the sound disappears) should be used to identify the diastolic blood pressure

PROTEINURIA ASSESSMENT

- Use an automated reagent-strip reading device for dipstick screening for proteinuria in pregnancy in secondary care settings.
- If dipstick screening is positive (1+ or more) use protein:creatinine or albumin:creatinine ratio to quantify proteinuria in pregnant women.
- Do not use first morning urine void to quantify proteinuria in pregnant women.
- If using protein:creatinine ratio to quantify proteinuria
    - Use 30mg/mmol as a threshold for significant proteinuria
- If urine albumin:creatinine ratio as an alternative to protein:creatinine ratio
    - use 8mg/mmol as a diagnostic threshold.

ANTENATAL CARE AND TREATMENT

Women with essential hypertension irrespective of aetiology are at increased risk of

- Superimposed pre-eclampsia [(1)]
- Small for gestational age babies (SGA)[(1)]
- Placental abruption [(1)]

Frequency of antenatal appointments or enhanced surveillance in Day Bed Area (DBA)/Day Assessment unit (DAU) should be arranged on the individual needs of the woman and her baby.

Offer pregnant women with chronic hypertension referral to obstetric consultant clinic to discuss the risks and benefits of treatment.

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

- Sustained systolic blood pressure of less than 110 mmHg, **or**
- Sustained diastolic blood pressure of less than 70 mmHg, **or**
- The woman has symptomatic hypotension.

hypertension and who are not already on treatment if they have

- A sustained systolic BP of 140 mmHg or higher
- A sustained diastolic BP of 90 mmHg or higher.

When using medicines to treat hypertension in pregnancy, **aim for a target BP of 135/85 mmHg.**

ANTIHYPERTENSIVE THERAPY

Women taking angiotensin-converting enzyme (ACE) inhibitors (e.g. Lisinopril), angiotensin II receptor blockers (ARBs) (e.g. Candesartan) or thiazides (e.g. Bendroflumethiazide) should be informed

- That there is an increased risk of congenital abnormalities if ACE inhibitors or ARBs are taken during pregnancy (cardiovascular and neurological malformations)
- Stop antihypertensive treatment in women taking ACE inhibitors or ARBs if they become pregnant (ideally within 2 days of notification of pregnancy) and offer alternatives.
- There may be increased risk of congenital abnormalities and neonatal complications if thiazides are taken during pregnancy. Stopping advice as above.
- There is limited evidence however this shows no increased risk of congenital abnormalities with other antihypertensive treatments
- Alternative antihypertensive treatments should be discussed with the health care professional responsible for managing their condition.

TREATMENT CHOICE

Consider labetalol to treat chronic hypertension in pregnancy. Consider nifedipine for women in whom labetalol is not suitable, or methyldopa if both labetalol and nifedipine are not suitable. Base the choice on any pre-existing treatment, side-effect profiles, risks (including fetal effects) and the woman's preference.

Offer pregnant women with chronic hypertension aspirin 150mg once daily from 12 weeks.

See Appendix 2 for drugs to treat hypertension in pregnancy.

TIMING OF BIRTH

Do not offer planned early birth before 37 weeks to women with chronic hypertension whose blood pressure is lower than 160/110 mmHg, with or without antihypertensive treatment, unless there are other medical indications.

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

If planned early birth is necessary offer a course of antenatal corticosteroids and magnesium sulphate, in line with local guidelines.

INTRAPARTUM CARE

Third stage management

Ergometrine eg Syntometrine® containing drugs are contra-indicated in those women with underlying hypertension [4].

POST NATAL CARE

See *postnatal hypertension*.

GESTATIONAL HYPERTENSION

Gestational hypertension (GH) is hypertension in the second half of pregnancy but in the absence of proteinuria or any other features of pre-eclampsia. GH usually appears after 20 weeks gestation and resolves within six weeks of delivery. The likelihood of progression to pre-eclampsia in this group is approximately 15% and is directly correlated to the gestation at which PIH develops.

- Hypertension occurring before 30 weeks – 40% risk of pre-eclampsia
- Hypertension occurring after 38 weeks – 7% risk of pre-eclampsia

GH tends to recur on subsequent pregnancies and some women remain hypertensive following a pregnancy complicated by GH [1].

ANTENATAL CARE

IN WOMEN WITH GESTATIONAL HYPERTENSION, A FULL ASSESSMENT SHOULD BE CARRIED OUT IN A SECONDARY CARE SETTING BY A HEATLHCARE PROFESSIONAL TRAINED IN THE MANAGEMENT OF HYPERTENSIVE DISORDERS.

Take into account the following factors that require additional assessment and follow-up. This should include

- Nulliparity
- Age of 40 years or older
- Pregnancy interval of more than 10 years
- Family history of pre-eclampsia
- Multi-fetal pregnancy
- BMI of 35 kg/m2 or more
- Gestational age at presentation
- Previous history of pre-eclampsia or gestational hypertension
- Pre-existing vascular or renal disease

MANAGEMENT OF PREGNANCY WITH GESTATIONAL HYPERTENSION

	MODERATE HYPERTENSION	SEVERE HYPERTENSION
	Blood pressure of 140/90-159/109 mmHg	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 30 minutes until BP is 160/110 mmHg or less
Dipstick proteinuria*	Once or twice a week (with BP measurement)	Daily whilst 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
Placenta growth factor (PLGF)- based testing	Carry out PLGF on 1 occasion – see PLGF guideline	Carry out PLGF on 1 occasion – see PLGF guideline
Fetal assessment	Carry out an ultrasound for fetal growth +/- doppler at diagnosis. Repeat if clinically indicated. Only carry out a CTG if fetal activity is abnormal.	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.
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

TREATMENT

Consider labetalol to treat gestational hypertension. Consider nifedipine for women in whom labetalol is not suitable, or methyldopa if both labetalol and nifedipine are not suitable. Base the choice on side-effect profiles, risk (including fetal effects) and the woman's preference.

See Appendix 2 for drugs to treat hypertension in pregnancy.

TIMING OF DELIVERY

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.

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

If planned early birth is necessary offer a course of antenatal corticosteroids and magnesium sulphate if indicated, in line with local guidelines

INTRAPARTUM CARE

Third stage management

Ergometrine eg Syntometrine® containing drugs are contra-indicated in those women with underlying hypertension.

POST NATAL CARE

See *postnatal hypertension*

MANAGEMENT OF PRE-ECLAMPSIA

Carry out a full clinical assessment at each antenatal appointment for women with pre-eclampsia, and offer admission to hospital for surveillance and any interventions needed if there are concerns for the wellbeing of the woman or baby. Including any of the following:

- Sustained systolic blood pressure above 160mmHg or higher
- Any maternal biochemical or haematological investigations that cause concern, for example, a new and persistent
    - Rise in creatinine (90micromol/litre or more, 1mg/100ml or more)
    - Rise in ALT (over 70 IU/litre, or twice upper limit of normal range)
    - Fall in platelet count (under 150,000/microlitre)
- Signs of impending eclampsia
- Signs of impending pulmonary oedema
- Other signs of severe pre-eclampsia
- Suspected fetal compromise

MANAGEMENT OF PREGNANCY WITH PRE-ECLAMPSIA

Management	Hypertension	Severe Hypertension
Admission to hospital	Admit if any clinical concerns for the wellbeing of the woman or baby	Admit, 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, and more frequently if the woman is admitted to hospital	Every 30 minutes until BP is less than 160/110 mmHg, then at least 4 times daily while the woman is an inpatient, depending on clinical circumstances
Dipstick proteinuria testing	Only repeat if clinically indicated, for example, if new symptoms and signs develop or if there is uncertainty over diagnosis	Only repeat if clinically indicated, for example, if new symptoms and signs develop or if there is uncertainty over diagnosis
Blood tests	Measure full blood count, liver function and renal function twice a week	Measure full blood count, liver function and renal function 3 times a week
Fetal assessment	Offer fetal heart auscultation at every antenatal appointment Carry out ultrasound assessment of the fetus at diagnosis and, if normal, repeat every 2 weeks Carry out a cardiotocography (CTG) at diagnosis and then only if clinically indicated	Offer fetal heart auscultation at every antenatal appointment Carry out ultrasound assessment of the fetus at diagnosis and, if normal, repeat every 2 weeks Carry out a CTG at diagnosis and then only if clinically indicated

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MANAGEMENT OF SEVERE PRE-ECLAMPSIA

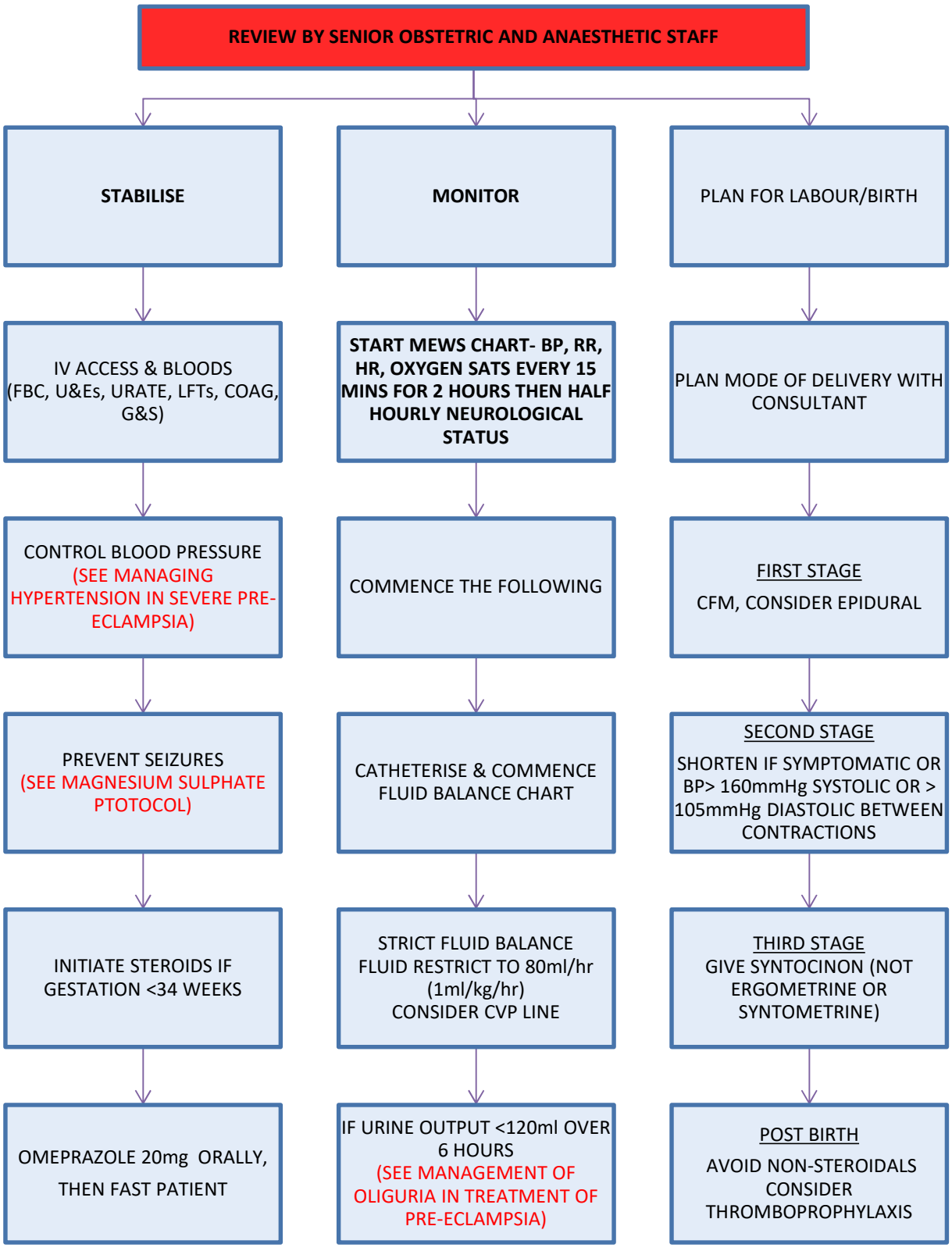
The following signs and symptoms in isolation or any combination may indicate fulminating pre-eclampsia. Transfer to labour ward and consider delivery. Management plan should be discussed at obstetric and anaesthetic consultant level.

DEFINITION

Severe hypertension (BP ≥160/110mmHg) and proteinuria (PCR >30 mg/mmol or 24 urine collection >300 mg protein).
Or
Mild or moderate hypertension (BP 140/90-159/109 mmHg) and proteinuria with at least one of the following:

- Severe headache
- Visual disturbances
- Severe RUQ pain or vomiting
- Papilledema
- Signs of clonus (≥3 beats)
- Liver tenderness
- HELLP syndrome
- Platelets falling <100 x 10^9/L
- Abnormal liver enzymes (ALT or AST > 70IU/L)

MANAGEMENT OF SEVERE PRE-ECLAMPSIA



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MANAGING HYPERTENSION IN SEVERE PRE-ELAMPSIA

Beware synergistic effects of different drug classes including magnesium sulphate. Cases of severe hypotension have been reported. An interaction between nifedipine and magnesium sulphate leading to profound muscle weakness has been reported. Anaesthetic staff should be informed of patients, as invasive monitoring may be required. Target blood pressure should be clearly documented in patient's notes, usually 140-150 systolic and 90-100 diastolic. **For severe intrapartum hypertension consider earlier IV route of administration due to variable absorption from GI tract.**

First Line- Labetalol

- 200mg stat. Repeat oral dose once after 30 mins if no response.

Cautions

Contraindicated in patients with AV block or bradycardia (<60bpm)

Afro-Caribbean patients- reduced effectiveness

Asthmatics

Second Line Nifedipine tablet (Coracten SR) – if labetalol contraindicated.

- 10mg modified release orally. NOT sublingual.
- Wait 30 min; repeat dose ONCE if necessary

Third Line IV Labetalol (5mg/ml) (when oral therapy inadequate.)

- Loading: 50 mg (10ml) over 2 mins. Rpt to a maximum of 200 mg (4 doses) in 5 min intervals.
- Maintenance: 4ml/hour, double infusion rate every 30 minutes until BP controlled. Max infusion rate 32ml/hour.
- See *Infusion protocol for the control of hypertension in pregnancy*

Fourth Line IV **Hydralazine (1mg/ml) (Consider when Labetolol contraindicated)**

- Loading: 5mg (5ml) over 15 minutes, while measuring blood pressure every 5 minutes. If systolic BP > 160mmHg after 20 minutes give further 5mg over 15 minutes
- Maintenance: Start infusion at 2.5ml/hour. Double every 30 mins to maintain systolic BP 140-150mmgHg., max infusion rate 10ml/hour. Reduce rate if significant adverse effect or maternal pulse > 120 beats/minute
- See *Infusion protocol for the control of hypertension in pregnancy*

Cautions

Consider alternatives if tachycardia, flushing, nausea are problems

Enhanced action with beta blockers and nifedipine

AN EPIDURAL IS USEFUL IN CONTROLLING BLOOD PRESSURE

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MANAGEMENT OF ECLAMPSIA

IMMEDIATE RESUSCITATION

Call for Help	Dial 2222 State "Obstetric Emergency" and location
Airway	Flatten bed and place in left lateral position
Breathing	High flow oxygen
Circulation	Intravenous access x 2 (16 gauge) Bloods -Brown tube -U&Es, LFTs, Urate -Red tube -FBC -Green tube -Coagulation -Blue tube -Group and Save -Yellow tube -Serum glucose Fluid restriction to 80 ml/hr (RCOG 2006)

IMMEDIATE MANAGEMENT OF SEIZURE

Magnesium Sulphate triage	Obtain **Eclampsia box** from labour ward or antenatal ward or obstetric See *Magnesium Sulphate Protocol* Loading dose: 4g IV over 15 minutes Maintenance dose: 1g/hour IV for at least 24 hours after last seizure
Recurrent seizure	2g bolus of $MgSO_4$ over 5 minutes or 4g bolus over 5 minutes if >70Kg at booking
Third or more seizure	Consultant Anaesthetist and Obstetrician must attend and consider intubation, ICU management ±CT Brain Maternal stabilisation and blood pressure control is vital *prior* to intubation in order to minimise maternal risk Neuroimaging should be performed urgently if any focal neurology

MATERNAL MONITORING

Once initially stabilised transfer to Labour Ward	
MEWS Chart	Pulse, respiratory rate, oxygen saturations measured every 10 minutes for two hours then half hourly.
Blood pressure	Appropriate size/ level of heart. Korotkoff 5 (silence) Correlate manual with automated BP cuff Every 15 minutes until stable, then half hourly. Keep BP<150/100.
TREAT HYPERTENSION	See *Managing Hypertension in Severe Pre-eclampsia*

FETAL ASSESSMENT

Continuous CTG in acute setting (RCOG 2006)
Plan for delivery after mother stabilized, discuss with consultant regarding Induction of Labour Vs Caesarean section
USS – growth, liquor volumes, umbilical artery Doppler if conservative management.

Only Syntocinon (oxytocin) should be used for 3rd stage.

MANAGING PULMONARY OEDEMA

Symptoms: Shortness of breath, unable to lie flat, unable to speak in full sentences, confusion/agitation
Signs: Consider if SaO_2 < 95%, tachypnoea, crepitations at lung bases, positive fluid balance, tachycardia, frothy sputum (often pink)

Management: -

- **Call for help - anaesthetist, senior obstetrician and senior midwife**
- Sit patient up
- High flow Oxygen via face mask with reservoir bag
- Exclude sedation from opiates
- CXR
- Arterial Blood Gases
- Stop all fluids
- Very careful fluid balance with fluid restriction
- Furosemide 40mg slowly IV

Consider ICU referral

MANAGEMENT OF OLIGURIA IN TREATMENT OF PRE-ECLAMPSIA

Oliguria = Urine output < 100mls of urine over 4 hours

- Consult senior obstetric and anaesthetic staff
- Assess patient including auscultation of chest, measurement of RR and SaO_2.
- Check urinary catheter not blocked
- Check PET bloods if not performed in last 4 hours
- Consider overall fluid balance: calculate and replace fluid deficits
- Fluid Challenge -250 ml Plasma-Lyte solution over 15 min and assess at 1 hour

At one hour - UO ≥ 20ml then return to 80ml/hr fluid regime

- UO < 20ml then discuss Central Venous Line (CVP)

CENTRAL VENOUS PRESSURE

CVP	<0	Repeat Fluid Challenge 250ml Plasma-Lyte solution over 15 min Check CVP after fluid bolus.
	0-5 MmHg	Continue with 80mls/hr (1 ml/kg/hr) Monitor CVP hourly
	>5	Furosemide 10- 20 mg IV Check CVP after 30 mins If oliguria persists check U+Es If UO < 20ml/hr consult with renal physician

POSTNATAL HYPERTENSION[5&6]

Blood pressure changes in pregnancy
Blood pressure falls in pregnancy due to generalised systemic vasodilatation despite an increase in cardiac output, reaching a low point in mid-pregnancy (22-24 weeks gestation). During the last trimester blood pressure gradually rises to pre-pregnancy levels.

Postnatal blood pressure changes
Immediately after delivery blood pressure usually falls, then tends to rise reaching a peak between three and six days postnatally. This occurs in both normotensive women and those with hypertension during pregnancy. Transient hypertension may occur in postpartum after uncomplicated pregnancies.

Importance of postnatal blood pressure control
The most important clinical concern is to identify women with severe hypertension or postpartum pre-eclampsia as they are at risk of life threatening complications. The triennial Confidential Enquiry into Maternal Deaths continues to identify substandard care in the management of hypertension in pregnancy, particularly the inadequate treatment of systolic hypertension [3].

BLOOD PRESSURE TARGETS

- Aim to keep blood pressure < 150/100 ideally <140/90 mm Hg.

BLOOD PRESSURE MONITORING

- Measure BP daily for the first 2 days after birth
- Measure BP at least once in day 3-5
- Measure BP on alternate days until normal, if blood pressure was abnormal on days 3 to 5.

POSTNATAL ANTIHYPERTENSIVE TREATMENT

- Methyldopa should be stopped and changed to an alternative agent within 2 days of delivery because of associated sedation, postural hypotension and depression.
- For women of African or Caribbean family origin with hypertension during the postnatal period, consider anti-hypertensive treatment with nifedipine modified release or amlodipine.
- If blood pressure is not controlled with a single medication, consider a combination of nifedipine (or amlodipine) and enalapril. If this combination is not tolerated, consider adding or swapping for atenolol.
- Consider Enalapril for treating hypertension in those who were on ACEi preconceptually (and wish to breastfeed), those with longstanding hypertension in pregnancy or those where labetalol and nifedipine are not sufficient to control blood pressure.
- Avoid using diuretics or ARBs to treat women who are breastfeeding or expressing milk.
- Medication should be reviewed and rationalised, where clinically appropriate to the least number of medications and where possible twice daily.
- Postnatal hypertension peaks between day 3 and 6 postnatally. It is important to continue prescribed antihypertensive treatment during this time.
- After this time (day 6) further dose reduction can be considered when BP has be < 130/80 for > 24hrs.
- Review overall BP trend to guide on dose reduction- see below.
- Medication can be stopped when consistently <120/70

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Suggestions of reducing doses:

NIFEDIPINE:
NIFEDIPINE MR 20mgs bd → 10mgs bd →discontinue
NIFEDIPINE MR 30mgs bd→ 20mgs bd → 10mgs bd → discontinue
NIFEDIPINE MR 40mgs bd → 30mgs bd → 20mgs bd → 10 mgs bd → discontinue

LABETALOL:
200mgs tds → 200mgs bd →stop
300mgs tds → 200mgs tds → as above
400mgs bd → 200mgs bd→ as above
400mgs tds → 400mgs bd → as above

NEW ONSET POSTPARTUM HYPERTENSION

Blood pressure should be checked on the fifth or sixth day following delivery to identify women with late presentation of pre-eclampsia.

Explain to women with hypertension who wish to breast feed that:

- Antihypertensive medicines can pass into breastmilk
- Most antihypertensive medicines taken while breast feeding only lead to very low levels in breast milk, so the amounts taken in by babies are very small and would be unlikely to have any clinical effect

Most medicines are not tested in pregnant or breastfeeding women, so disclaimers in the manufacturer's information are not because of any specific safety concerns or evidence of harm.

Make decision on treatment together with the woman, based on her preferences.

Treat women with hypertension in the postnatal period who are not breastfeeding and who are not planning to breastfeed in line with the NICE guideline on hypertension in adults.

RECURRENCE RISKS

- Advise women with hypertensive disorders of pregnancy that the overall risk of recurrence in future pregnancies is approximately 1 in 5.

LIKELIHOOD OF RECURRENCE OF HYPERTENSIVE DISORDERS OF PREGNANCY

	Types of hypertension	In previous or current	Pregnancy
Prevalence of hypertensive disorder in a future pregnancy	Any hypertension	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 20-28 weeks: approx. 40% (1 in 2 women) If birth was at 28-34 weeks: approx. 33% (1 in 3 women) If birth was at 34-37 weeks: approx 23% (1 in 4 women)	Approximately 7% (1 in 14 women)
Gestational hypertension	Approximately 9% (1 in 11women)	Between approximately 6 and 12% (up to 1 in 8 women)	
Chronic hypertension	Not applicable	Approximately 2% (up to 1 in 50 women)	

Advise women who have had a hypertensive disorder of pregnancy that this is associated with an increased risk of hypertension and cardiovascular disease later in life.

Advise women who have had a hypertensive disorder of pregnancy to discuss how to reduce their risk of cardiovascular disease, including hypertensive disorders, with their GP.

In women who have had pre-eclampsia or hypertension with early birth before 34 weeks please inform the GP pre-pregnancy counselling can be offered with an obstetrician to discuss possible risks of recurrent hypertensive disorders of pregnancy, and how to lower them for any future pregnancies.

Appendix 1

Aspirin Advice[2]

Advise women to take aspirin 150mg/day at night, with food from 12 weeks until delivery if there are two or more moderate risk factors or at least one high risk factor for pre-eclampsia.

Risk factors for pre-eclampsia

Moderate

- First pregnancy
- Age ≥ 40 years
- Pregnancy interval > 10 years
- Family history of pre-eclampsia
- Multiple pregnancy
- BMI ≥35 kg/m2 at first visit

High

- Hypertensive disease during previous pregnancy
- Chronic renal disease
- Autoimmune disease such as systemic lupus erythematosis or antiphospholipid syndrome
- Type 1 or type 2 diabetes
- Chronic hypertension

Appendix 2

Drugs used to treat hypertension [1]

DRUG	PLACE IN THERAPY	STARTING DOSE	MAXIMUM DOSE	CONTRAINDICATION	BREAST FEEDING ?
Labetalol	First-line therapy	200mg 8 hourly	600mg 6 hourly	Asthma	Yes
Nifedipine	Second-line therapy	10mg sustained release 12 hourly	40mg sustained release 12 hourly		Yes
Methyldopa	Second-line therapy	250mgs 12 hourly	1 gram 8 hourly	Depression	Yes [a]
Hydralazine	Second-line therapy	25mg 8 hourly	75mg 6 hourly		Yes
Enalapril	Not in pregnancy only postpartum	5mg daily.	40mg daily.		Yes

(a) Avoid postpartum

NOTE:
See Appendix 3 for drugs to treat postnatal hypertension and breastfeeding mother

Appendix 3

Drugs and dosages for treatment of hypertension and breastfeeding mothers [5]

DRUG	DOSE	COMMENTS
β-blockers:		
Labetalol	200-600mg 3 times / day	Only small amounts in breast milk
Atenolol	25-100mg once daily	Second line use for women who require once daily formulation
Calcium antagonists:		
Nifedipine twice daily formulation (Coracten SR ®)	10-20mg twice daily	Amount in breast milk too small to be harmful; manufacturer suggests avoid but widely used without reports of neonatal effect
Nifedipine (daily formulation) (eg Coracten XL®)	30-90mg once daily	Second line use for women who require once daily formulation;
ACE Inhibitors:		
Enalapril	5-40mg once daily	Can be used in women who were previously taking an ACE inhibitor when other first choice agents cannot be used or cardiac/renal protection needed; excreted into breast milk in low concentrations but probably too small to be harmful
Contraindicated		
Other ACE inhibitors and ARBs	Not recommended	Minimal data on use during lactation; manufacturer suggest that it should be avoided
Diuretics	Not recommended	Produce excessive thirst in breastfeeding women; large doses may suppress lactation

Appendix 4

Infusion Protocol for the Control of Hypertension in Pregnancy

Target blood pressure should be clearly documented in patient's notes

LABETALOL HCL INFUSION

Loading dose: 50 mg IV (10ml) over 2 mins. Repeat to a maximum of 200 mg (4 doses) in 5 min intervals.

Maintenance:

Preparation of infusion for 50 ml syringe

Draw up 50mls of labetalol 5mg/ml (2½Ampoules)

Rate

- Infusion rate is started at 4ml/hr
- ***Double every 30 min to a maximum of 32 ml/hr***
  OR
- Until target blood pressure is achieved (usually 150/95 mmHg)

Administration	Rate (ml/hr)	Dose (mg/hr)
	4ml/hr	20mg/hr
	8ml/hr	40mg/hr
	16ml/hr	80mg/hr
	32ml/hr	160mg/hr

Weaning Off: Reduce infusion by 2ml/hr every 30 minutes

Cautions

- Labetalol should be used with caution in patients with asthma/liver damage
- Contraindicated in patients with AV block or bradycardia (<60bpm)
- Monitor blood pressure closely during administration, check manually before major treatment decisions made
- BEWARE OF PULMONARY OEDEMA

Side Effects

- Headache, dizziness
- Sweating
- Tremor
- Urinary retention
- Ankle oedema
- Masks symptoms of hypoglycaemia
- GI upset
- Sleep disorder
- Hallucinations and rarely psychoses

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Appendix 5

HYDRALAZINE INFUSION

To be considered where Labetalol either unsuitable or unsuccessful

Preparation of infusion for 50 ml syringe driver:

Preparation

Hydralazine 40 mg (2 ampoules) made up to 40ml in Sodium Chloride 0.9% (i.e. 1mg/ml)

Administration

- 5mg (5ml) i.v. bolus should be given *slowly*
- Run at 2.5mg/hr (2.5ml/hr)
- Double every 30 min until target blood pressure achieved then maintain.
- Do not exceed 10ml/hr
- Consider alternatives if tachycardia, flushing or nausea are problems
- Do not infuse with glucose

Side Effects

- Profound hypotension (rapid dose increase)
- Flushing
- Nasal congestion
- Palpitations
- Tachycardia
- GI upset

Appendix 6

Magnesium Sulphate Protocol

DISCUSS WITH CONSULTANT PRIOR TO COMMENCEMENT

An interaction between nifedipine and magnesium sulphate leading to profound muscle weakness has been reported

Loading Dose	Magnesium Sulphate - 4 grams over 15 minutes Draw 8 ml of 50 % $MgSO_4$ from 10ml vial Add to 100ml bag of NaCl IVI via Braun pump at 400ml/hr
Maintenance	Magnesium Sulphate 1 gram per hour Maintenance for 24 hrs post last seizure or post delivery 10ml of 50% $MgSO_4$ (5 grams) Add to 40 ml NaCl (Total volume = 50ml) IVI at 10 ml / hour
2nd Seizure	2 grams (4 ml of 50% $MgSO_4$) over 5 minutes or 4grams over 5 minutes if booking weight >70kg Make up to 10 ml with NaCl

MONITIORING ON MAGNESIUM INFUSION

Respiratory rate, reflexes and oxygen saturations should be measured every 10 minutes for two hours then half hourly. Urine volumes hourly.

Pulse oximetry	If <95%, stop infusion and inform senior duty doctor
Patella/Arm reflexes	If absent, stop infusion and inform senior duty doctor
Respiratory rate	If < 12, stop infusion and inform doctor
Urine volumes	If < 20ml/hr, half infusion. If <10ml/hr, stop infusion.

If any of the above adverse signs occur, then check magnesium levels (Mg toxicity level >5mmol/l). Therapeutic range is 2-4 mmol/l, if <4mmol/L or reflexes return, recommence infusion at 0.5g/hr.

Cardio-Respiratory Arrest	Dial 2222 State “Respiratory Arrest and location”) **A**irway, **B**reathing, **C**irculation Stop and remove $MgS0_4$ infusion Administer Calcium gluconate 10% (1g in 10 ml)
Respiratory Depression	**A**irway, **B**reathing, **C**irculation Stop $MgS0_4$ infusion Consider Calcium gluconate

ANTIDOTE: CALCIUM GLUCONATE 10% (1G IN 10ML) GIVEN OVER 10 MINUTES.

Side Effects of magnesium sulphate

- Nausea, vomiting, diarrhoea
- Dizziness, confusion. Itching/tingling, thirst
- Muscle weakness, reduced or absent tendon reflexes
- Hypotension, palpitations, tachycardia
- Respiratory depression and arrest
- Cardiac arrest

Appendix 7

Contents of Eclampsia Box

- **AIRWAY BAG**
  - Laerdal pocket mask
  - Hudson mask with tubing
  - Guedel airway

- **IV BAG**
  - Tourniquet
  - Venflons x2
  - Tegaderm
  - Connector
  - Tubes-FBC, Coag, U&E, Glucose, Group & Save
  - Forms-Combined Labs (RIE), Haematology, Biochemistry, BTS
  - Blood bags
  - IV chart
  - Drug Kardex

- **MAGNESIUM BAG**
  - 6 ampoules magnesium sulphate (5g/10mls)
  - INSTRUCTION SHEET FOR MAKING UP MAGNESIUM SULPHATE
  - Needles x2
  - 10 & 60 ml syringes
  - 5% Dextrose 100ml bag
  - Label
  - Giving set
  - SIGNS OF MAGNESIUM TOXICITY INFORMATION

- **CALCIUM GLUCONATE**
  - 1 ampoule of calcium gluconate (1g/10mls)
  - 10ml syringe
  - Drawing up needle
  - Instructions for administration of calcium gluconate

- **CATHETER BAG**
  - Sterile pack
  - Gloves
  - Catheter
  - Water
  - Syringe

Appendix 8

GP LETTER

Patients who are diagnosed with hypertension in pregnancy should have a clear discharge letter to the GP *that includes all of the following:*

- *Who will provide follow-up care, including medical review if needed*
- *Frequency of blood pressure monitoring needed*
- *Threshold for reducing or stopping treatment*
- *Indications for referral to primary care for BP review*

Offer women who have had hypertension during pregnancy and who remain on antihypertensive treatment, a medical review with their GP 2 weeks after transfer to community care

Example

Dear Doctor,

This patient is x days postpartum and has been discharged from Ward 119/211/11 at RIE/ SJH on DATE.

Diagnosis – Pregnancy induced hypertension / Pre-eclampsia/ Chronic hypertension.

Discharged on antihypertensive medication Yes/No.

MEDICATION Dose Frequency

Aim BP < 150/100. Target 140/90 or less.

Blood pressure should be monitored by the community midwife on alternate days until day 5 and again on day 10. If above 150/100 continue alternate day monitoring until 2 weeks.

The patient's community midwife will arrange a GP review if they remain on medication 2 weeks after discharge from hospital.
If BP <130/80 consider dose reduction. If BP <120/70 stop medication.

If antihypertensive medication required beyond 12 weeks postpartum GP to consider referral for specialist medical review.

If proteinuria has not resolved at 12 weeks postpartum GP to consider referral to renal physician.

Women who have had hypertensive disease in pregnancy are at risk of recurrence in any future pregnancy.

Women who have had hypertensive disease in pregnancy are at increased risk of hypertension in later life and should have at least annual surveillance of their blood pressure.

Name
Role
Date

This section to be completed by document control

1. Associated Documents:

1. **Lothian Maternity Services Guidelines – Eclampsia and Severe pre-eclampsia guideline**
2. **Lothian Maternity Services Guidelines – Small for gestational age guideline**
3. **Lothian Maternity Services Guidelines – Corticosteroids for fetal lung maturation**
4. **Lothian Maternity Services Guidelines – Magnesium sulphate for fetal neuroprotection**

- National Collaborating Centre for Women's and Children's Health. Hypertension in pregnancy: the management of hypertensive disorders during pregnancy. NICE Clinical Guideline, NG133. London: RCOG;2019.

- MBRRACE-UK: Saving Lives, Improving Mothers' Care 2020: Lessons to inform maternity care from the UK and Ireland Confidential Enquiries in Maternal Death and Morbidity 2016-18

- PROMPT manual. Second Edition.

- International Society for the Study of Hypertension in Pregnancy. The Classification, Diagnosis and management of the Hypertensive Disorders of Pregnancy: A revised statement from the ISSHP (2014)

- Knight M on behalf of UKOSS. "Eclampsia in the United Kingdom 2005" *BJOG* 2007; 114:1072-1078

2. REFERENCES:

1. **Handbook of obstetric medicine, Fifth Edition. Catherine Nelson-Piercy.**
2. **Hypertension in pregnancy, NICE GUIDEANCE. 2019**
3. **ACOG opinion: Low dose aspirin use during pregnancy 2018**
4. **NICE guideline: Hypertension in adults : diagnosis and treatment**
5. **Saving Mothers' Lives report: CEMACE 2006-2008**
6. **Postpartum management of hypertension. Bramham et al; British Journal of medicine. BMJ 2013; 346:f894**
7. **Management of postpartum hypertension. Smith et al; The Obstetrician & Gynaecologist. 2013; 15:45-50**

3. AUTHOR/S:

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Author 2: Dr Anne Armstrong

Author 3: Obstetric Guideline Group

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Induction of labour
Maternity Services Lothian
Guidelines

NHS Lothian

1. INTRODUCTION:

Induction of labour is common and associated with increased intervention rates. This guideline aims to prevent inappropriate induction of labour and provide a standard care pathway for those induced.

2. AIM:

To provide all staff in maternity care with access to clear guidance on the indications for induction of labour, the referral pathway and the process of labour induction.

3. GUIDELINES:

Induction of labour-criteria and booking	page 2
Membrane sweeping	page 5
Outpatient induction	page 6
Inpatient induction	page 6
Induction using Propess®	Page 7
Induction using vaginal Prostin E2® gel	page 9
Induction by amniotomy	page 11
Oxytocin use for routine induction of labour	page 12
Non-routine use of oxytocin for induction of labour	page 14
Augmentation for pre-labour rupture of membranes	page 15
Appendix 1 Induction process using Propess®	page 16
Appendix 2 Insertion of Propess®	page 17
Appendix 3 Spontaneous rupture of membranes with Propess®	page 17
Appendix 4 Induction using Prostin E2gel after use of Propess for women para 3 or less	page 18
Appendix 5-Induction for women Para 4 or 5	page 19
Appendix 5-Management of pre-labour rupture of membranes at term	page 20

Induction of labour – criteria and booking

1) Postdates

The most frequent indication is for prolonged pregnancy to avoid late stillbirth that occurs in 2-3/1000 pregnancies at 42 weeks. Staff may offer induction between 10-14 days post EDD, when induction reduces perinatal mortality without increasing the caesarean section rate[1]. Staff are able to refuse unless gestation is at least T+10 AND a vaginal examination has been performed in the clinic to assess the Bishops score. All women should be offered a membrane sweep at this VE unless this has already been performed.

Midwifery staff are able organise induction of labour for low risk women who are **Para 3 or less**. They must complete the Induction assessment questionnaire (Maternity TRAK) and if all the induction risk assessment questions are answered 'Yes' then induction can be booked.

The following criteria have to be met for outpatient induction of labour to be appropriate:
Low risk (no significant maternal or fetal risk factors)
Post dates (Term+10-14)
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 48hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

On arrival for induction of labour the midwife should complete a new induction assessment questionnaire ensuring that she has completed the risk assessments questions and performed a Modified Bishops Score. If all risk assessment questions are answered 'Yes' and the Modified Bishops Score is <7 then the midwife may administer Propess under the PGD

All women who are **Para 4 or more** should have an appointment with a senior Obstetrician between Term and Term+12. This group of women are not suitable for outpatient induction of labour

2) Maternal age 40yrs or more at time of booking

In this group the risk of stillbirth is increased and therefore induction of labour at term should be considered. All women in this group are offered serial growth scans and antenatal review by a consultant. At one of these consultations induction at tern will be discussed and offered and the individualised care plan documented.

Women aged 40 years or more declining IOL at term

Fetal monitoring should start at 40 weeks. This should be a CTG and LV performed on that day or nearest Friday/ Monday if falls on a weekend. This should then be repeated weekly until delivery AND further discussion arranged with a Consultant if still declining IOL at term +14.

3) <u>Maternal and fetal reasons.</u>

Although a variety of specific circumstances may indicate the need for induction of labour with a greater or lesser degree of urgency, the essential judgement that the clinician and the pregnant woman must make is whether the interests of the mother or the baby, or both, will be better served by ending or continuing the pregnancy[1]. The decision to undertake IOL in these circumstances needs to be clear and clinically justified and discussed with a Consultant and requires an individual documented induction plan.

Contraindications to Induction of labour

Absolute:

Severe Intra uterine growth retardation with evidence of fetal compromise

Relative:

Previous uterine surgery

Grand multiparity (Para 6 or more)

Booking appointments

To book induction slots phone

- Ward 119 tel 0131 2422475/2421191 at RIE
- Day Assessment unit tel. 01506 524024 at St Johns

If outpatient induction IOL being considered ensure that the patient has an appointment for a liquor volume scan prior to attending for induction.

Methods of Induction of labour

1) Membrane sweep

2) Propess® pessary (see page 6)

3) Prostin E2® gel (see page 8)

4) Amniotomy (see page 10)

5) Oxytocin infusion (see page 11)

Membrane sweeping

It is already well established and routine practice to offer membrane sweeps to women prior to admission for induction as this significantly reduces the need for induction and improves the modified Bishops score (Cochrane 2005). It is thought to be effective by increasing local endogenous production of prostaglandins.

There is evidence to suggest that membrane sweeping at the initiation of induction of labour increases the SVD rate, reduces the induction to delivery interval, reduces the use of oxytocin. Women's satisfaction with the process is improved even though the sweep is associated with greater discomfort at the time of insertion of prostaglandins or amniotomy (Tan 2006). There is also evidence suggesting benefits from repeated membrane sweeping.

To perform a sweep, a finger is inserted as high as possible through the internal cervical os and the membranes are swept off the lower pole of the uterus by a complete circular sweep of the finger, once clockwise and once anticlockwise. If the internal os is closed the cervical canal should be 'swept'. During this process a modified Bishops score should be calculated and clearly documented in Maternity Trak. The fetal heart should be auscultated prior to and after the membrane sweep and documented.

At both 40 and 41 weeks women should be offered a vaginal examination for membrane sweeping. Additional membrane sweeping may be offered if labour does not start spontaneously.

Outpatient induction of labour

Criteria
Low risk (no significant maternal or fetal risk factors)
Post dates (Term+10-14)
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 48hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

Post treatment
After insertion of the Propess® pessary women should remain recumbent for 30 minutes. Thereafter, a 30 minute CTG should be performed. If reassuring, no further monitoring is required unless SRM or uterine activity occurs. Women may go home and be managed on an outpatient basis. Ensure they have the IOL patient information leaflet prior to going home. Women should be advised to contact the relevant hospital if uterine activity occurs, SRM or any other concerns eg. Reduced fetal movements, vaginal bleeding and women should be advised to remove the Propess® pessary and attend the hospital immediately. Women are asked to contact the hospital by telephone after 12 hours

Inpatient induction of labour

Where inpatient induction of labour is being undertaken for maternal or fetal reasons an individualised plan for induction should be clearly documented in the patient's medical records. These women need a medical review before commencing the induction process
Prior to the onset of uterine activity the fetal heart should be auscultated as a minimum every 2 hours, when awake.

Induction of labour for women with pre labour rupture of membranes at term

Induction of labour is appropriate approximately 24 hours after rupture of membranes. The interval between rupture of membranes and commencement of the induction process should not exceed 36 hours, unless the woman specifically requests this. Women wishing to wait longer than 72 hours should be discussed with their Consultant Obstetrician and offered an appointment with a Senior Obstetrician.

Women with meconium stained liquor or Group B Sreptococcus should be augmented immediately.

Induction using Propess®

NICE[1] recommends that IOL with vaginal prostaglandin is the preferred method of induction unless there are specific clinical reasons for not using it eg. the risk of uterine hyperstimulation or previous caesarean section.
Propess® is the first line prostaglandin for use in induction in women with Parity 3 or less if there is no contra-indication.

Contraindications to Propess®

Propess® should not be used in women:

1. When labour has started.

2. When oxytocin drugs are being given.

3. When strong prolonged uterine contractions would be inappropriate such as in patients:

a. who have had previous major uterine surgery, e.g. caesarean section, myomectomy

b. with cephalopelvic disproportion

c. with fetal malpresentation

d. with suspicion or evidence of fetal distress

e. who have had more than three full term deliveries eg a Para 4 or more

f. previous surgery or rupture of the cervix

4. When there is current pelvic inflammatory disease, unless adequate prior treatment has been instituted.

5. When there is hypersensitivity to dinoprostone or to any of the excipients.

6. When there is placenta praevia or unexplained vaginal bleeding during the current pregnancy.

Cautions (for Propess®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension
- uterine hypertony
- multiple pregnancy (as no studies have been undertaken with Propess in this patient group)
- see page 2

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG-this must be reassuring

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart for insertion of Propess® (Appendix 1and 2):

4. Woman to remain semi-recumbent for 30 minutes after insertion of pessary.

5. CTG- this must be reassuring

6. Women who are being managed as an outpatient should be instructed to inform the hospital if:

i) Contractions become painful or regular (every 5 minutes)
ii) Vaginal bleeding
iii) SRM
iv)Reduced fetal movements
v) Propess® falls out

Staff should tell women to remove the pessary and attend the hospital immediately.

7. Telephone call or if inpatient review at 12 hours

8. Women should be reviewed and the Propess® pessary should removed 24 hours after insertion.

Side effects of Propess®

Nausea, vomiting and diarrhoea are most commonly reported. Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Genital oedema.
Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypotonus, uterine hyperstimulation, abruptio placentae, rapid cervical dilation.

- on the neonate fetal bradycardia /fetal distress, low Apgar scores, stillbirth, neonatal death

- on breast feeding no hazard at recommended dose.

Indications for removal of Propess®

- Propess should be removed and the woman referred to the labour ward in the following situations
- Regular painful contractions (3 or more in 10 minutes)
- BS ≥ 7
- There is evidence of uterine tachysystole, hypertonus or hyperstimulation
  Tachysystole = ≥5 contractions in 10 minutes with reassuring CTG
  Hypertonus = painful contraction lasting ≥ 90 seconds with reassuring CTG
  Hyperstimulation = Tachysystole or hypertonus with non reassuring CTG
- Concerns about the fetal heart rate /CTG
- Vaginal bleeding
- There is evidence of maternal systemic adverse effect such as severe nausea or vomiting

Induction using of Prostin E2® vaginal gel

NICE[1] recommends that IOL with vaginal prostaglandin is the preferred method of induction unless there are specific clinical reasons for not using it eg. the risk of uterine hyperstimulation or previous caesarean section.

Prostin E2® gel may be used as 1st line for induction for women with **Parity 4 and 5** needing prostaglandin induction (after Consultant Obstetrician review). It may be used as a 2nd line agent if Propess® has failed in women with parity 0-3 where amniotomy is not possible (See Appendix 1 and 4).

Contraindications to Prostin E2®

Dinoprostone is not recommended in the following circumstances:

1. For women in whom oxytocic drugs are generally contraindicated:

a. previous caesarean section or major uterine surgery

b. cephalopelvic disproportion

c. fetal malpresentation

d. suspicion or evidence of fetal distress

e. grand multiparity with over 5 previous term pregnancies

2. Women with ruptured membranes

3. Past history of or existing, pelvic inflammatory disease, unless adequate prior treatment has been instituted

4. Clinical suspicion or definite evidence of placenta praevia or explained vaginal bleeding during pregnancy

5. Active cardiac, pulmonary, renal or hepatic disease

6. When there is hypersensitivity to prostaglandins or to any of the excipients.

Cautions (for Prostin E2®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension
- uterine hypertony
- see page 2

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart (Appendix 2):

4. Woman to remain semi-recumbent for 30 minutes after each dose of gel.

5. CTG

Side effects of Prostin E2®
Nausea, vomiting and diarrhoea are most commonly reported. Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypotonus, uterine hyperstimulation, abruptio placentae, rapid cervical dilation.

- on the neonate fetal bradycardia /fetal distress, low Apgar scores, stillbirth, neonatal death
- on breast feeding no hazard at recommended dose.

Induction by amniotomy

Amniotomy and oxytocin infusion should not be used as the primary method of IOL unless there are specific indications eg, grand multiparity, contraindications to vaginal prostaglandin.
Booking and criteria as previously described.
Performed when the cervix is at least 2cm dilated and effacing and the fetal head is engaged.

1. Record the fetal heart rate before amniotomy

2. Record the colour and amount of liquor

3. A fetal heart rate should be obtained immediately following ARM

4. If FHR normal then the woman should be encouraged to mobilise

5. In primigravida with no uterine activity commence oxytocin immediately after amniotomy (allow correct delay from prostaglandin administration)

6. In parous women, assess uterine activity after 2 hours

- If contracting 3:10, then VE 4 hours after ARM
- If contractions are < 3:10, then start oxytocin infusion

Once the oxytocin infusion has started a continuous CTG is required.

Oxytocin use in induction/augmentation of labour

1. Continuous CTG monitoring should be used if an oxytocin infusion is used.

2. Oxytocin infusion must not be started within 6 hours of administering Prostin E2 (dinoprostone) gel or within 30 minutes of removing a Propess® pessary. The dosage regime is as follows:

- Oxytocin 30 IU in 500ml of sodium chloride 0.9%

  1ml/hr=1milliunit oxytocin per minute

The minimum dose possible should be used and this should be titrated against uterine contractions aiming for a maximum of 3 to 4 contractions in 10 minutes.

- Commence at 2ml/hr (2 milliunits per minute)
- Increase at intervals of 30 minutes using regime below

Rate	**Dose**
2ml/hr	2 milliunits per minute
4ml/hr	4 milliunits per minute
8ml/hr	8 milliunits per minute
12ml/hr	12 milliunits per minute
16ml/hr	16 milliunits per minute
20ml/hr	20 milliunits per minute
The licensed maximum dose is 20 milliunits per minute. If higher doses are required discuss with senior medical staff. The maximum dose should not exceed 32 ml/hr (32 millunits per minute)	
24ml/hr	**24 milliunits per minute**
28ml/hr	**28 milliunits per minute**
32ml/hr	**32 milliunits per minute**

In the event of a non reassuring CTG, the oxytocin infusion should be discontinued and senior obstetric advice sought.

Contraindications

- Known hypersensitivity to any constituents of the product
- Hypertonic uterine contractions
- Vaginal delivery contraindicated
- Fetal compromise or malpresentation
- Known cephalopelvic disproportion
- Placenta praevia
- Vasa praevia
- placental abruption
- cord presentation or prolapse

Potential adverse reactions to oxytocin
Administration at too high doses results in uterine overstimulation which may cause foetal distress, asphyxia, and death, or may lead to hypertonicity, tetanic contractions, soft tissue damage or rupture of the uterus.

- Nausea and vomiting
- Headache
- Rash
- Cardiac arrhythmias
- Anaphylactoid reactions
- Uterine hyperstimulation & Ruptured uterus
- Rapid IV administration may lead to acute hypotension
- Water intoxication
-

Cautions

Oxytocin has a slight anti-diuretic activity so prolonged IV use at high doses in conjunction with large volumes of fluid, may cause water intoxication (see side-effects) and hyponatraemia. To avoid this rare complication, the following precautions must be observed: Administer oxytocin in sodium chloride 0.9% (not glucose); restrict fluid intake by mouth.

Special precautions:
- Presence of uterine scar.

- Avoid prolonged use in patients with severe PIH.
- It should not be used for prolonged periods in patients with oxytocin-resistant uterine inertia, severe pre-eclamptic toxaemia or severe cardiovascular disorders.

If a caution applies then decision to use should be made by a Consultant Obstetrician

Non routine use of oxytocin in induction/augmentation of labour

Examples include:

- Presence of uterine scar
- Non-reassuring CTG
- Breech presentation
- Multiple pregnancy
- Grand multiparity
- Severe pre-eclampsia

An oxytocin infusion should only be started after discussion and agreement with a Consultant Obstetrician. This discussion should be clearly documented in Maternity Trak and should include maximum dose and rate of increase and time for further review. In the interest of safety the rate should not exceed 8ml/hour without discussion/review by a Consultant Obstetrician

The minimum dose possible should be used and this should be titrated against uterine contractions aiming for a maximum of 3 to 4 contractions in 10 minutes

Starting oxytocin in the 2nd stage of labour

In the event of oxytocin augmentation being required in the second stage of labour, advice must be sought from senior obstetric staff. The recommended rate of increase should be documented in the patient's notes.

Induction of labour for women with pre labour rupture of membranes at term

Induction of labour is appropriate approximately 24 hours after rupture of membranes. The interval between rupture of membranes and commencement of the induction process should not exceed 48 hours, unless the woman specifically requests this. Women wishing to wait longer than 72 hours should be discussed with their Consultant Obstetrician and offered an appointment with a Senior Obstetrician.

Women with meconium stained liquor or Group B Sreptococcus should be augmented immediately.

There is evidence that in women with an unfavourable cervix and ruptured membranes, the use of oxytocin is less effective than vaginal PGE2 in achieving a vaginal birth within 24 hours[1]. See appendix 5.

1. Take temperature, pulse and blood pressure. If temperature >37.5 then perform a septic screen and commence antibiotics

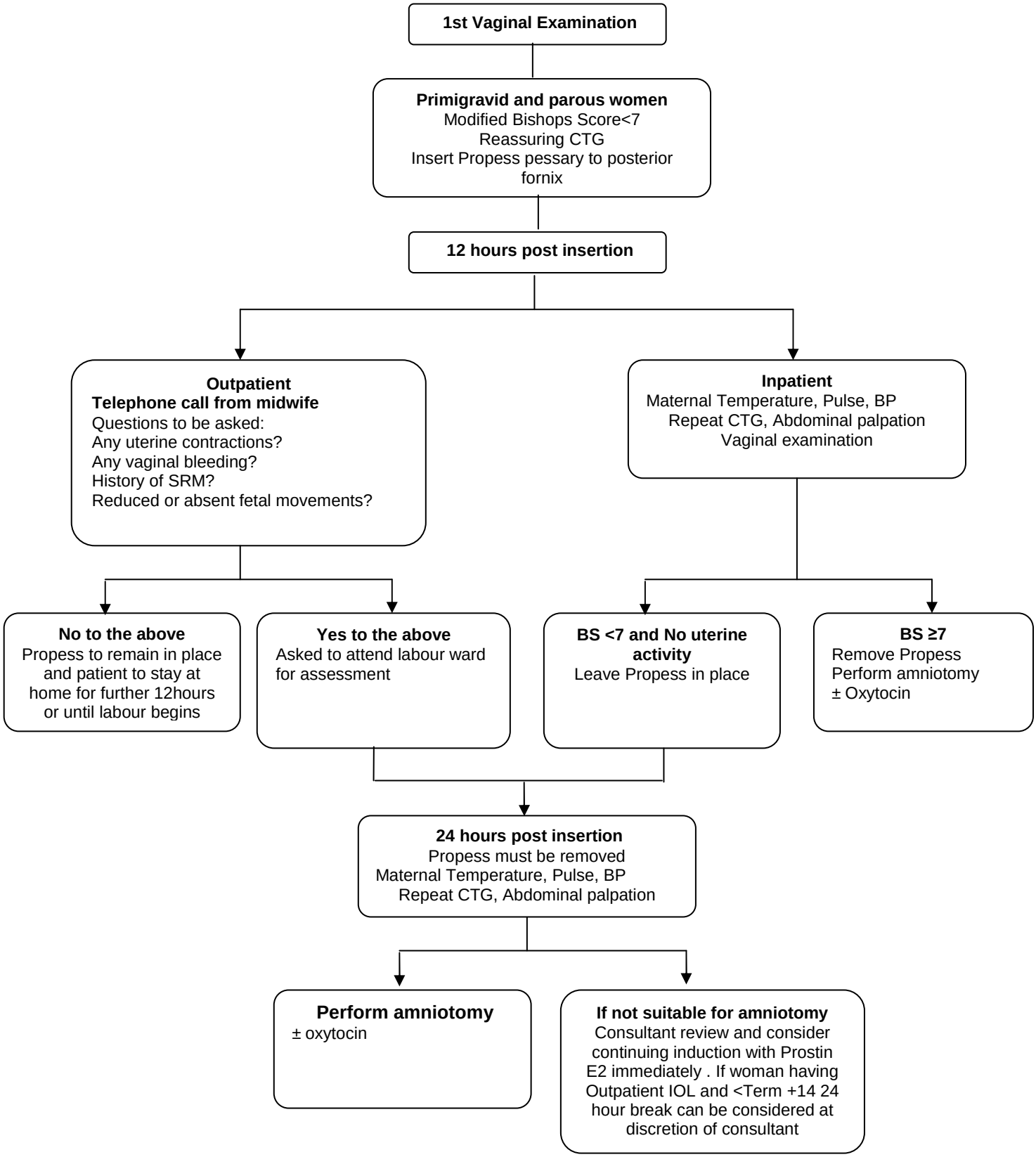
2. CTG. If temperature is elevated then commence continuous fetal heart rate monitoring

3. Vaginal assessment and follow chart (Appendix 5)

Para 3 or less- If cervix unfavourable (Bishops score <7), for Propess pessary and review at 12 hours (See Appendix5)

Para 4 or more-Commence intravenous oxytocin due to risk of hyperstimulation even if cervix is unfavourable

Appendix 1- Induction process using Propess® (Women Para 3 or less)



Appendix 2- Insertion of Propess® pessary

1. Ensure that Propess pessary is adminsistered within 20 minutes after removal form the fridge.

2. Insert Propess high into the posterior fornix using aquagel

3. The pessary should lie transversely in the posterior fornix

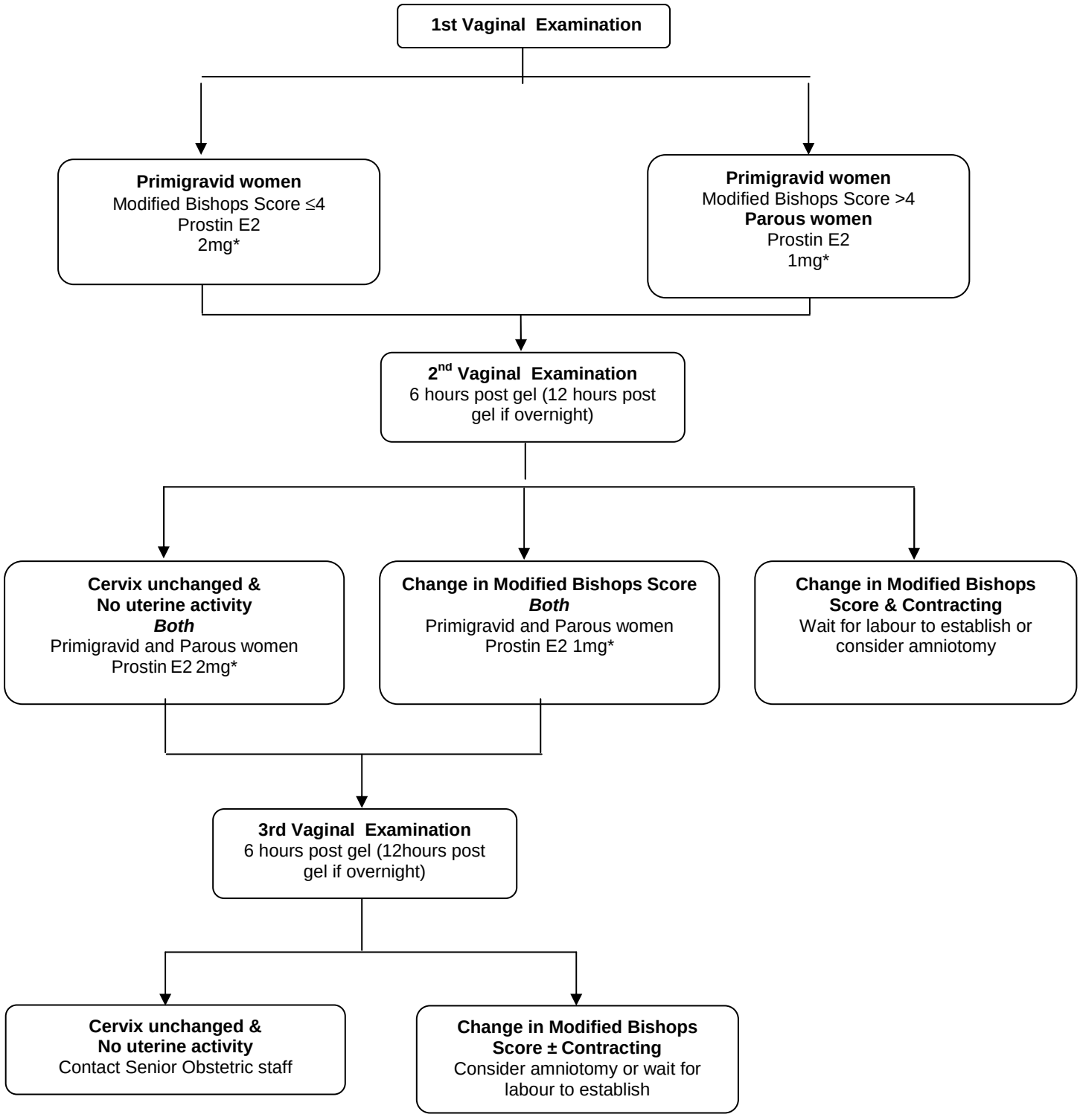
4. After Propess has been inserted the withdrawal tape may be cut or excess tape placed in the lower part of the vagina but ensure that there is sufficient tape outside the vagina to allow removal.

Appendix 3- Management if there is spontaneous rupture of membranes with Propess® in the vagina

Inpatient:
Commence CTG
Assess contractions
If contractions are 3 or more in 10 minutes then remove Propess and transfer to Labour Ward
If there are no contractions perform a speculum examination if this is needed to confirm the diagnosis and then perform VE:
If BS<7, Propess can be left in place until can be transferred to Labour ward for oxytocin
If BS ≥ 7 then Propess to be removed and transfer to Labour ward

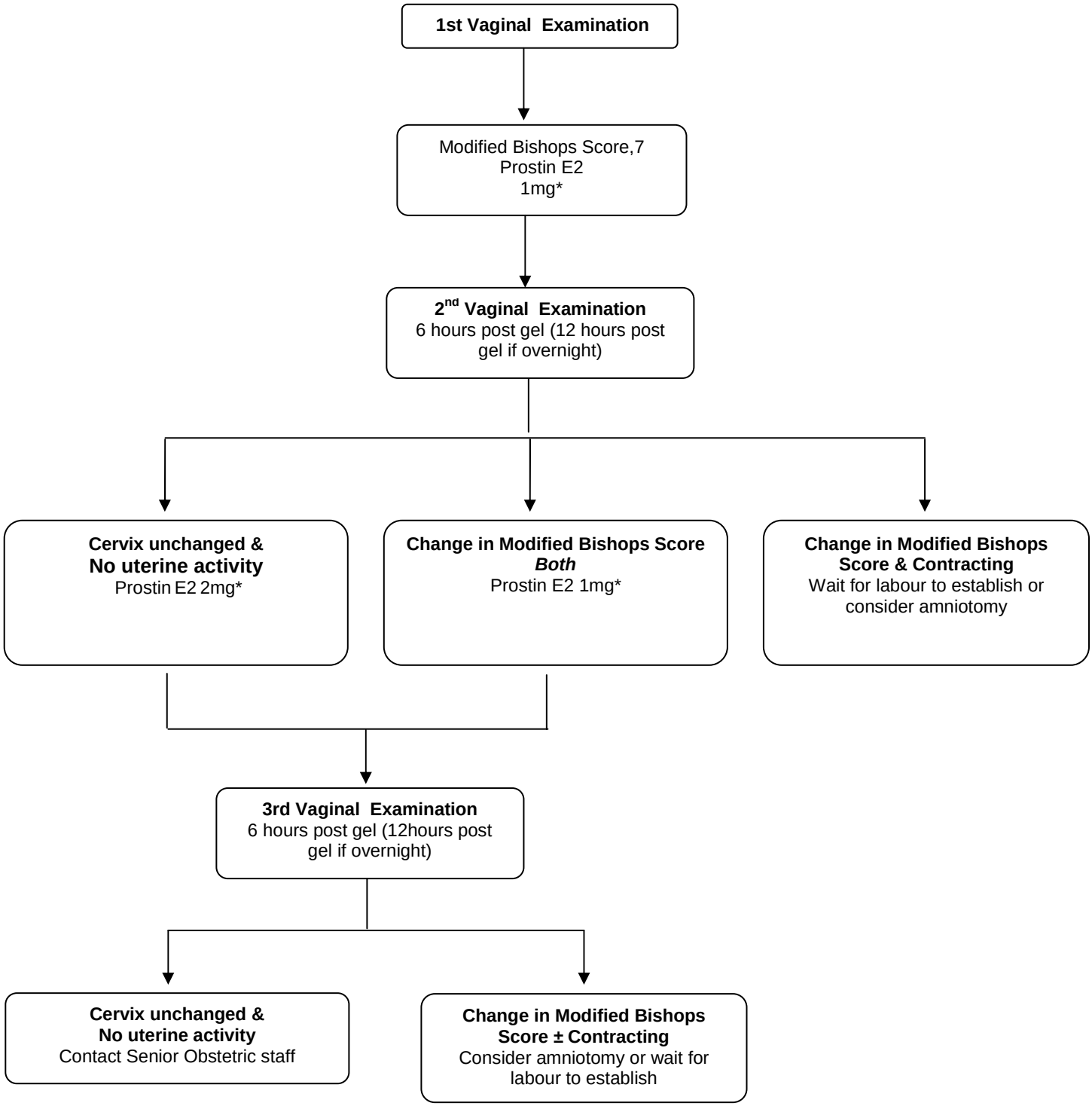
Outpatient
Patient to telephone hospital
Staff to ask the following questions:
Colour of the liquor
Fetal movements
Are the contractions 3 or more in 10 minutes
Ask to attend
If contractions 3 or more in 10 minutes then ask patient to remove Propess immediately

Appendix 4- Induction using Prostin E2® gel (dinoprostone) after use of Propess for Women Para 3 or less



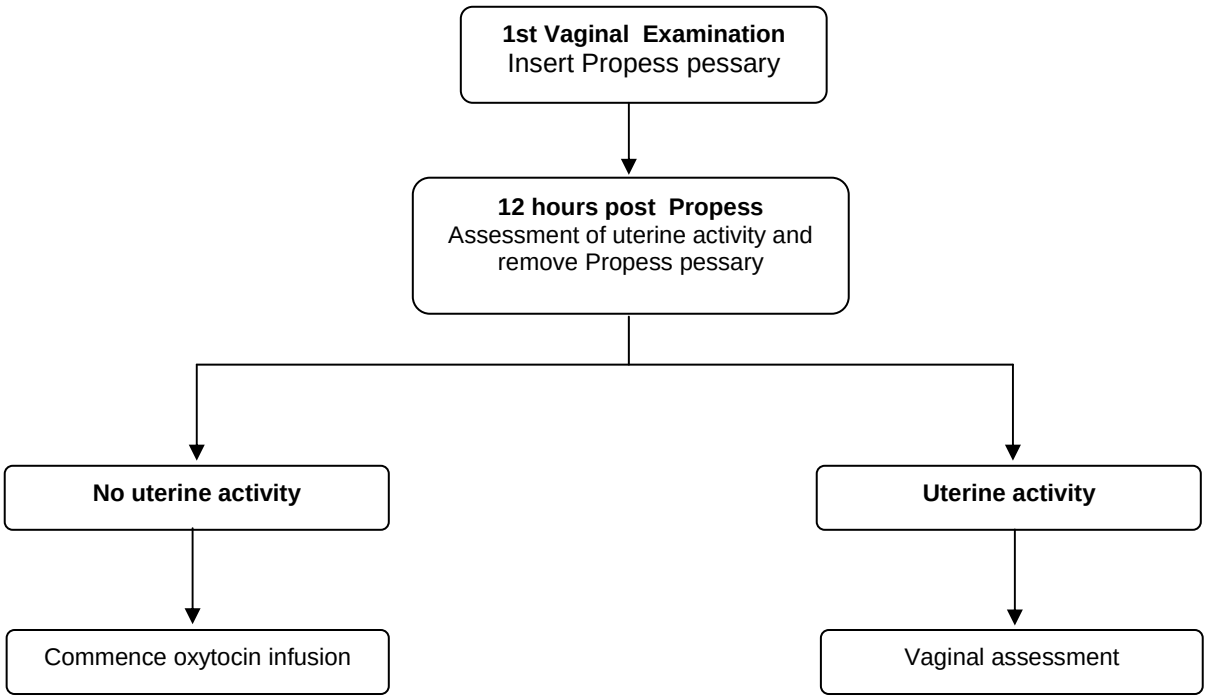
* All Prostin E" should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

Appendix 5- Induction using Prostin E2® gel (dinoprostone) for women Para 4 or 5



Appendix 6- Induction of women with pre-labour rupture of membranes at term

Para 3 or less



Para 4 or more

Should not receive Propess and should commence an oxytocin infusion (See page 8)

4. ASSOCIATED DOCUMENTS:

Uterine Hyperstimulation guideline
Fetal monitoring guideline
Prelabour rupture membranes at term guideline
Group B streptococcus management
PGD Propess and Dinoprostone
http://intranet.lothian.scot.nhs.uk/NHSLothian/Healthcare/A-Z/MedicinesManagement/PatientGroupDirections/Documents/Acute%20Services%20PGDs/PGD%20236v1%20-%20Dinoprostone%20-%20Propess%20for%20induction%20of%20Labour%20%20-%20Midwives.pdf

5. REFERENCES:

[1] NICE Induction of labour Clinical Guideline 2008
[2] NICE Intrapartum care Clinical Guideline 2007

[4]eMC- Prostin E2 Vaginal gel 1mg, 2mg- Summary of product characteristics (SPC)
[4]eMC- Propess 10mg- Summary of product characteristics (SPC)
[4]eMC- Syntocinon - Summary of product characteristics (SPC)

6. AUTHOR/S:

Author 1: Lothian Obstetric Guideline Group

Author 2:

Author 3:

Author 4:

Author 5:

Author 6:

Induction of labour
Maternity Services Lothian
Guidelines

NHS Lothian

1. INTRODUCTION:

Induction of labour is common and associated with increased intervention rates. This guideline aims to prevent inappropriate induction of labour and provide a standard care pathway for those induced.

2. AIM:

To provide all staff in maternity care with access to clear guidance on the indications for induction of labour, the referral pathway and the process of labour induction.

3. GUIDELINES:

Induction of labour-criteria and booking	page 2
Membrane sweeping	page 5
Outpatient induction	page 6
Inpatient induction	
Induction after SRM	
Induction using Mysodelle®	page 7
Induction using Propess ®	page 9
Induction using dinoprostone 2nd line agent	page 11
Induction with cervical ripening balloon – see separate guideline	Page
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Oxytocin use for routine induction of labour	page 15
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Augmentation for pre-labour rupture of membranes	page 18
Appendix 1 Induction process using Mysodelle®	page19
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Appendix 7 Induction using Dinoprostone® tablets after use of Propess® or Mysodelle®for women para 3 or less	page 23
Appendix 8- Management of pre-labour rupture of membranes at term	page 24
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Appendix 9b process of prostin gel ® as 2nd line agent	page 27
Appendix 10 Induction of para 4 and 5 if using PGE2 prostin gel	page 28

Induction of labour – criteria and booking

1) Postdates

The most frequent indication is for prolonged pregnancy to avoid late stillbirth that occurs in 2-3/1000 pregnancies at 42 weeks. Staff may offer induction between 10-14 days post EDD, when induction reduces perinatal mortality without increasing the caesarean section rate[1]. Staff are able to refuse unless gestation is at least T+10 AND a vaginal examination has been performed in the clinic to assess the Bishops score. All women should be offered a membrane sweep at this VE unless this has already been performed.

Midwifery staff are able to organise induction of labour for low risk women who are **Para 3 or less**. They must complete the Induction assessment questionnaire (Maternity TRAK) and if all the induction risk assessment questions are answered 'Yes' then induction can be booked.

The following criteria have to be met for **outpatient induction** of labour to be appropriate:
Low risk (no significant maternal or fetal risk factors)
Post dates (Term+10-14)
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 72hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

On arrival for induction of labour the midwife should continue the induction assessment questionnaire ensuring that she has completed the risk assessments questions and performed a Modified Bishops Score. If all risk assessment questions are answered 'Yes' and the Modified Bishops Score is <7 then the midwife may administer Propess or Mysodelle under the PGD

All women who are **Para 4 or more** should have an appointment with a senior Obstetrician between Term and Term+12. This group of women are never suitable for outpatient induction of labour with prostaglandins

2) Maternal age 40yrs or more at time of booking

In this group the risk of stillbirth is increased and therefore induction of labour at term should be considered. All women in this group are offered serial growth scans and antenatal review by a consultant. At one of these consultations induction at term will be discussed and offered and the individualised care plan documented.

Women aged 40 years or more declining IOL at term

Fetal monitoring should start at 40 weeks. This should be a CTG and LV performed on that day or nearest Friday/ Monday if falls on a weekend. This should then be repeated weekly until delivery AND further discussion arranged with a Consultant if still declining IOL at term +14.

3) <u>Maternal and fetal reasons.</u>

Although a variety of specific circumstances may indicate the need for induction of labour with a greater or lesser degree of urgency, the essential judgement that the clinician and the pregnant woman must make is whether the interests of the mother or the baby, or both, will be better served by ending or continuing the pregnancy[1]. The decision to undertake IOL in these circumstances needs to be clear and clinically justified and discussed with a Consultant and requires an individual documented induction plan.

Contraindications to Induction of labour

Absolute:

Severe Intra uterine growth retardation with evidence of fetal compromise

Relative:

Previous uterine surgery

Grand multiparity (Para 6 or more)

Booking appointments

To book induction slots phone

Ward 119 tel 0131 2422475/2421191 at RIE

ward 11 01506524111 at St Johns

If outpatient induction IOL being considered ensure that the patient has an appointment for a liquor volume scan prior to attending for induction.

Methods of Induction of labour

1) Membrane sweep

2) Mysodelle® pessary

3) Propess ® pessary

4) Dinoprostone tablets (or prostin gel if unavailable)

5) Balloon cervical ripening

6) Amniotomy

7) Oxytocin infusion

Women should be advised as to their induction options antenatally and be included in the decision making process for their induction having been given advice and the patient information leaflet. The aim for induction should always be to use the least intervention needed. Each woman should have an individualised induction plan to optimise her care.

First line induction for main groups

1 Primigravid women with BS ≤ 4 and no fetal compromise should be offered induction with Mysodelle as an inpatient, however outpatient induction with Propess® remains an option if meet other criteria i.e T+10-14 – they should be advised process may take longer with Propess®.

2.Primigravid women having post dates induction T+10-14 with no other risk factors should be offered outpatient induction with Propess ® however if the BS ≤ 4, they should be offered Mysodelle® as inpatient instead and should be advised this may be more effective.

3. Primigravid women with BS 5-7 and para 1-3 (no uterine surgery) with Bs< 7 should be offered Propess®

4.Women who are ≥para 4 and any woman with a previous CS needing induction who cannot have an ARM should be offered balloon induction. Occasionally para 4 or 5 with no uterine surgery may be offered dinoprostone 1mg gel as alternative – CONSULTANT DECISION ONLY.

Membrane sweeping

It is already well established and routine practice to offer membrane sweeps to women prior to admission for induction as this significantly reduces the need for induction and improves the modified Bishops score (Cochrane 2005). It is thought to be effective by increasing local endogenous production of prostaglandins.

There is evidence to suggest that membrane sweeping at the initiation of induction of labour increases the SVD rate, reduces the induction to delivery interval and reduces the use of oxytocin. Women's satisfaction with the process is improved even though the sweep is associated with greater discomfort at the time of insertion of prostaglandins or amniotomy (Tan 2006). There is also evidence suggesting benefits from repeated membrane sweeping.

To perform a sweep, a finger is inserted as high as possible through the internal cervical os and the membranes are swept off the lower pole of the uterus by a complete circular sweep of the finger, once clockwise and once anticlockwise. If the internal os is closed the cervical canal should be 'swept'. During this process a modified Bishops score should be calculated and clearly documented in Maternity Trak. The fetal heart should be auscultated prior to and after the membrane sweep and documented.

At both 40 and 41 weeks women should be offered a vaginal examination for membrane sweeping. Additional membrane sweeping may be offered if labour does not start spontaneously. This may be done prior to 40 weeks if authorised by medical staff.

Outpatient induction of labour with Propess®

Criteria
Low risk (no significant maternal or fetal risk factors)
Post dates (Term+10-14)
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7 (primigravid women with BS ≤ 4 should be offered Mysodelle as inpatient)
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 72 hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

Post treatment
After insertion of the Propess® pessary women should remain recumbent for 30 minutes. Thereafter, a 30 minute CTG should be performed. If reassuring, no further monitoring is required unless SRM or uterine activity occurs. Women may go home and be managed on an outpatient basis. Ensure they have the IOL patient information leaflet prior to going home and are advised to contact the relevant hospital if uterine activity occurs, SRM or any other concerns eg. reduced fetal movements, vaginal bleeding and women should be advised to remove the Propess® pessary and **attend the hospital immediately**. Women are asked to contact the hospital by telephone after 12 hours

Inpatient induction of labour

Where inpatient induction of labour is being undertaken for maternal or fetal reasons an individualised plan for induction should be clearly documented in the patient's medical records. These women may need a medical review before commencing the induction process Prior to the onset of uterine activity the fetal heart should be auscultated as a minimum every 2 hours, when awake.

Induction of labour for women with pre labour rupture of membranes at term

Induction of labour is appropriate approximately 24 hours after rupture of membranes. The interval between rupture of membranes and commencement of the induction process should not exceed 36 hours, unless the woman specifically requests this. Women wishing to wait longer than 72 hours should be discussed with their Consultant Obstetrician and offered an appointment with a Senior Obstetrician. Women with BS≤4 with SRM may have Mysodelle ® for 12 hours instead of Propess®.

Women with meconium stained liquor or Group B Streptococcus should be augmented immediately.

Induction using Mysodelle®

Mysodelle 200 micrograms is a first line misoprostol vaginal delivery for use in induction in nulliparous women, singleton pregnancy from 36 weeks with modified bishop's score of ≤ 4, if there is no contra-indication.

Contraindications to Mysodelle® (as per SPC)

Mysodelle® should not be used in women:

1. When labour has started.

2. When oxytocin or dinoprostone are being given.

3. When strong prolonged uterine contractions would be inappropriate such as in patients:

a. who have had previous major uterine surgery, e.g. myomectomy

b. with cephalopelvic disproportion

c. with fetal malpresentation

d. with suspicion or evidence of fetal distress e.g. abnormal CTG or meconium

g. uterine abnormality e.g. bocornuate uterus

4. When there is current chorioamnionitis, unless adequate prior treatment has been instituted.

5. When there is hypersensitivity to misoprostol or to any of the excipients.

6. When there is placenta praevia or unexplained vaginal bleeding during the current pregnancy

7. **When known placental insufficiency i.e. IUGR, oligohydramnios , AEDF or REDF**

8. Severe PET or HELLP syndrome

Cautions (for Mysodelle®)

Caution should be exercised in the administration of Mysodelle ® for the induction of labour in patients with:

- >48 hours SRM

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG-this must be normal
2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart for insertion of Mysodelle® (Appendix 1and 2):

4. Woman to remain semi-recumbent for 30 minutes after insertion of pessary.

5. CTG- this must be normal

6. Women must remain as inpatients. They should be advised to inform staff if

i) Contractions become painful or regular (every 5 minutes)
ii) Vaginal bleeding
iii) SRM
iv)Reduced fetal movements
v) pessary falls out

Staff should review women to consider removal of the pessary

7. Women should be reviewed and the pessary should be removed 24 hours after insertion.

Indications for removal of Mysodelle®

Mysodelle® should be removed and the woman referred to the labour ward in the following situations

- Regular painful contractions (3 or more in 10 minutes) And lasting 45 sec or more
- BS ≥ 7
- There is evidence of uterine tachysystole, hypertonus or hyperstimulation
  Tachysystole = >5 contractions in 10 minutes with reassuring CTG
  Hypertonus = painful contraction lasting ≥ 90 seconds with reassuring CTG
  Hyperstimulation = tachysystole or hypertonus with non reassuring CTG
- Concerns about the fetal heart rate /CTG
- Vaginal bleeding
- evidence of maternal systemic adverse effect such as severe nausea or vomiting
- >24 hours since insertion.
- >12 hours after insertion where the indication is SRM

If the Mysodelle® pessary comes out it can be re-inserted if uncontaminated ie still partially in the vagina or on pad, otherwise it should be replaced by Propess®.
if the Bishops score has reached >4 when the pessary comes out it should only be replaced with Propess which can stay in for up to 24 hours. There should be a one hour delay between removal of Mysodelle® and insertion of Propess ®.

Side effects of Mysodelle®

Nausea and vomiting are sometimes reported as is genital pruritis.
Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypertonus, uterine hyperstimulation, abruption, rapid cervical dilation, meconium, fetal bradycardia or tachycardia /fetal distress.

- on the neonate low Apgar scores, transient tachypnoea of the newborn, acidosis, hypoxic ischaemic encephalopathy, neonatal respiratory distress

- on breast feeding no hazard at recommended dose.

Also skin reactions and irritation to eyes and mucus membranes- see SPC

Induction using Propess®

NICE[1] recommends that IOL with vaginal prostaglandin is the preferred method of induction unless there are specific clinical reasons for not using it eg. the risk of uterine hyperstimulation or previous caesarean section.
Propess® is the first line prostaglandin for use in induction in women with Parity 3 or less if there is no contra-indication. In primigravida women BS should be 5-7.

Contraindications to Propess® (as per SPC)

Propess® should not be used in women:

1. When labour has started.

2. When oxytocin drugs are being given.

3. When strong prolonged uterine contractions would be inappropriate such as in patients:

a. who have had previous major uterine surgery, e.g. caesarean section, myomectomy

b. with cephalopelvic disproportion

c. with fetal malpresentation

d. with suspicion or evidence of fetal distress

e. who have had more than three full term deliveries eg a Para 4 or more

f. previous surgery or rupture of the cervix

4. When there is current pelvic inflammatory disease, unless adequate prior treatment has been instituted.

5. When there is hypersensitivity to dinoprostone or to any of the excipients.

6. When there is placenta praevia or unexplained vaginal bleeding during the current pregnancy.

Cautions (for Propess®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG-this must be reassuring

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart for insertion of Propess® (Appendix 4 and 5):

4. Woman to remain semi-recumbent for 30 minutes after insertion of pessary.

5. CTG- this must be reassuring

6. Women who are being managed as an outpatient should be instructed to inform the hospital if:

i) Contractions become painful or regular (every 5 minutes)
ii) Vaginal bleeding
iii) SRM
iv)Reduced fetal movements
v) Propess® falls out

Staff should tell women to remove the pessary and attend the hospital immediately.

7. Telephone call or if inpatient review at 12 hours

8. Women should be reviewed and the Propess® pessary removed 24 hours after insertion.

Side effects of Propess®

Nausea, vomiting and diarrhoea are most commonly reported. Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Genital oedema.
Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypertonus, uterine hyperstimulation, abruption rapid cervical dilation, fetal bradycardia /fetal distress

- on the neonate, low Apgar scores, stillbirth, neonatal death

- on breast feeding no hazard at recommended dose.

Indications for removal of Propess®

- Propess should be removed and the woman transferred to the labour ward in the following situations
- Regular painful contractions (3 or more in 10 minutes)
- BS ≥ 7
- There is evidence of uterine tachysystole, hypertonus or hyperstimulation
  Tachysystole = ≥5 contractions in 10 minutes with reassuring CTG
  Hypertonus = painful contraction lasting ≥ 90 seconds with reassuring CTG
  Hyperstimulation = tachysystole or hypertonus with non reassuring CTG
- Concerns about the fetal heart rate /CTG
- Vaginal bleeding
- There is evidence of maternal systemic adverse effect such as severe nausea or vomiting

Induction using Dinoprostone tablets

NICE[1] recommends that IOL with vaginal prostaglandin is the preferred method of induction unless there are specific clinical reasons for not using it eg. the risk of uterine hyperstimulation or previous caesarean section.

Dinoprostone tablets may be used as 1st line for induction for women with **Parity 4 and 5** needing prostaglandin induction (only after Consultant Obstetrician review and consideration has been given to balloon induction). It may be used as a 2nd line agent if Propess® or Mysodellle ® has failed in women with parity 0-3 where amniotomy is not possible (See Appendix 4 and 7)

Contraindications to Dinoprostone tablets

Dinoprostone is not recommended in the following circumstances:

1. For women in whom oxytocic drugs are generally contraindicated:

a. previous caesarean section or major uterine surgery

b. cephalopelvic disproportion

c. fetal malpresentation

d. suspicion or evidence of fetal distress

e. grand multiparity with over 5 previous term pregnancies

2. Women with ruptured membranes

3. chorioamnionitis, unless adequate prior treatment has been instituted

4. Clinical suspicion or definite evidence of placenta praevia or explained vaginal bleeding during pregnancy

5. Active cardiac, pulmonary, renal or hepatic disease

6. When there is hypersensitivity to prostaglandins or to any of the excipients.

Cautions for dinoprostone

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG must be normal

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart (Appendix 7):

4. Woman to remain semi-recumbent for 30 minutes after each dose of tablet.

5. CTG must be normal

Side effects of Dinoprostone®
Nausea, vomiting and diarrhoea are most commonly reported. Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypertonus, uterine hyperstimulation, abruptio placentae, rapid cervical dilation, fetal bradycardia /fetal distress

- on the neonate, low Apgar scores, stillbirth, neonatal death
- on breast feeding no hazard at recommended dose.

Induction using Cervical Ripening Balloon – see separate guideline

Induction by Amniotomy

Amniotomy and oxytocin infusion should not be used as the primary method of induction unless there are specific indications eg, grand multiparity, contraindications to vaginal prostaglandin.
Booking and criteria as previously described.
Performed when the cervix is at least 2cm dilated and effacing and the fetal head is engaged.

1. Record the fetal heart rate before amniotomy

2. Record the colour and amount of liquor

3. A fetal heart rate should be obtained immediately following ARM

4. If FHR normal then the woman should be encouraged to mobilise

5. In primigravida with no uterine activity commence oxytocin immediately after amniotomy

6. In parous women, assess uterine activity after 2 hours

- If contracting 3:10, then VE 4 hours after ARM
- If contractions are < 3:10, then start oxytocin infusion

Once the oxytocin infusion has started a continuous CTG is required.

Oxytocin use in induction/augmentation of labour

1. Continuous CTG monitoring should be used if an oxytocin infusion is used.

2. Oxytocin infusion must not be started within 6 hours of administering Prostin E2 (dinoprostone) gel or within 30 minutes of removing a Propess® pessary. The dosage regime is as follows:

- Oxytocin 30 IU in 500ml of sodium chloride 0.9%

  1ml/hr = 1milliunit oxytocin per minute

The minimum dose possible should be used and this should be titrated against uterine contractions aiming for a maximum of 3 to 4 contractions in 10 minutes.

- Commence at 2ml/hr (2 milliunits per minute)
- Increase at intervals of 30 minutes using regime below

Rate	**Dose**
2ml/hr	2 milliunits per minute
4ml/hr	4 milliunits per minute
8ml/hr	8 milliunits per minute
12ml/hr	12 milliunits per minute
16ml/hr	16 milliunits per minute
20ml/hr	20 milliunits per minute
The licensed maximum dose is 20 milliunits per minute. If higher doses are required discuss with senior medical staff. The maximum dose should not exceed 32 ml/hr (32 millunits per minute)	
24ml/hr	**24 milliunits per minute**
28ml/hr	**28 milliunits per minute**
32ml/hr	**32 milliunits per minute**

In the event of a non reassuring CTG, the oxytocin infusion should be discontinued and senior obstetric sought.

Contraindications

- Known hypersensitivity to any constituents of the product
- Hypertonic uterine contractions
- Vaginal delivery contraindicated
- Fetal compromise or malpresentation
- Known cephalopelvic disproportion
- Placenta praevia
- Vasa praevia
- Placental abruption
- Cord presentation or prolapse

Potential adverse reactions to oxytocin
Administration at too high doses results in uterine overstimulation which may cause fetal distress, asphyxia, and death, or may lead to hypertonicity, tetanic contractions, soft tissue damage or rupture of the uterus.

- Nausea and vomiting
- Headache
- Rash
- Cardiac arrhythmias
- Anaphylactoid reactions
- Uterine hyperstimulation & ruptured uterus
- Rapid IV administration may lead to acute hypotension
- Water intoxication

Cautions

Oxytocin has a slight anti-diuretic activity so prolonged IV use at high doses in conjunction with large volumes of fluid, may cause water intoxication (see side-effects) and hyponatraemia. To avoid this rare complication, the following precautions must be observed: Administer oxytocin in sodium chloride 0.9% (not glucose); restrict fluid intake by mouth.

Special precautions:
- Presence of uterine scar.
- Avoid prolonged use in patients with severe PIH.
- It should not be used for prolonged periods in patients with oxytocin-resistant uterine inertia, severe pre-eclamptic toxaemia or severe cardiovascular disorders.

If a caution applies then decision to use should be made by a Consultant Obstetrician

Non routine use of oxytocin in induction/augmentation of labour

Examples include:

- Presence of uterine scar
- Non-reassuring CTG
- Breech presentation
- Multiple pregnancy
- Grand multiparity
- Severe pre-eclampsia

An oxytocin infusion should only be started after discussion and agreement with a Consultant Obstetrician. This discussion should be clearly documented in Maternity Trak and should include maximum dose and rate of increase and time for further review. In the interest of safety the rate should not exceed 8ml/hour without discussion/review by a Consultant Obstetrician

The minimum dose possible should be used and this should be titrated against uterine contractions aiming for a maximum of 3 to 4 contractions in 10 minutes

Starting oxytocin in the 2nd stage of labour

In the event of oxytocin augmentation being required in the second stage of labour, advice must be sought from senior obstetric staff. The recommended rate of increase should be documented in the patient's notes.

SEE OXYTOCIN GUIDELINE

Induction of labour for women with pre labour rupture of membranes at term

Induction of labour is appropriate approximately 24-48 hours after rupture of membranes. The interval between rupture of membranes and commencement of the induction process should not exceed 72 hours, unless the woman specifically requests this. Women wishing to wait longer than 72 hours should be discussed with their Consultant Obstetrician and offered an appointment with a Senior Obstetrician.

Women with meconium stained liquor or Group B Streptococcus should be augmented immediately.

There is evidence that in women with an unfavourable cervix and ruptured membranes, the use of oxytocin is less effective than vaginal PGE2 in achieving a vaginal birth within 24 hours[1]. See appendix 8

1. Take temperature, pulse and blood pressure. If temperature >37.5 then perform a septic screen and commence antibiotics

2. CTG. If temperature is elevated then commence continuous fetal heart rate monitoring

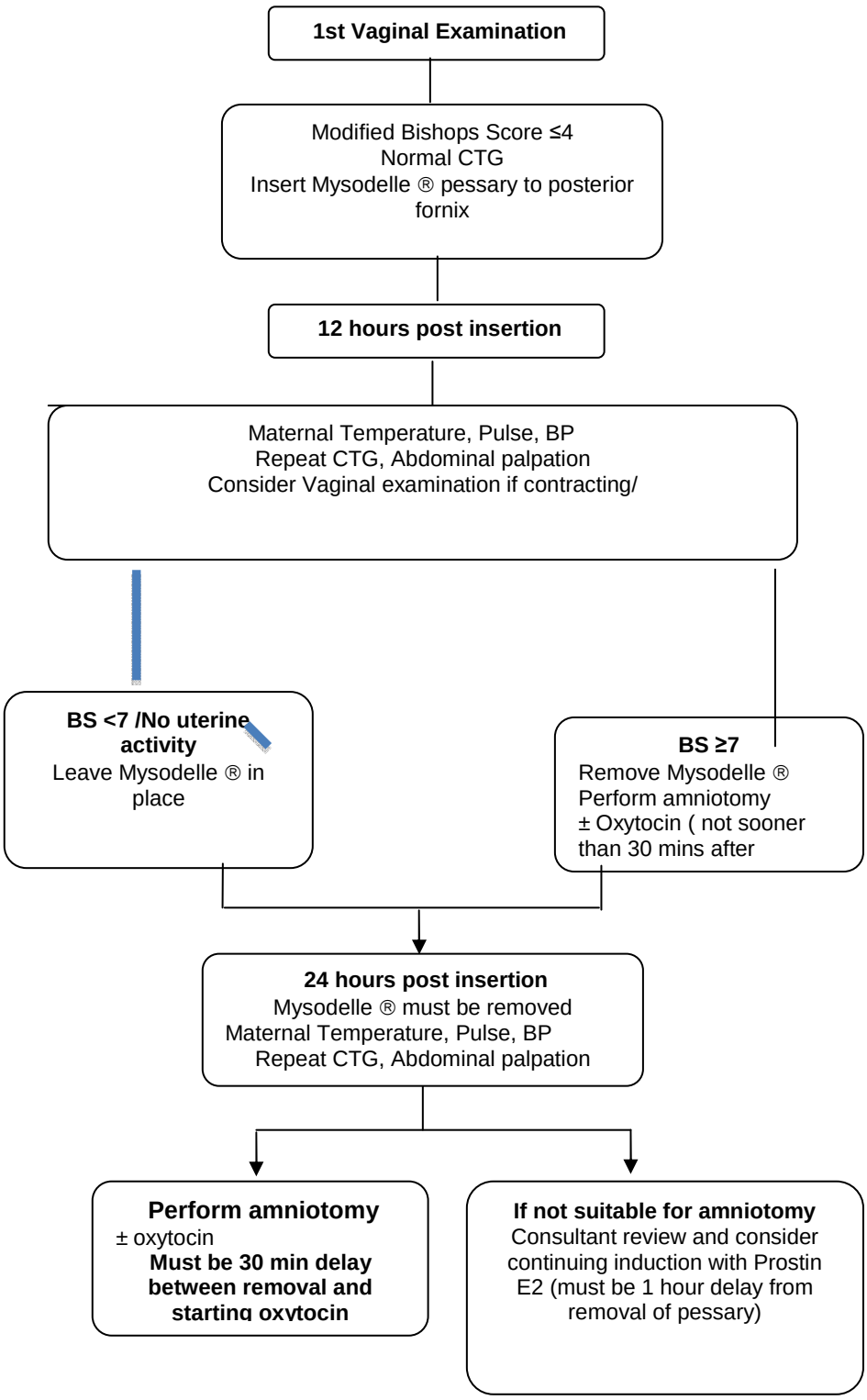
3. Vaginal assessment and follow chart (Appendix 8)

Prim BS≤4 Mysodelle ®

Prim BS 5-7 or para 1- 3 with Bishops score <7 for Propess pessary and review at 12 hours (See Appendix 5,8)

Para 4 or more-Commence intravenous oxytocin due to risk of hyperstimulation even if cervix is unfavourable

Appendix 1- Induction process using Mysodelle® (Primigravida with unfavourable cervix)



Appendix 2- Insertion of Mysodelle® pessary

1.Storage of pessary is in freezer and no thawing is required.
Do not use scissors or sharp object to open the packet

2. Insert pessary high into the posterior fornix using aquagel

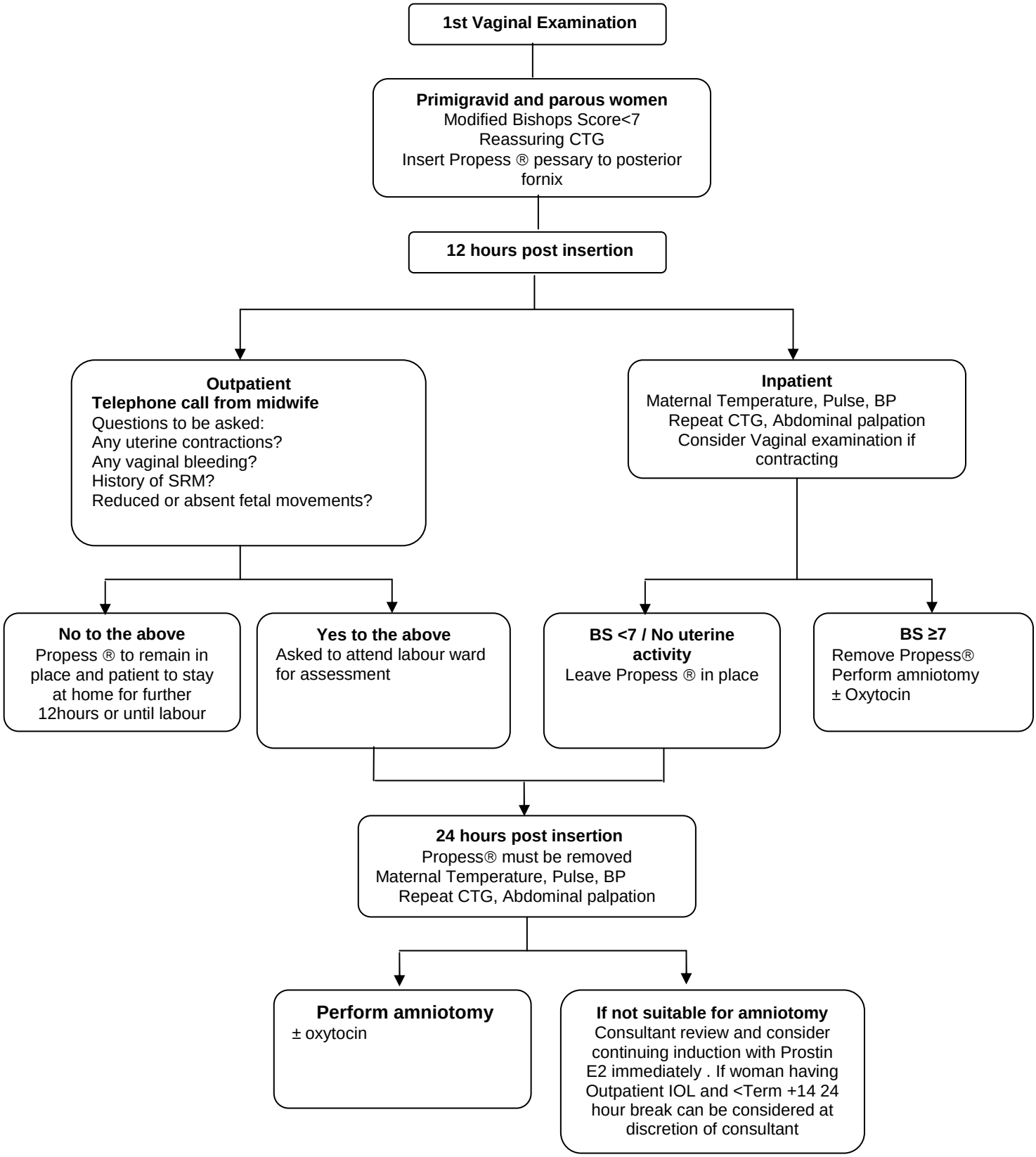
3. The pessary should lie transversely in the posterior fornix

4. After pessary has been inserted the withdrawal tape may be cut or excess tape placed in the lower part of the vagina but ensure that there is sufficient tape outside the vagina to allow removal.

Appendix 3- Management if there is spontaneous rupture of membranes with Mysodelle® in the vagina

Inpatient:
Commence CTG
Assess contractions
If contractions are 3 or more in 10 minutes then remove pessary and transfer to Labour Ward
If there are no contractions perform a speculum examination if this is needed to confirm the diagnosis and then perform VE:
If BS<7, pessary can be left in place until can be transferred to Labour ward for oxytocin
If BS ≥ 7 then pessary to be removed and transfer to Labour ward

Appendix 4- Induction process using Propess® (Women Para 3 or less)



Appendix 5- Insertion of Propess® pessary

1. Ensure that Propess ®pessary is adminsistered within 20 minutes after removal form the fridge.

2. Insert Propess ® high into the posterior fornix using aquagel

3. The pessary® should lie transversely in the posterior fornix

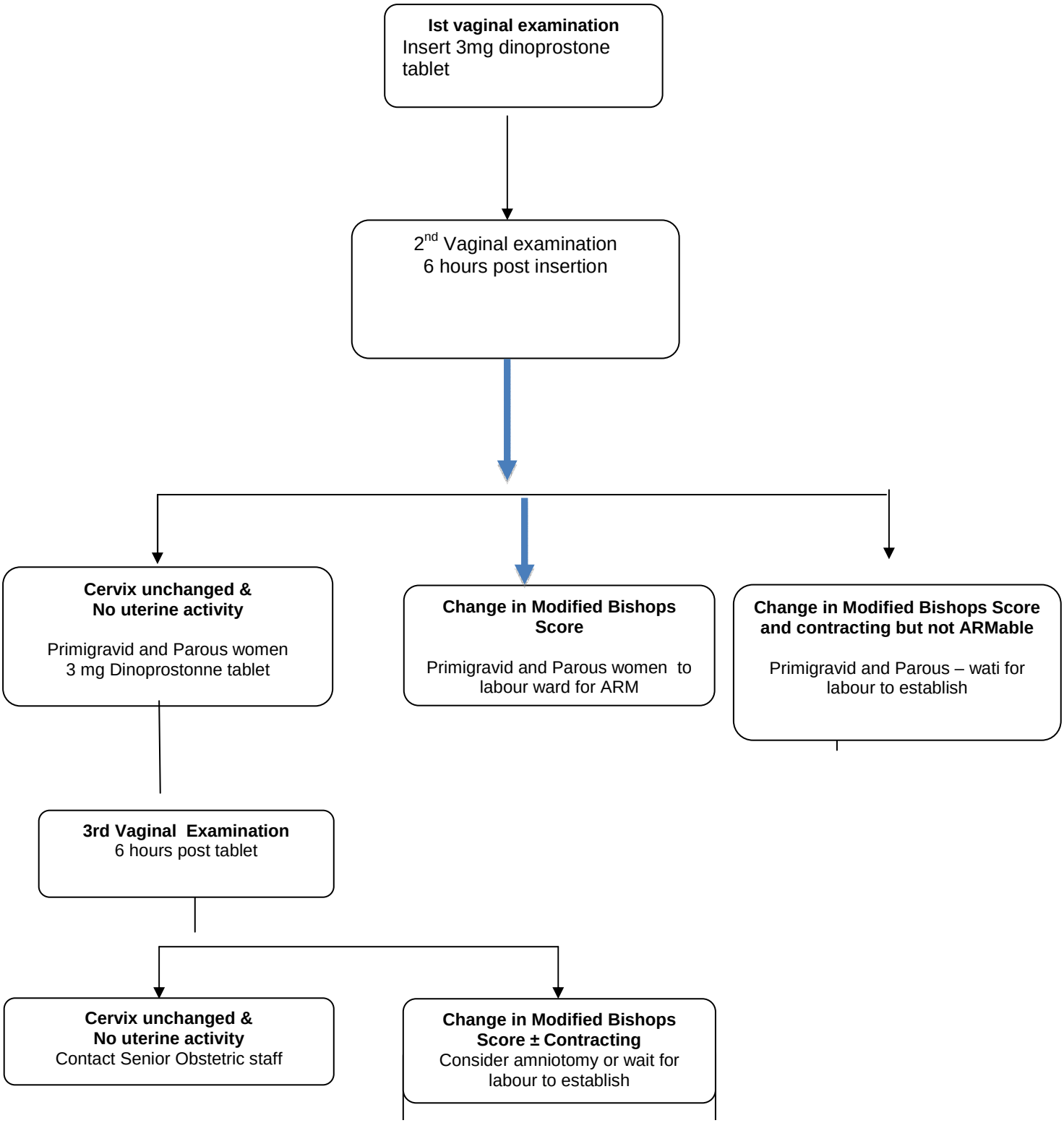
4. After Propess ®has been inserted the withdrawal tape may be cut or excess tape placed in the lower part of the vagina but ensure that there is sufficient tape outside the vagina to allow removal.

Appendix 6- Management if there is spontaneous rupture of membranes with Propess® in the vagina

Inpatient:
Commence CTG
Assess contractions
If contractions are 3 or more in 10 minutes then remove Propess® and transfer to Labour Ward
If there are no contractions perform a speculum examination if this is needed to confirm the diagnosis and then perform VE:
If BS<7, Propess® can be left in place until can be transferred to Labour ward for oxytocin
If BS ≥ 7 then Propess® to be removed and transfer to Labour ward

Outpatient
Patient to telephone hospital
Staff to ask the following questions:
Colour of the liquor
Fetal movements
Are the contractions 3 or more in 10 minutes
Ask to attend
If contractions 3 or more in 10 minutes then ask patient to remove Propess® immediately

Appendix 7- Induction using Dinoprostone tablets – usually in primigravid or parous, following Propess® or Mysodelle® 24 hours and no uterine activity or unsuitable for ARM

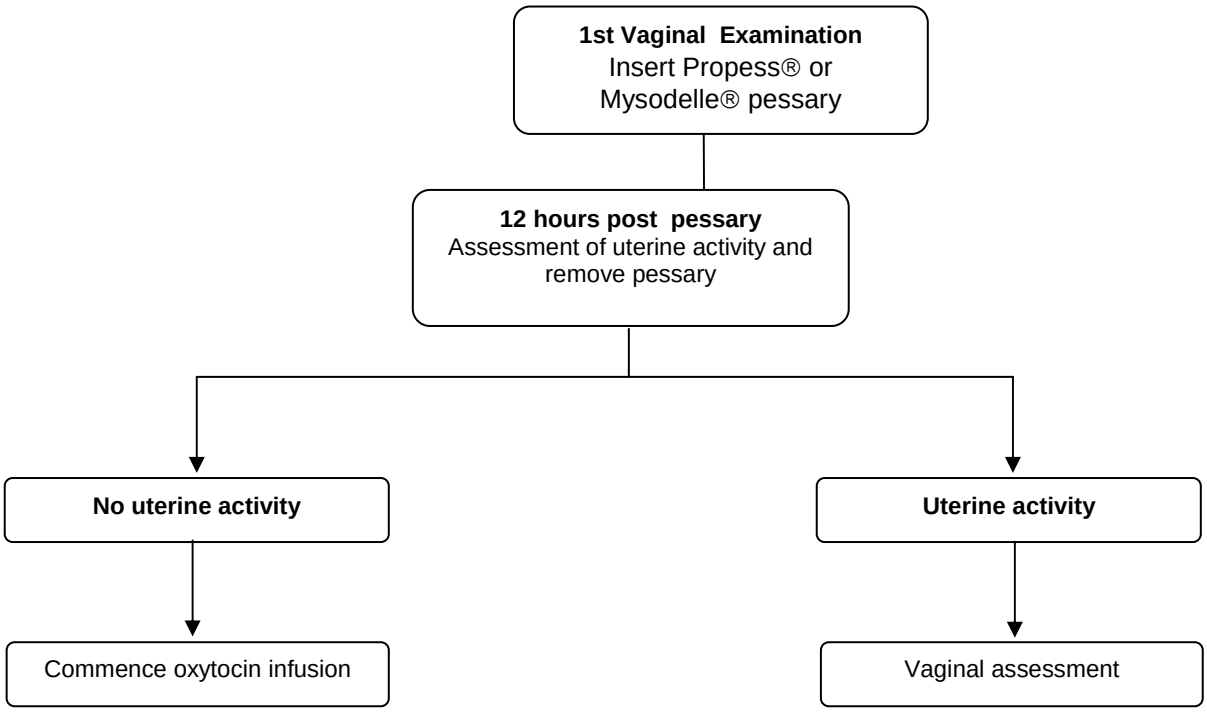


* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

Appendix 8
Induction of women with pre-labour rupture of membranes at term

Primigravid woman BS ≤ 4 use Mysodelle ®
Para 3 or less/no uterine surgery/prim BS 5-7 use Propess ®

Para 3 or less



Para 4 or more

Should not receive any prostaglandins and should commence an oxytocin infusion
(See page 6)

Appendix 9

Induction using of Prostin E2® vaginal gel (2nd line agent when no dinoprostone tablets in stock)

NICE[1] recommends that IOL with vaginal prostaglandin is the preferred method of induction unless there are specific clinical reasons for not using it eg. the risk of uterine hyperstimulation or previous caesarean section.

Prostin E2® gel may be used as 1st line for induction for women with **Parity 4 and 5** needing prostaglandin induction (only Consultant Obstetrician review and consideration has been given to balloon induction). It may be used as a 2nd line agent if Propess® has failed in women with parity 0-3 where amniotomy is not possible (See Appendix 4 and 7)

Contraindications to Prostin E2®

Dinoprostone is not recommended in the following circumstances:

1. For women in whom oxytocic drugs are generally contraindicated:

a. previous caesarean section or major uterine surgery

b. cephalopelvic disproportion

c. fetal malpresentation

d. suspicion or evidence of fetal distress

e. grand multiparity with over 5 previous term pregnancies

2. Women with ruptured membranes

3. Past history of or existing, pelvic inflammatory disease, unless adequate prior treatment has been instituted

4. Clinical suspicion or definite evidence of placenta praevia or explained vaginal bleeding during pregnancy

5. Active cardiac, pulmonary, renal or hepatic disease

6. When there is hypersensitivity to prostaglandins or to any of the excipients.

Cautions (for Prostin E2®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG must be normal

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart (Appendix 2):

4. Woman to remain semi-recumbent for 30 minutes after each dose of gel.

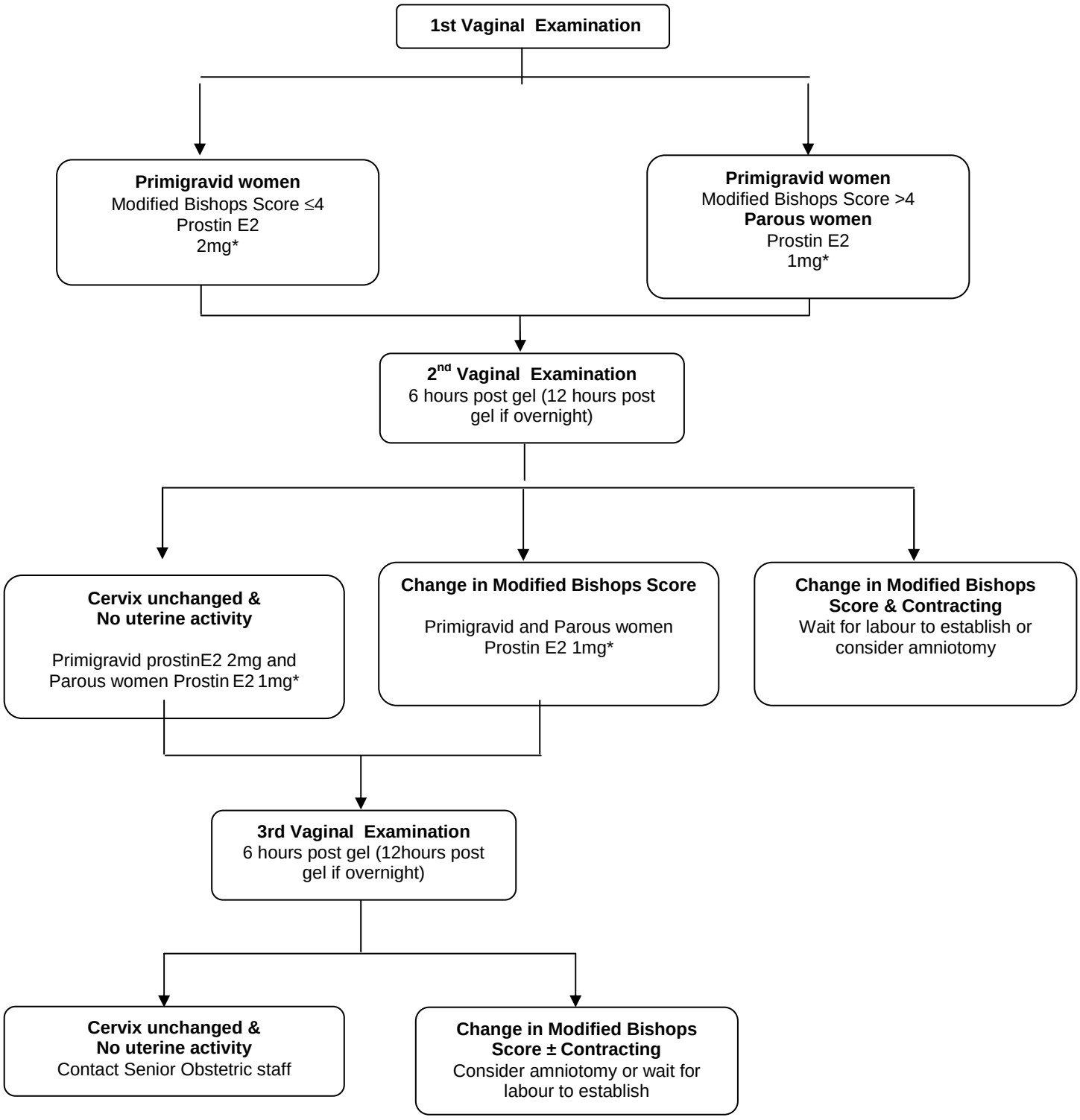
5. CTG must be normal

Side effects of Prostin E2®
Nausea, vomiting and diarrhoea are most commonly reported. Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypertonus, uterine hyperstimulation, abruptio placentae, rapid cervical dilation, fetal bradycardia /fetal distress

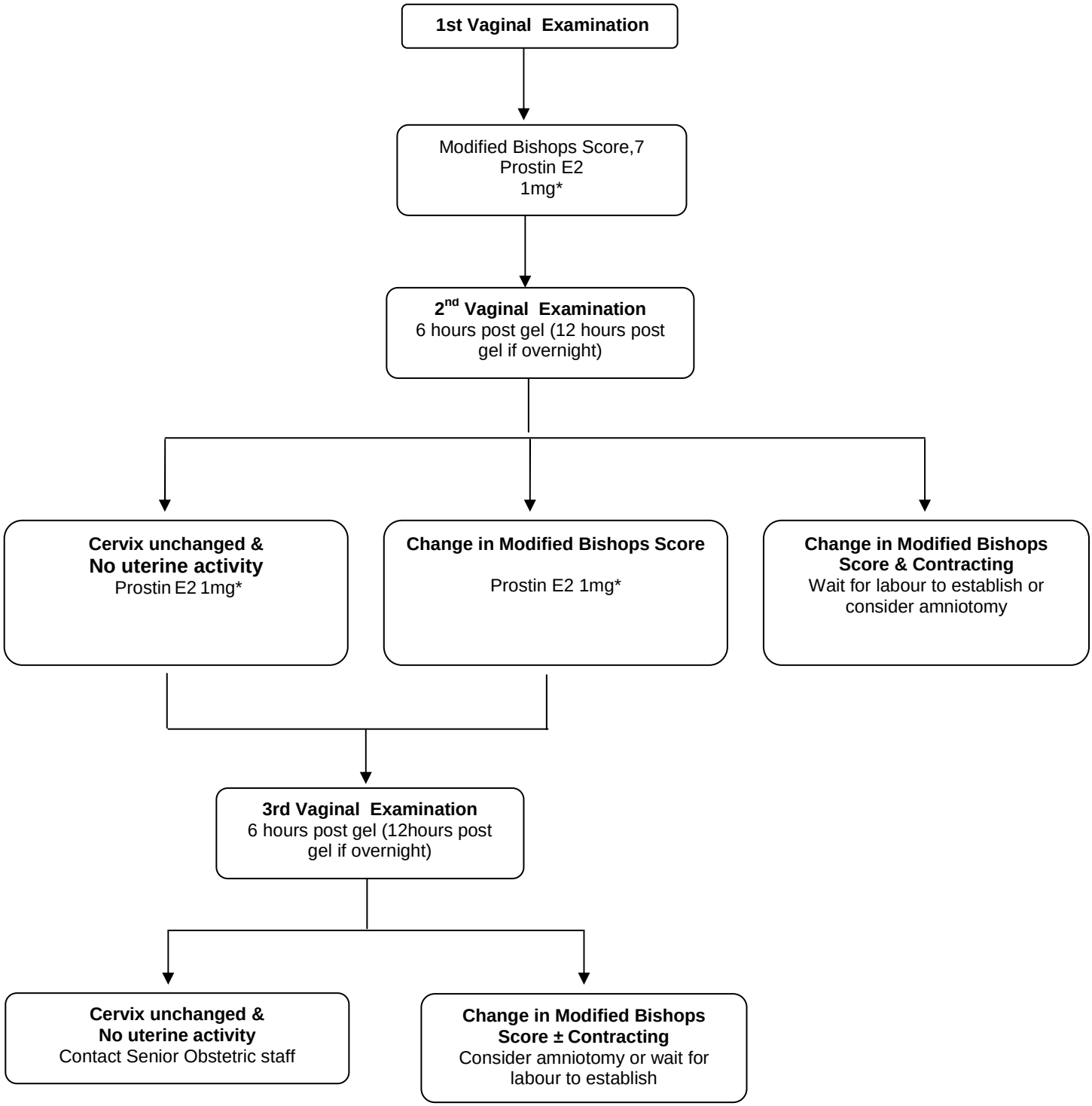
- on the neonate, low Apgar scores, stillbirth, neonatal death
- on breast feeding no hazard at recommended dose.

Appendix 9b- Induction using Prostin E2® gel (dinoprostone) after use of Propess®® or Mysodelle® for Women Para 3 or less



* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

Appendix 10- Induction using Prostin E2® gel (dinoprostone) for women Para 4 or 5



4. ASSOCIATED DOCUMENTS:

Uterine Hyperstimulation guideline
Fetal monitoring guideline
Prelabour rupture membranes at term guideline
Group B streptococcus management
PGD Propess and Dinoprostone
Induction with cervical ripening balloon
http://intranet.lothian.scot.nhs.uk/NHSLothian/Healthcare/A-Z/MedicinesManagement/PatientGroupDirections/Documents/Acute%20Services%20PGDs/PGD%20236v1%20-%20Dinoprostone%20-%20Propess%20for%20induction%20of%20Labour%20%20-%20Midwives.pdf

5. REFERENCES:

[1] NICE Induction of labour Clinical Guideline 2008
[2] NICE Intrapartum care Clinical Guideline 2007

[4]eMC- Prostin E2 Vaginal gel 1mg, 2mg- Summary of product characteristics (SPC)
[4]eMC- Propess 10mg- Summary of product characteristics (SPC)
[4]eMC- Syntocinon - Summary of product characteristics (SPC)

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Induction of labour
Maternity Services Lothian
Guidelines

NHS Lothian

1. INTRODUCTION:

Induction of labour is common and associated with increased intervention rates. This guideline aims to prevent inappropriate induction of labour and provide a standard care pathway for those induced.

2. AIM:

To provide all staff in maternity care with access to clear guidance on the indications for induction of labour, the referral pathway and the process of labour induction.

3. GUIDELINES:

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Induction of labour – criteria and booking

1) Postdates

The most frequent indication is for prolonged pregnancy to avoid late stillbirth that occurs in 2-3/1000 pregnancies at 42 weeks. Staff may offer induction between 10-14 days post EDD, when induction reduces perinatal mortality without increasing the caesarean section rate[1]. Staff are able to refuse unless gestation is at least T+10 AND a vaginal examination has been performed in the clinic to assess the Bishops score. All women should be offered a membrane sweep at this VE unless this has already been performed.

Midwifery staff are able to organise induction of labour for low risk women who are **Para 3 or less**. They must complete the Induction assessment questionnaire (Maternity TRAK) and if all the induction risk assessment questions are answered 'Yes' then induction can be booked.

The following criteria have to be met for **outpatient induction** of labour to be appropriate:
Low risk (no significant maternal or fetal risk factors)
Post dates (Term+10-14)
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 72hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

On arrival for induction of labour the midwife should continue the induction assessment questionnaire ensuring that she has completed the risk assessments questions and performed a Modified Bishops Score. If all risk assessment questions are answered 'Yes' and the Modified Bishops Score is <7 then the midwife may administer Propess or Mysodelle under the PGD

All women who are **Para 4 or more** should have an appointment with a senior Obstetrician between Term and Term+12. This group of women are never suitable for outpatient induction of labour with prostaglandins

2) Maternal age 40yrs or more at time of booking

In this group the risk of stillbirth is increased and therefore induction of labour at term should be considered. All women in this group are offered serial growth scans and antenatal review by a consultant. At one of these consultations induction at term will be discussed and offered and the individualised care plan documented.

Women aged 40 years or more declining IOL at term

Fetal monitoring should start at 40 weeks. This should be a CTG and LV performed on that day or nearest Friday/ Monday if falls on a weekend. This should then be repeated weekly until delivery AND further discussion arranged with a Consultant if still declining IOL at term +14.

3) <u>Maternal and fetal reasons.</u>

Although a variety of specific circumstances may indicate the need for induction of labour with a greater or lesser degree of urgency, the essential judgement that the clinician and the pregnant woman must make is whether the interests of the mother or the baby, or both, will be better served by ending or continuing the pregnancy[1]. The decision to undertake IOL in these circumstances needs to be clear and clinically justified and discussed with a Consultant and requires an individual documented induction plan.

Contraindications to Induction of labour

Absolute:

Severe Intra uterine growth retardation with evidence of fetal compromise

Relative:

Previous uterine surgery

Grand multiparity (Para 6 or more)

Booking appointments

To book induction slots phone

Ward 119 tel 0131 2422475/2421191 at RIE

ward 11 01506524111 at St Johns

If outpatient induction IOL being considered ensure that the patient has an appointment for a liquor volume scan prior to attending for induction.

Methods of Induction of labour

1) Membrane sweep

2) Mysodelle® pessary

3) Propess ® pessary

4) Dinoprostone tablets (or prostin gel if unavailable)

5) Balloon cervical ripening

6) Amniotomy

7) Oxytocin infusion

Women should be advised as to their induction options antenatally and be included in the decision making process for their induction having been given advice and the patient information leaflet. The aim for induction should always be to use the least intervention needed. Each woman should have an individualised induction plan to optimise her care.

First line induction for main groups

1 Primigravid women with BS ≤ 4 and no fetal compromise should be offered induction with Mysodelle as an inpatient, however outpatient induction with Propess® remains an option if meet other criteria i.e T+10-14 – they should be advised process may take longer with Propess®.

2.Primigravid women having post dates induction T+10-14 with no other risk factors should be offered outpatient induction with Propess ® however if the BS ≤ 4, they should be offered Mysodelle® as inpatient instead and should be advised this may be more effective.

3. Primigravid women with BS 5-7 and para 1-3 (no uterine surgery) with Bs< 7 should be offered Propess®

4.Women who are ≥para 4 and any woman with a previous CS needing induction who cannot have an ARM should be offered balloon induction. Occasionally para 4 or 5 with no uterine surgery may be offered dinoprostone 1mg gel as alternative – CONSULTANT DECISION ONLY.

Membrane sweeping

It is already well established and routine practice to offer membrane sweeps to women prior to admission for induction as this significantly reduces the need for induction and improves the modified Bishops score (Cochrane 2005). It is thought to be effective by increasing local endogenous production of prostaglandins.

There is evidence to suggest that membrane sweeping at the initiation of induction of labour increases the SVD rate, reduces the induction to delivery interval and reduces the use of oxytocin. Women's satisfaction with the process is improved even though the sweep is associated with greater discomfort at the time of insertion of prostaglandins or amniotomy (Tan 2006). There is also evidence suggesting benefits from repeated membrane sweeping.

To perform a sweep, a finger is inserted as high as possible through the internal cervical os and the membranes are swept off the lower pole of the uterus by a complete circular sweep of the finger, once clockwise and once anticlockwise. If the internal os is closed the cervical canal should be 'swept'. During this process a modified Bishops score should be calculated and clearly documented in Maternity Trak. The fetal heart should be auscultated prior to and after the membrane sweep and documented.

At both 40 and 41 weeks women should be offered a vaginal examination for membrane sweeping. Additional membrane sweeping may be offered if labour does not start spontaneously. This may be done prior to 40 weeks if authorised by medical staff.

Outpatient induction of labour with Propess®

Criteria
Low risk (no significant maternal or fetal risk factors)
Post dates (Term+10-14)
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7 (primigravid women with BS ≤ 4 should be offered Mysodelle as inpatient)
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 72 hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

Post treatment
After insertion of the Propess® pessary women should remain recumbent for 30 minutes. Thereafter, a 30 minute CTG should be performed. If reassuring, no further monitoring is required unless SRM or uterine activity occurs. Women may go home and be managed on an outpatient basis. Ensure they have the IOL patient information leaflet prior to going home and are advised to contact the relevant hospital if uterine activity occurs, SRM or any other concerns eg. reduced fetal movements, vaginal bleeding and women should be advised to remove the Propess® pessary and **attend the hospital immediately**. Women are asked to contact the hospital by telephone after 12 hours

Inpatient induction of labour

Where inpatient induction of labour is being undertaken for maternal or fetal reasons an individualised plan for induction should be clearly documented in the patient's medical records. These women may need a medical review before commencing the induction process Prior to the onset of uterine activity the fetal heart should be auscultated as a minimum every 2 hours, when awake.

Induction of labour for women with pre labour rupture of membranes at term

Induction of labour is appropriate approximately 24 hours after rupture of membranes. The interval between rupture of membranes and commencement of the induction process should not exceed 36 hours, unless the woman specifically requests this. Women wishing to wait longer than 72 hours should be discussed with their Consultant Obstetrician and offered an appointment with a Senior Obstetrician. Women with BS≤4 with SRM may have Mysodelle ® for 12 hours instead of Propess®.

Women with meconium stained liquor or Group B Streptococcus should be augmented immediately.

Induction using Mysodelle®

Mysodelle 200 micrograms is a first line misoprostol vaginal delivery for use in induction in nulliparous women, singleton pregnancy from 36 weeks with modified bishop's score of ≤ 4, if there is no contra-indication.

Contraindications to Mysodelle® (as per SPC)

Mysodelle® should not be used in women:

1. When labour has started.

2. When oxytocin or dinoprostone are being given.

3. When strong prolonged uterine contractions would be inappropriate such as in patients:

a. who have had previous major uterine surgery, e.g. myomectomy

b. with cephalopelvic disproportion

c. with fetal malpresentation

d. with suspicion or evidence of fetal distress e.g. abnormal CTG or thick fresh meconium

g. uterine abnormality e.g. bocornuate uterus

4. When there is current chorioamnionitis, unless adequate prior treatment has been instituted.

5. When there is hypersensitivity to misoprostol or to any of the excipients.

6. When there is placenta praevia or unexplained vaginal bleeding during the current pregnancy

7. **When known placental insufficiency i.e. IUGR, oligohydramnios , AEDF or REDF**

8. Severe PET or HELLP syndrome

Cautions (for Mysodelle®)

Caution should be exercised in the administration of Mysodelle ® for the induction of labour in patients with:

- >48 hours SRM

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG-this must be normal
2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart for insertion of Mysodelle® (Appendix 1and 2):

4. Woman to remain semi-recumbent for 30 minutes after insertion of pessary.

5. CTG- this must be normal

6. Women must remain as inpatients. They should be advised to inform staff if

i) Contractions become painful or regular (every 5 minutes)
ii) Vaginal bleeding
iii) SRM
iv)Reduced fetal movements
v) pessary falls out

Staff should review women to consider removal of the pessary

7. Women should be reviewed and the pessary should be removed 24 hours after insertion.

Indications for removal of Mysodelle®

Mysodelle® should be removed and the woman referred to the labour ward in the following situations

- Regular painful contractions (3 or more in 10 minutes) And lasting 45 sec or more
- BS ≥ 7
- There is evidence of uterine tachysystole, hypertonus or hyperstimulation
  Tachysystole = >5 contractions in 10 minutes with reassuring CTG
  Hypertonus = painful contraction lasting ≥ 90 seconds with reassuring CTG
  Hyperstimulation = tachysystole or hypertonus with non reassuring CTG
- Concerns about the fetal heart rate /CTG
- Vaginal bleeding
- evidence of maternal systemic adverse effect such as severe nausea or vomiting
- >24 hours since insertion.
- >12 hours after insertion where the indication is SRM

If the Mysodelle® pessary comes out it can be re-inserted if uncontaminated ie still partially in the vagina or on pad, otherwise it should be replaced by Propess®.
if the Bishops score has reached >4 when the pessary comes out it should only be replaced with Propess which can stay in for up to 24 hours. There should be a one hour delay between removal of Mysodelle® and insertion of Propess ®.

Side effects of Mysodelle®

Nausea and vomiting are sometimes reported as is genital pruritis.
Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypertonus, uterine hyperstimulation, abruption, rapid cervical dilation, meconium, fetal bradycardia or tachycardia /fetal distress.

- on the neonate low Apgar scores, transient tachypnoea of the newborn, acidosis, hypoxic ischaemic encephalopathy, neonatal respiratory distress

- on breast feeding no hazard at recommended dose.

Also skin reactions and irritation to eyes and mucus membranes- see SPC

Induction using Propess®

NICE[1] recommends that IOL with vaginal prostaglandin is the preferred method of induction unless there are specific clinical reasons for not using it eg. the risk of uterine hyperstimulation or previous caesarean section.
Propess® is the first line prostaglandin for use in induction in women with Parity 3 or less if there is no contra-indication. In primigravida women BS should be 5-7.

Contraindications to Propess® (as per SPC)

Propess® should not be used in women:

1. When labour has started.

2. When oxytocin drugs are being given.

3. When strong prolonged uterine contractions would be inappropriate such as in patients:

a. who have had previous major uterine surgery, e.g. caesarean section, myomectomy

b. with cephalopelvic disproportion

c. with fetal malpresentation

d. with suspicion or evidence of fetal distress

e. who have had more than three full term deliveries eg a Para 4 or more

f. previous surgery or rupture of the cervix

4. When there is current pelvic inflammatory disease, unless adequate prior treatment has been instituted.

5. When there is hypersensitivity to dinoprostone or to any of the excipients.

6. When there is placenta praevia or unexplained vaginal bleeding during the current pregnancy.

Cautions (for Propess®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG-this must be reassuring

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart for insertion of Propess® (Appendix 4 and 5):

4. Woman to remain semi-recumbent for 30 minutes after insertion of pessary.

5. CTG- this must be reassuring

6. Women who are being managed as an outpatient should be instructed to inform the hospital if:

i) Contractions become painful or regular (every 5 minutes)
ii) Vaginal bleeding
iii) SRM
iv)Reduced fetal movements
v) Propess® falls out

Staff should tell women to remove the pessary and attend the hospital immediately.

7. Telephone call or if inpatient review at 12 hours

8. Women should be reviewed and the Propess® pessary removed 24 hours after insertion.

Side effects of Propess®

Nausea, vomiting and diarrhoea are most commonly reported. Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Genital oedema.
Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypertonus, uterine hyperstimulation, abruption rapid cervical dilation, fetal bradycardia /fetal distress

- on the neonate, low Apgar scores, stillbirth, neonatal death

- on breast feeding no hazard at recommended dose.

Indications for removal of Propess®

- Propess should be removed and the woman transferred to the labour ward in the following situations
- Regular painful contractions (3 or more in 10 minutes)
- BS ≥ 7
- There is evidence of uterine tachysystole, hypertonus or hyperstimulation
  Tachysystole = ≥5 contractions in 10 minutes with reassuring CTG
  Hypertonus = painful contraction lasting ≥ 90 seconds with reassuring CTG
  Hyperstimulation = tachysystole or hypertonus with non reassuring CTG
- Concerns about the fetal heart rate /CTG
- Vaginal bleeding
- There is evidence of maternal systemic adverse effect such as severe nausea or vomiting

Induction using Dinoprostone tablets

NICE[1] recommends that IOL with vaginal prostaglandin is the preferred method of induction unless there are specific clinical reasons for not using it eg. the risk of uterine hyperstimulation or previous caesarean section.

Dinoprostone tablets may be used as 1st line for induction for women with **Parity 4 and 5** needing prostaglandin induction (only after Consultant Obstetrician review and consideration has been given to balloon induction). It may be used as a 2nd line agent if Propess® or Mysodellle ® has failed in women with parity 0-3 where amniotomy is not possible (See Appendix 4 and 7)

Contraindications to Dinoprostone tablets

Dinoprostone is not recommended in the following circumstances:

1. For women in whom oxytocic drugs are generally contraindicated:

a. previous caesarean section or major uterine surgery

b. cephalopelvic disproportion

c. fetal malpresentation

d. suspicion or evidence of fetal distress

e. grand multiparity with over 5 previous term pregnancies

2. Women with ruptured membranes

3. chorioamnionitis, unless adequate prior treatment has been instituted

4. Clinical suspicion or definite evidence of placenta praevia or explained vaginal bleeding during pregnancy

5. Active cardiac, pulmonary, renal or hepatic disease

6. When there is hypersensitivity to prostaglandins or to any of the excipients.

Cautions for dinoprostone

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG must be normal

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart (Appendix 7):

4. Woman to remain semi-recumbent for 30 minutes after each dose of tablet.

5. CTG must be normal

Side effects of Dinoprostone®
Nausea, vomiting and diarrhoea are most commonly reported. Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypertonus, uterine hyperstimulation, abruptio placentae, rapid cervical dilation, fetal bradycardia /fetal distress

- on the neonate, low Apgar scores, stillbirth, neonatal death
- on breast feeding no hazard at recommended dose.

Induction using Cervical Ripening Balloon – see separate guideline

Induction by Amniotomy

Amniotomy and oxytocin infusion should not be used as the primary method of induction unless there are specific indications eg, grand multiparity, contraindications to vaginal prostaglandin.
Booking and criteria as previously described.
Performed when the cervix is at least 2cm dilated and effacing and the fetal head is engaged.

1. Record the fetal heart rate before amniotomy

2. Record the colour and amount of liquor

3. A fetal heart rate should be obtained immediately following ARM

4. If FHR normal then the woman should be encouraged to mobilise

5. In primigravida with no uterine activity commence oxytocin immediately after amniotomy

6. In parous women, assess uterine activity after 2 hours

- If contracting 3:10, then VE 4 hours after ARM
- If contractions are < 3:10, then start oxytocin infusion

Once the oxytocin infusion has started a continuous CTG is required.

Oxytocin use in induction/augmentation of labour

1. Continuous CTG monitoring should be used if an oxytocin infusion is used.

2. Oxytocin infusion must not be started within 6 hours of administering Prostin E2 (dinoprostone) gel or within 30 minutes of removing a Propess® pessary. The dosage regime is as follows:

- Oxytocin 30 IU in 500ml of sodium chloride 0.9%

  1ml/hr = 1milliunit oxytocin per minute

The minimum dose possible should be used and this should be titrated against uterine contractions aiming for a maximum of 3 to 4 contractions in 10 minutes.

- Commence at 2ml/hr (2 milliunits per minute)
- Increase at intervals of 30 minutes using regime below

Rate	**Dose**
2ml/hr	2 milliunits per minute
4ml/hr	4 milliunits per minute
8ml/hr	8 milliunits per minute
12ml/hr	12 milliunits per minute
16ml/hr	16 milliunits per minute
20ml/hr	20 milliunits per minute
The licensed maximum dose is 20 milliunits per minute. If higher doses are required discuss with senior medical staff. The maximum dose should not exceed 32 ml/hr (32 millunits per minute)	
24ml/hr	**24 milliunits per minute**
28ml/hr	**28 milliunits per minute**
32ml/hr	**32 milliunits per minute**

In the event of a non reassuring CTG, the oxytocin infusion should be discontinued and senior obstetric sought.

Contraindications

- Known hypersensitivity to any constituents of the product
- Hypertonic uterine contractions
- Vaginal delivery contraindicated
- Fetal compromise or malpresentation
- Known cephalopelvic disproportion
- Placenta praevia
- Vasa praevia
- Placental abruption
- Cord presentation or prolapse

Potential adverse reactions to oxytocin
Administration at too high doses results in uterine overstimulation which may cause fetal distress, asphyxia, and death, or may lead to hypertonicity, tetanic contractions, soft tissue damage or rupture of the uterus.

- Nausea and vomiting
- Headache
- Rash
- Cardiac arrhythmias
- Anaphylactoid reactions
- Uterine hyperstimulation & ruptured uterus
- Rapid IV administration may lead to acute hypotension
- Water intoxication

Cautions

Oxytocin has a slight anti-diuretic activity so prolonged IV use at high doses in conjunction with large volumes of fluid, may cause water intoxication (see side-effects) and hyponatraemia. To avoid this rare complication, the following precautions must be observed: Administer oxytocin in sodium chloride 0.9% (not glucose); restrict fluid intake by mouth.

Special precautions:
- Presence of uterine scar.
- Avoid prolonged use in patients with severe PIH.
- It should not be used for prolonged periods in patients with oxytocin-resistant uterine inertia, severe pre-eclamptic toxaemia or severe cardiovascular disorders.

If a caution applies then decision to use should be made by a Consultant Obstetrician

Non routine use of oxytocin in induction/augmentation of labour

Examples include:

- Presence of uterine scar
- Non-reassuring CTG
- Breech presentation
- Multiple pregnancy
- Grand multiparity
- Severe pre-eclampsia

An oxytocin infusion should only be started after discussion and agreement with a Consultant Obstetrician. This discussion should be clearly documented in Maternity Trak and should include maximum dose and rate of increase and time for further review. In the interest of safety the rate should not exceed 8ml/hour without discussion/review by a Consultant Obstetrician

The minimum dose possible should be used and this should be titrated against uterine contractions aiming for a maximum of 3 to 4 contractions in 10 minutes

Starting oxytocin in the 2nd stage of labour

In the event of oxytocin augmentation being required in the second stage of labour, advice must be sought from senior obstetric staff. The recommended rate of increase should be documented in the patient's notes.

SEE OXYTOCIN GUIDELINE

Induction of labour for women with pre labour rupture of membranes at term

Induction of labour is appropriate approximately 24-48 hours after rupture of membranes. The interval between rupture of membranes and commencement of the induction process should not exceed 72 hours, unless the woman specifically requests this. Women wishing to wait longer than 72 hours should be discussed with their Consultant Obstetrician and offered an appointment with a Senior Obstetrician.

Women with meconium stained liquor or Group B Streptococcus should be augmented immediately.

There is evidence that in women with an unfavourable cervix and ruptured membranes, the use of oxytocin is less effective than vaginal PGE2 in achieving a vaginal birth within 24 hours[1]. See appendix 8

1. Take temperature, pulse and blood pressure. If temperature >37.5 then perform a septic screen and commence antibiotics

2. CTG. If temperature is elevated then commence continuous fetal heart rate monitoring

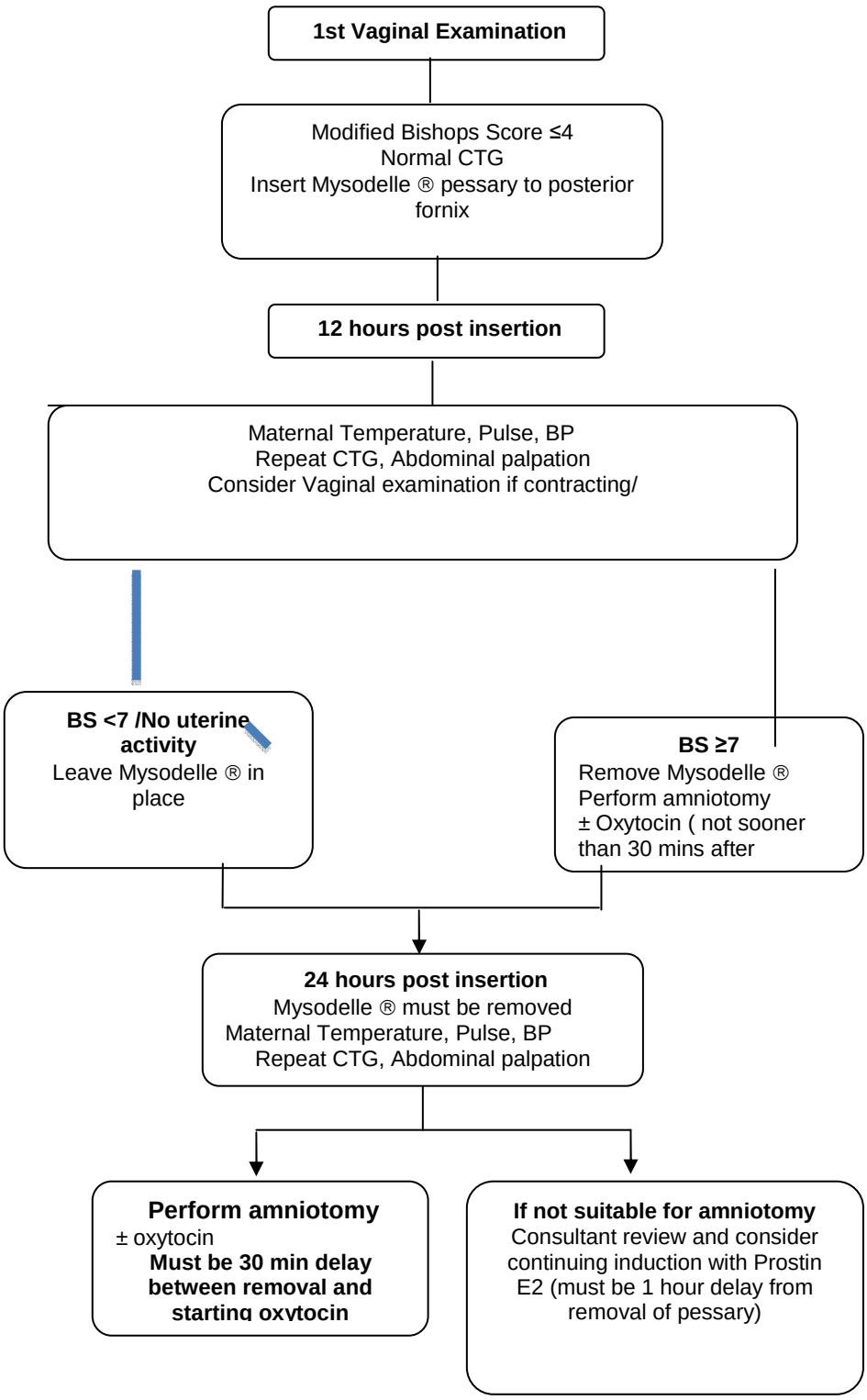
3. Vaginal assessment and follow chart (Appendix 8)

Prim BS≤4 Mysodelle ® (not use if thick fresh meconium)

Prim BS 5-7 or para 1- 3 with Bishops score <7 for Propess pessary and review at 12 hours (See Appendix 5,8)

Para 4 or more-Commence intravenous oxytocin due to risk of hyperstimulation even if cervix is unfavourable

Appendix 1- Induction process using Mysodelle® (Primigravida with unfavourable cervix)



Appendix 2- Insertion of Mysodelle® pessary

1.Storage of pessary is in freezer and no thawing is required.
Do not use scissors or sharp object to open the packet

2. Insert pessary high into the posterior fornix using aquagel

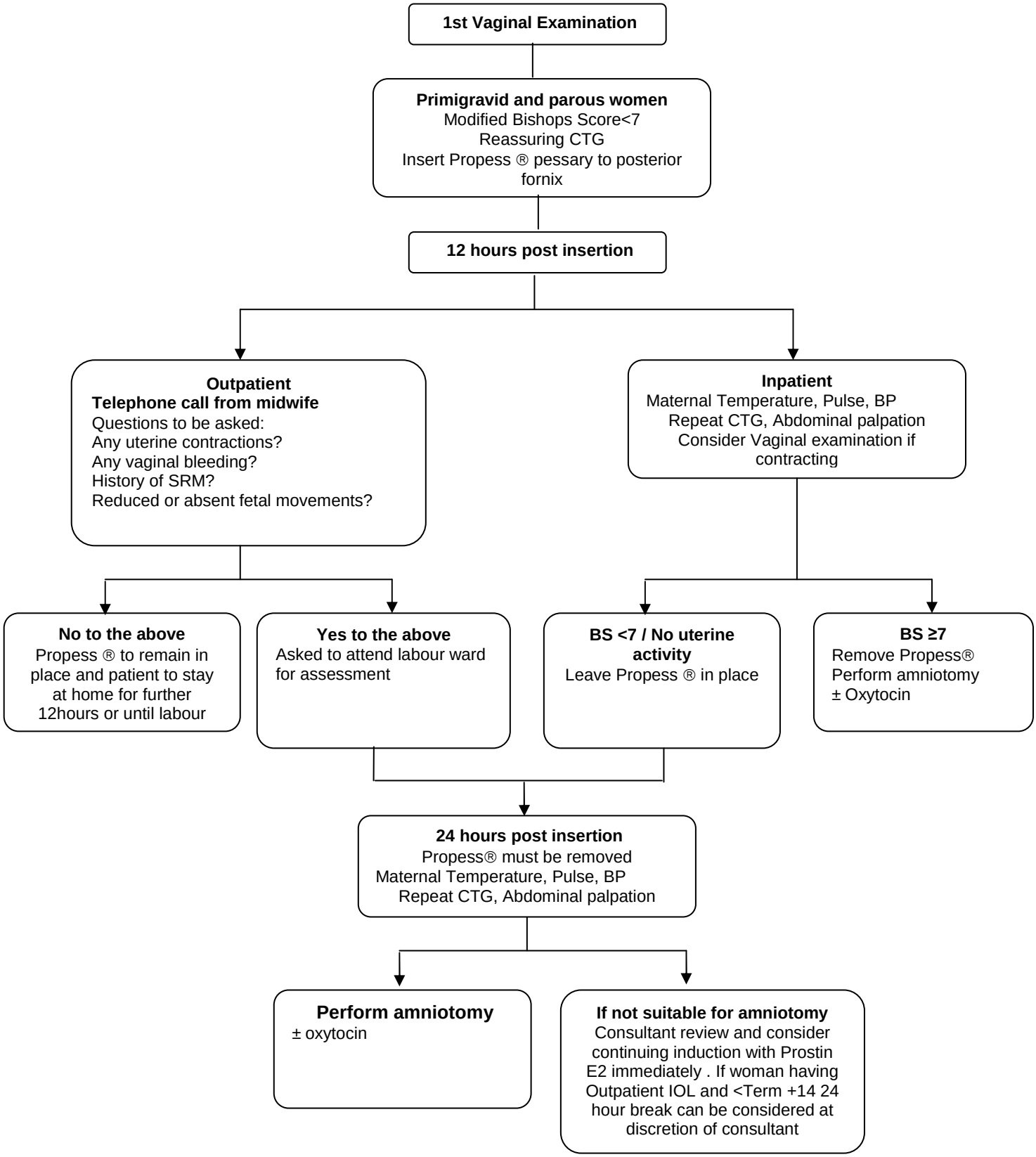
3. The pessary should lie transversely in the posterior fornix

4. After pessary has been inserted the withdrawal tape may be cut or excess tape placed in the lower part of the vagina but ensure that there is sufficient tape outside the vagina to allow removal.

Appendix 3- Management if there is spontaneous rupture of membranes with Mysodelle® in the vagina

Inpatient:
Commence CTG
Assess contractions
If contractions are 3 or more in 10 minutes then remove pessary and transfer to Labour Ward
If there are no contractions perform a speculum examination if this is needed to confirm the diagnosis and then perform VE:
If BS<7, pessary can be left in place until can be transferred to Labour ward for oxytocin
If BS ≥ 7 then pessary to be removed and transfer to Labour ward

Appendix 4- Induction process using Propess® (Women Para 3 or less)



Appendix 5- Insertion of Propess® pessary

1. Ensure that Propess ®pessary is adminsistered within 20 minutes after removal form the fridge.

2. Insert Propess ® high into the posterior fornix using aquagel

3. The pessary® should lie transversely in the posterior fornix

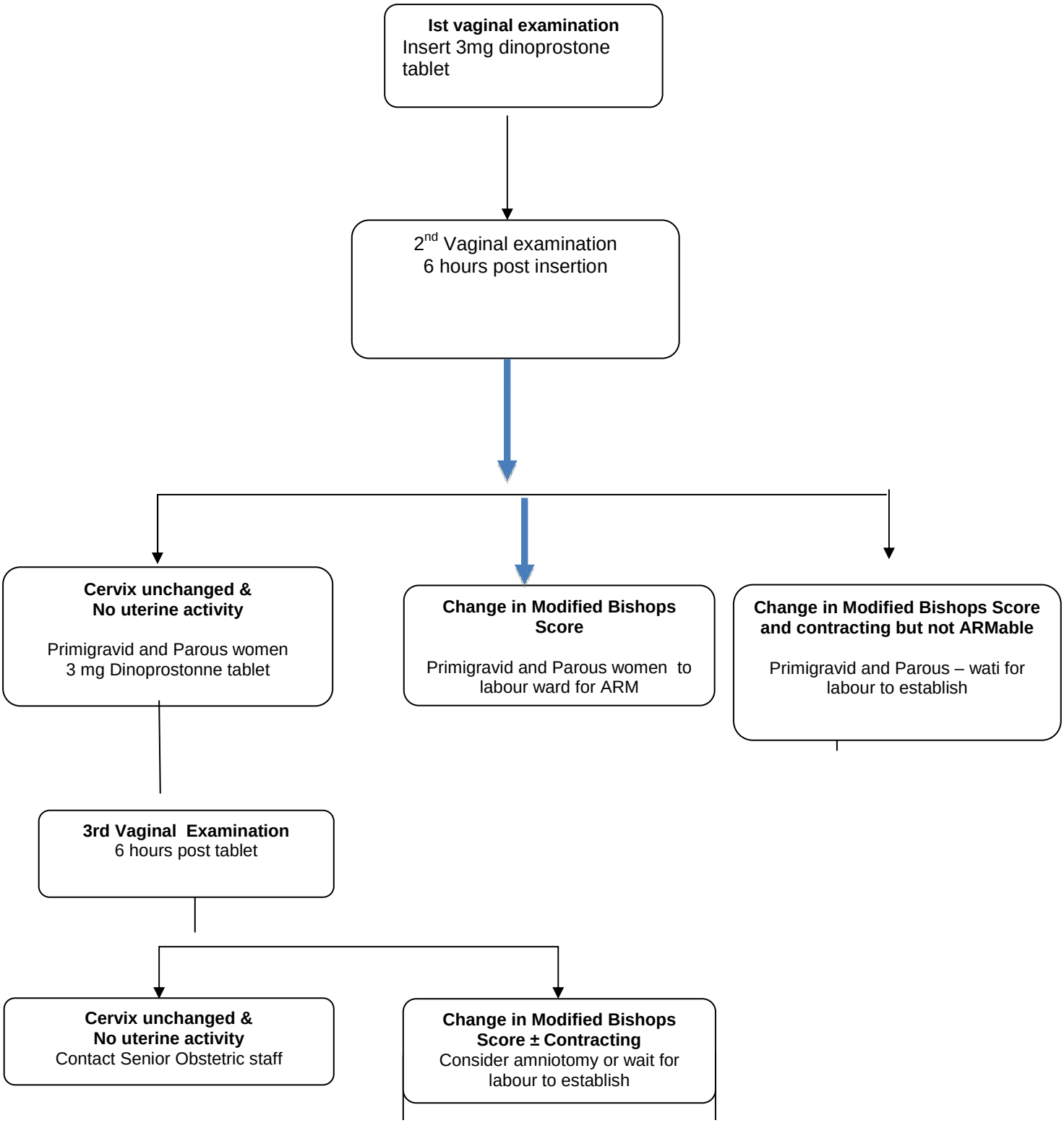
4. After Propess ®has been inserted the withdrawal tape may be cut or excess tape placed in the lower part of the vagina but ensure that there is sufficient tape outside the vagina to allow removal.

Appendix 6- Management if there is spontaneous rupture of membranes with Propess® in the vagina

Inpatient:
Commence CTG
Assess contractions
If contractions are 3 or more in 10 minutes then remove Propess® and transfer to Labour Ward
If there are no contractions perform a speculum examination if this is needed to confirm the diagnosis and then perform VE:
If BS<7, Propess® can be left in place until can be transferred to Labour ward for oxytocin
If BS ≥ 7 then Propess® to be removed and transfer to Labour ward

Outpatient
Patient to telephone hospital
Staff to ask the following questions:
Colour of the liquor
Fetal movements
Are the contractions 3 or more in 10 minutes
Ask to attend
If contractions 3 or more in 10 minutes then ask patient to remove Propess® immediately

Appendix 7- Induction using Dinoprostone tablets – usually in primigravid or parous, following Propess® or Mysodelle® 24 hours and no uterine activity or unsuitable for ARM

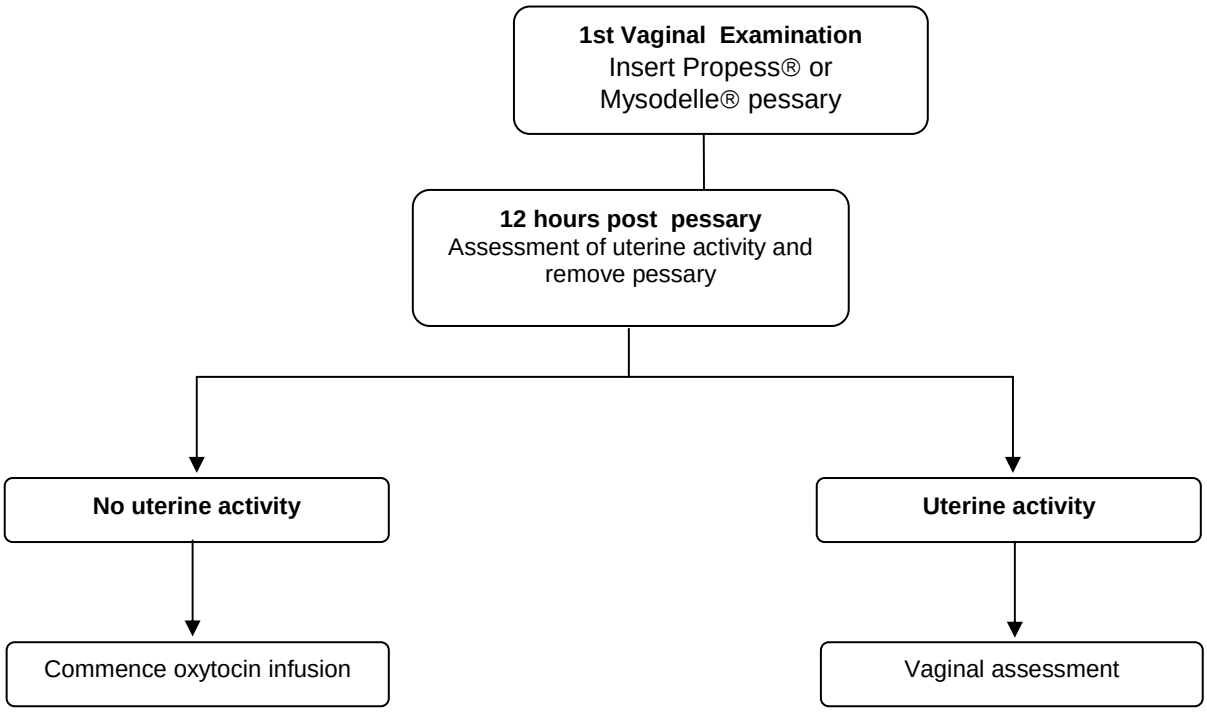


* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

Appendix 8
Induction of women with pre-labour rupture of membranes at term

Primigravid woman BS ≤ 4 use Mysodelle ® (but not if thick fresh meconium)
Para 3 or less/no uterine surgery/prim BS 5-7 use Propess ®

Para 3 or less



Para 4 or more

Should not receive any prostaglandins and should commence an oxytocin infusion
(See page 6)

Appendix 9

Induction using of Prostin E2® vaginal gel (2nd line agent when no dinoprostone tablets in stock)

NICE[1] recommends that IOL with vaginal prostaglandin is the preferred method of induction unless there are specific clinical reasons for not using it eg. the risk of uterine hyperstimulation or previous caesarean section.

Prostin E2® gel may be used as 1st line for induction for women with **Parity 4 and 5** needing prostaglandin induction (only Consultant Obstetrician review and consideration has been given to balloon induction). It may be used as a 2nd line agent if Propess® has failed in women with parity 0-3 where amniotomy is not possible (See Appendix 4 and 7)

Contraindications to Prostin E2®

Dinoprostone is not recommended in the following circumstances:

1. For women in whom oxytocic drugs are generally contraindicated:

a. previous caesarean section or major uterine surgery

b. cephalopelvic disproportion

c. fetal malpresentation

d. suspicion or evidence of fetal distress

e. grand multiparity with over 5 previous term pregnancies

2. Women with ruptured membranes

3. Past history of or existing, pelvic inflammatory disease, unless adequate prior treatment has been instituted

4. Clinical suspicion or definite evidence of placenta praevia or explained vaginal bleeding during pregnancy

5. Active cardiac, pulmonary, renal or hepatic disease

6. When there is hypersensitivity to prostaglandins or to any of the excipients.

Cautions (for Prostin E2®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG must be normal

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart (Appendix 2):

4. Woman to remain semi-recumbent for 30 minutes after each dose of gel.

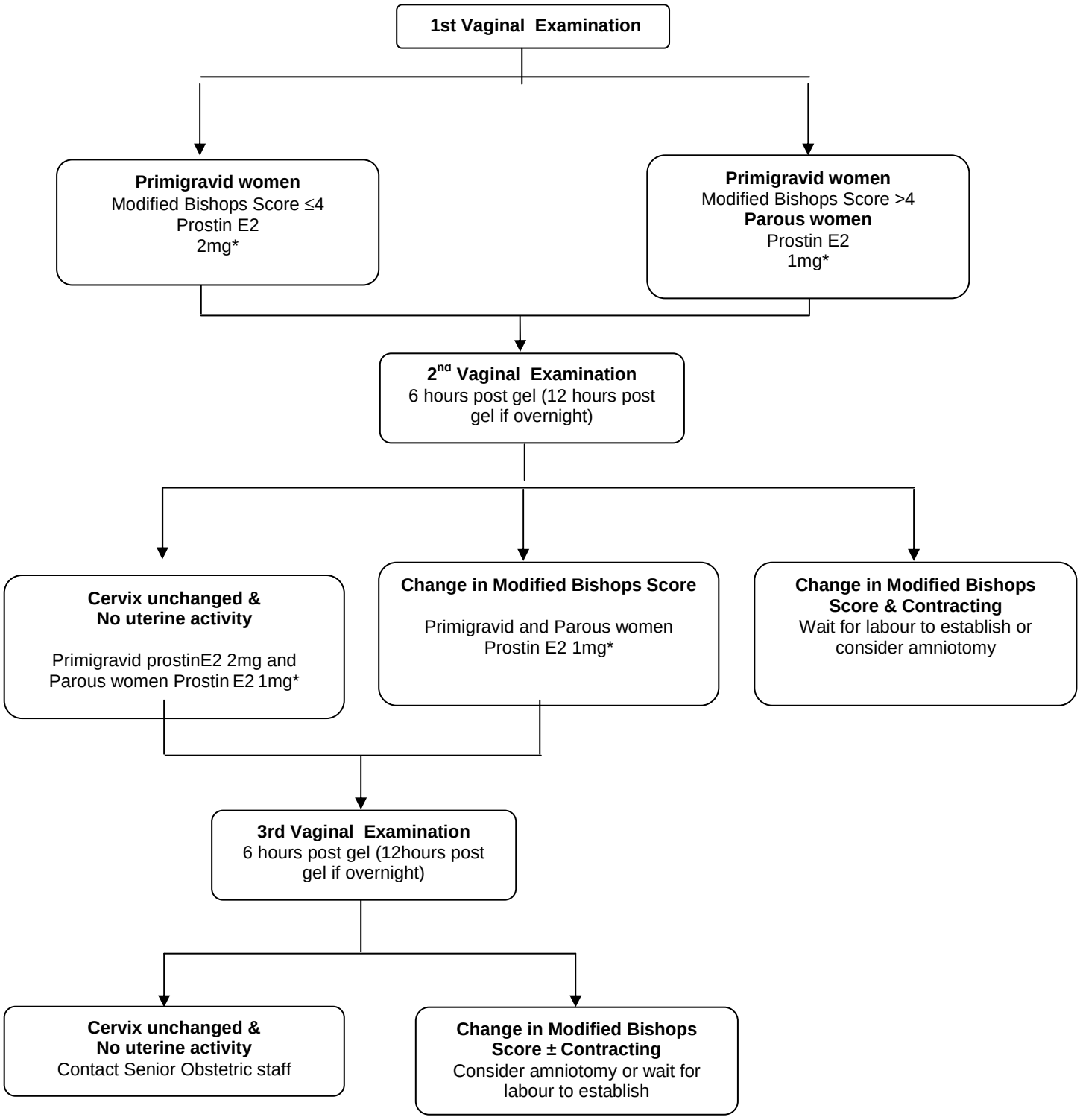
5. CTG must be normal

Side effects of Prostin E2®
Nausea, vomiting and diarrhoea are most commonly reported. Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypertonus, uterine hyperstimulation, abruptio placentae, rapid cervical dilation, fetal bradycardia /fetal distress

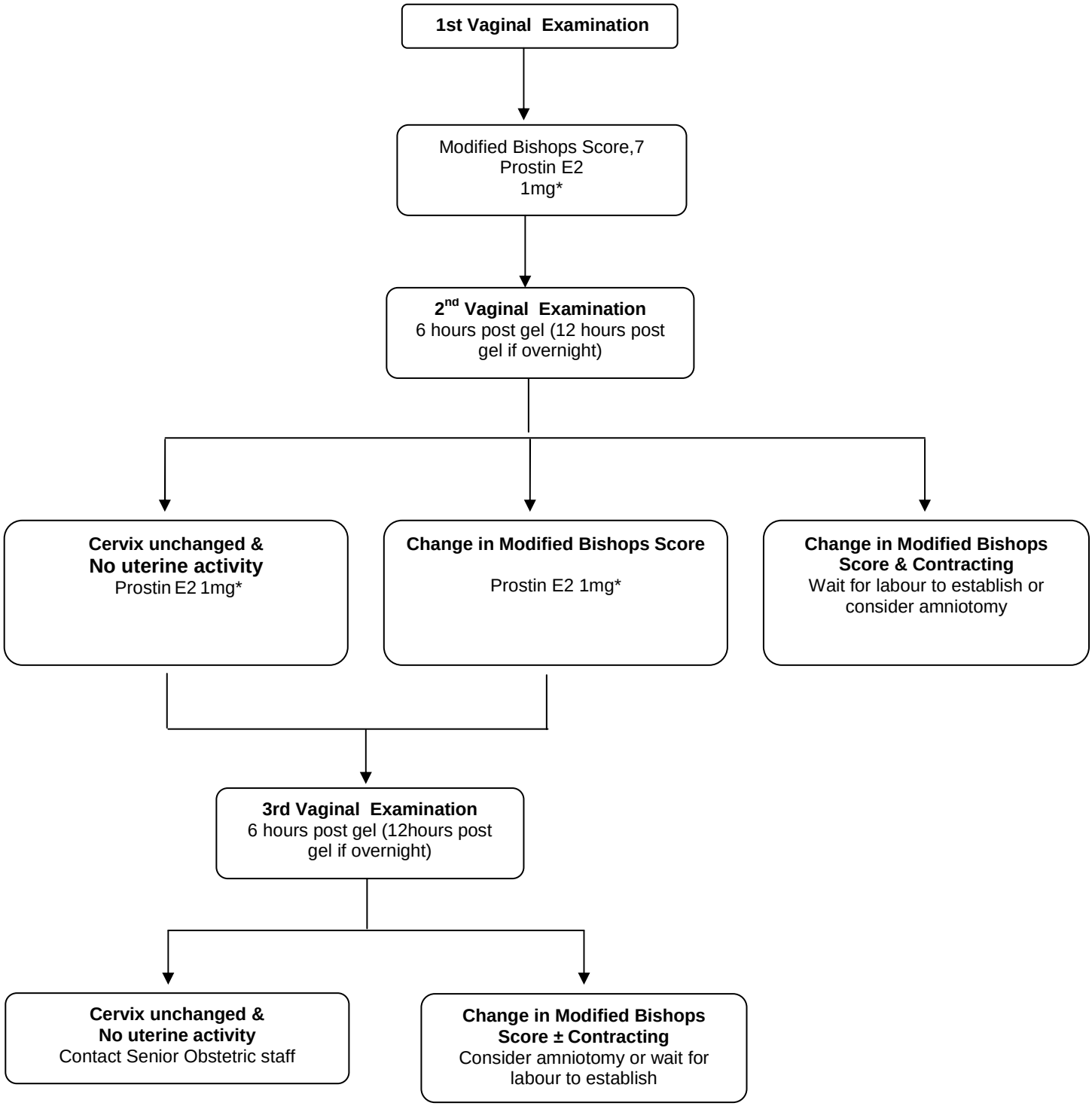
- on the neonate, low Apgar scores, stillbirth, neonatal death
- on breast feeding no hazard at recommended dose.

Appendix 9b- Induction using Prostin E2® gel (dinoprostone) after use of Propess®® or Mysodelle® for Women Para 3 or less



* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

Appendix 10- Induction using Prostin E2® gel (dinoprostone) for women Para 4 or 5



4. ASSOCIATED DOCUMENTS:

Uterine Hyperstimulation guideline
Fetal monitoring guideline
Prelabour rupture membranes at term guideline
Group B streptococcus management
PGD Propess and Dinoprostone
Induction with cervical ripening balloon
http://intranet.lothian.scot.nhs.uk/NHSLothian/Healthcare/A-Z/MedicinesManagement/PatientGroupDirections/Documents/Acute%20Services%20PGDs/PGD%20236v1%20-%20Dinoprostone%20-%20Propess%20for%20induction%20of%20Labour%20%20-%20Midwives.pdf

5. REFERENCES:

[1] NICE Induction of labour Clinical Guideline 2008
[2] NICE Intrapartum care Clinical Guideline 2007

[4]eMC- Prostin E2 Vaginal gel 1mg, 2mg- Summary of product characteristics (SPC)
[4]eMC- Propess 10mg- Summary of product characteristics (SPC)
[4]eMC- Syntocinon - Summary of product characteristics (SPC)

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Induction of labour
Maternity Services Lothian
Guideline

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Induction of labour – criteria and booking

Introduction:

Induction of labour is the most commonly performed obstetric intervention and associated with increased intervention rates. It is required in around 26% of pregnancies when the risks of continuing the pregnancy outweigh the benefits. This guideline aims to prevent inappropriate induction of labour and provide a standard of care pathway for those induced. In NHS Lothian Cervical Ripening balloon is the first line of induction. Propess can be used for those who do not meet the criteria for a Cervical Ripening balloon or those who choose to be induced using propess.

Staff should ensure women are given time to make decisions after balance and comprehensive discussion about risks and benefits of induction. Induction process can take 24-72 hours. Please provide a supportive environment with options of birthing balls, water immersion and peaceful setting for rest and sleep.

Encourage women to be mobile and active during the process of induction.

Maternal and Fetal Indications:

The decision to undertake IOL in these circumstances needs to be clear and clinically justified. Discussion with an experienced obstetrician and requires an individual documented induction plan.

- Post dates (41+0-42+0)
- Maternal age over 40
- Previous caesarean section
- Preterm Pre labour rupture of membranes
- Prelabour rupture of membranes at term
- Diabetes; PIH/PET/Essential hypertension
- Obstetric cholestasis
- Intrauterine Growth Restriction
- Reduced fetal movements

This list is not exhaustive.

Contraindications to induce labour

Absolute: Any contraindication to vaginal birth: e.g.

- Severe Intra uterine growth retardation with evidence of fetal compromise
- Abnormal fetal lie/presentation (transverse, oblique)
- Placenta praevia

- Active genital herpes infection
- Invasive cervical carcinoma
- Previous classical Caesarean section of myomectomy with breach of cavity
- More than 2 previous caesarean sections
- Absolute Cephalopelvic disproportion (Pelvic Deformity)

Relative:

- Previous Caesarean section x2
- Grand multiparity (Para 6 or more)

All women should have an cervical assessment at 40 weeks which includes the bishop score, offer of membrane sweep, discussion regarding IOL process and provision of the patient information leaflet. All the above information should be documented on Maternity TRAK.

Who can book IOL?

Community and Hospital Midwifery staff are able to organise induction of labour for low risk women who are **Para 3 or less**.

Medical staff would need to authorise induction of labour for high risk women and grand multiparous (Para 4 or more). They must also complete the induction assessment questionnaire on Maternity TRAK.

Booking appointments
To book induction slots phone:

RIE Inpatient: Ward 119 - 0131 242 1194/0131 242 1191 (Outpatients below T+10)
Outpatient: DAU - 0131 242 2656 (Low risk T+10-T+14 P3 or less)

St John's: Ward 11 01506 524111

If Outpatient Induction of labour is being considered ensure that the patient has an appointment for a liquor volume scan prior to attending for induction.

Where does the Induction of labour take place?

Induction of labour can be done as an outpatient if specific criteria are met or as an inpatient. Each induction of labour method will have a specific criteria which will be detailed later. However, the prerequisite for outpatient setting for induction of labour, regardless of method are:

1. Singleton pregnancy
2. Cephalic presentation
3. Availability of private transport
4. Availability of home landline or mobile phone
5. Ability to communicate in English

Hospital Procedure on Admission for Induction of labour

On arrival for induction of labour the midwife should continue the induction assessment questionnaire ensuring that she has completed the risk assessments questions and performed a Modified Bishops Score. If all risk assessment questions are answered 'Yes' and the Modified Bishops Score is <7 then the midwife may administer cervical ripening balloon or Propess (which can be administered under PGD).

If Induction is medically indicated but the patient declines induction then a discussion with a senior obstetrician should take place and an individualised care plan agreed.

Postdates

This is the most common indication aiming at reducing the risk of late stillbirth. There is a small increased risk of stillbirth from 1/1000 to 2-3/1000 pregnancies after 42 weeks. IOL for that indication is offered between 41-42 weeks, when induction reduces perinatal mortality without increasing the caesarean section rate.

Maternal age 40yrs or more at time of booking

In this group the risk of stillbirth is increased and therefore induction of labour at term should be considered. Therefore at term IOL will be discussed and offered and the individualised care plan documented on TRAK.

Previous Caesarean Section

Spontaneous labour is preferred where possible, but when IOL indicated the method will be limited to cervical ripening balloon, membrane sweep +/- amniotomy +/- syntocinon.

All patients should have been seen by an obstetrician antenatally and a full discussion highlighting potential maternal and fetal risks of labour outlined and documented on TRAK.

Maternal Request

Induction of labour should not be routinely offered on maternal request only.The patient should have a discussion with their consultant and the risks and benefits documented. Induction of labour in those circumstances might be considered at or after 40 weeks.

Methods of Induction of labour

1) Membrane sweep

2) Cervical ripening balloon

3) Prostaglandins

4) Amniotomy

See separate guideline for use of oxytocinon.

Women should be advised as to their induction options in the antenatal period and be included in the decision making process for their induction having been given advice and the patient information leaflet.
The aim for induction should always be to use the least intervention needed. Each woman should have an individualised induction plan to optimise her care.

Mechanical Induction of labour with Cervical Ripening Balloon (CRB) is the first line method and should be suitable for most women unless contraindicated or declined by patient.
Each patient should have clearly documented on Maternity TRAK the first line chosen and further management plan should that method fail.

Membrane sweep

There is established evidence that membrane sweeps at term significantly reduce the need for induction. It is thought to be effective by increasing local endogenous production of prostaglandins. Evidence suggests benefit from repeated outpatient membrane sweeps resulting in **increased SVD rate, reduced induction to delivery interval, reduced use of oxytocinon and improved women's satisfaction.**

To perform a sweep, a finger is inserted as high as possible through the internal cervical os and the membranes are swept off the lower pole of the uterus by a complete circular sweep of the finger, once clockwise and once anticlockwise. If the internal os is closed the cervical canal should be 'swept'. During this process a modified Bishops score should be calculated and clearly documented in Maternity Trak. The fetal heart should be auscultated prior to and after the membrane sweep and documented.

At both 40 and 41 weeks women should be offered a vaginal examination for membrane sweep. Additional membrane sweeping may be offered if labour does not start spontaneously. This may be done prior to 40 weeks if authorised by medical staff.

Induction using Cervical Ripening Balloon

The Cook Cervical Ripening Balloon (CRB) is a silicone double balloon catheter with an adjustable-length malleable stylet. The Cook Cervical Ripening Balloon is indicated for mechanical dilation of the cervical canal when the cervix is unfavourable for induction. Pharmacological agents have associated risk of hyperstimulation (3-20%) where as the balloon induction does not cause significant uterine contraction or systemic side effects.

Studies have shown both methods are equally effective with CRB having a slightly shorter insertion to delivery interval, infection rates and no adverse neonatal effects.

The Cook Balloon Device

- Silicone double balloon catheter with stylet
- One balloon in Uterus (inflating valve marked U)
- One balloon in Vagina (inflating valve marked V)
- A blue valve marked S for Stylet
- Each balloon could be filled in with sterile water / saline up to maximum of 80ml
- Single use device supplied in sterile package

Indications

Outpatient use (>= 37 weeks)

Any patient requiring Induction of labour in the absence of fetal or maternal compromise

1. Postdate
2. Gestational Diabetes Mellitis of Type 2 Diabetes with stable blood sugar monitoring
3. Previous Lower Segment Caesarean Section (x1)
4. Previous precipitate labour with prostaglandin use
5. Obstetric Cholestasis
6. Tailing off fetal growth above the 10th centile with normal dopplers and Liquor volume
7. Essential Hypertension or non proteinuric PIH with stable Blood Pressure (medicated or not) and normal bloods
8. Maternal age
9. Symphysis Pubis Dysfunction
10. Reduced Fetal Movement with normal growth and liquor volume

Inpatient use (Any Gestation)

1. Suspected fetal compromise i.e. SGA/oligohydramnios (< 5cm AFI/ <2cm DVP)
2. Type 1 Diabetes
3. Grand Multiparous (Para >=4)
4. Post failed Induction of Labour with prostaglandins
5. Preeclampsia
6. Consultant decision
7. Patient request

Contraindications

1. Non-cephalic fetal presentation
2. Free/ ballotable head
3. Multiple pregnancy
4. Sepsis
5. Active genital herpes infection
6. Ruptured membranes
7. Any contraindication to induction of labour

Who can insert it?

The CRB can be inserted by any healthcare professional (medical or midwifery) who has received the appropriate training

Booking and Admission procedure for CRB IOL (see flowchart 1)

1. IOL questionnaire filled on TRAK
2. Book a slot on Ward 119 (for inpatient) at RIE or DBU at SJH for the desired date and a slot the following day for removal (Minimum 12h; Max 24 Hours).
3. On admission, perform antenatal check:
   a. Full MEWS
   b. Confirm cephalic presentation
   c. CTG to assess fetal wellbeing

Procedure

Most staff will insert Cervical Ripening Balloon digitally under vaginal examination.

Equipment required:

1. Sterile Gloves and lubricating gel
2. 500ml bag of sodium chloride 0.9%
3. Red Filter Needle
4. 2 x 60ml Syringes, 4 x 20ml syringes
5. Red and Green Pen to mark syringes (not mandatory)
6. Wedge available if anticipating difficulty inserting

If unable to insert Cervical Ripening Balloon digitally a Speculum may have to be used to insert the Balloon under direct vision.

If inserting under direct vision

1. Lithotomy poles (Stirrups) – **Not mandatory.**
2. Speculum
3. Sterile Rampley's forceps
4. Sterile aquagel (optional)
5. 500ml bag of sodium chloride 0.9%
6. Red Filter Needle
7. 2 x 60ml Syringes, 4 x 20ml Syringes
8. Light source
9. Pre-packed CRB device

Patient preparation:

1. Procedure discussed with patient and verbal consent obtained
2. Encourage sustainable and comfortable position – consider use of wedge if anticipating difficult insertion
3. Vaginal examination, with consent, to determine if CRB is required
4. Open CRB pack and assemble stylet
5. During vaginal examination maintain hold of cervix using fingers to introduce CRB.

If inserting under direct vision

1. Procedure discussed with patient and verbal consent obtained
2. Place patient in lithotomy position (**Not mandatory**)
3. Open the CRB pack and assemble the stylet if required
4. Insert the speculum in vagina to fully visualise the cervix
5. Clean the cervix with wet gauze/ cotton roll
6. Use Rampley's Forceps to hold cervix in place while inserting stylus

Device placement:

1. Insert the device into the cervix and advance it until both balloons have entered the cervical canal (aquagel can be used as lubricant)
2. If the stylet is used then it should be withdrawn as soon as the 1st balloon is no longer in view or felt if not under direct vision.
3. Inflate the uterine balloon with 40 ml of sodium chloride through the blue valve marked '**U'**
   then pull the device back until the balloon abuts the internal os
4. The vaginal balloon is now visible (or felt) outside the external os. Inflate it with 20 ml of water through the green valve marked **'V'**
5. Remove the speculum
6. Add 40 ml water through valve **U** and 60 ml through valve **V.** The aim is to have 80mls in each balloon
7. If patient uncomfortable: reduce volume of fluid in vaginal balloon first, by 10ml increments
8. Advise use of 2 pairs of underwear – 1 with pad and valves passing through leg hole, then gently fold valves upwards and 2nd pair holding in place.

Post insertion monitoring:

1. Auscultation using sonicaid.
2. If normal, patient can go home and return 12-24 hours later to have it removed. At 12 hour point phone call from Ward 119 at RIE or Labour Ward at St John's to ensure well being. If bed available to return to labour ward for balloon removal. If bed not available at this point, phone call will be made from labour ward at both sites between 12 and 24 hours to notify when bed is available. If Labour Ward not able to accommodate by 24 hour point to return to Ward for balloon removal.
3. Can mobilise, eat and drink at leisure; should pass urine without difficulty. Please ensure can pass urine prior to discharge
4. Patient to contact OTA at RIE or LW at SJH and attend if: RFM, SRM, PV bleed, regular painful contractions (every 5 minutes), pain, CRB falls out, urine retention
5. If urine retention: withdraw 10mls from vaginal balloon until able to pass urine.

CRB removal (see flowchart 2)

- After minimum 12 hours (but no longer than 24 hours).
- Remove sooner if SRM or regular painful contractions >= 4:10 minutes

Procedure

- Check maternal observation
- Deflate both balloons and remove the device
- Allow a maximum of an hour to mobilise and for presenting part to descend
- Perform a VE to assess Bishop Score and suitability for ARM and do a membrane sweep.
- Auscultate Fetal Heart for 1 minute. CTG is not required unless abnormal auscultation
- Advise patient to mobilise
- If favourable for ARM discuss with labour ward for timing of transfer
  Liaise with LW for timing of transfer
- If not favourable for ARM proceed with any pre-agreed plan, or to be reviewed by/discussed with obstetrician for ongoing care

Outpatient induction of labour with Propess

Criteria
Low risk (no significant maternal or fetal risk factors)
Post dates (Term+10-14)
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 72 hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

Post treatment
After insertion of the Propess® pessary women should remain recumbent for 30 minutes. Thereafter, a 30 minute CTG should be performed. If reassuring, no further monitoring is required unless SRM or uterine activity occurs. Women may go home and be managed on an outpatient basis. Ensure they have the IOL patient information leaflet prior to going home and are advised to contact the relevant hospital if uterine activity occurs, SRM or any other concerns eg. reduced fetal movements, vaginal bleeding and women should be advised to remove the Propess® pessary and **attend the hospital immediately**. Women are asked to contact the hospital by telephone after 12 hours

Inpatient induction of labour with Propess

Where inpatient induction of labour is being undertaken for maternal or fetal reasons the indication should be documented on TRAK.
Prior to the onset of uterine activity the fetal heart should be auscultated as a minimum every 2 hours, when awake. CTG monitoring should commence with onset of regular painful contractions.

Induction of labour for women with pre labour rupture of membranes at term

SEE SEPARATE GUIDELINE

Induction using Propess®

Propess is the second line if Cervical Ripening Balloon cannot be used, or patient preference.

Contraindications to Propess® (as per SPC)

Propess® should not be used in women:

1. When labour has started.

2. When oxytocin drugs are being given.

3. When strong prolonged uterine contractions would be inappropriate such as in patients:

a. who have had previous major uterine surgery, e.g. caesarean section, myomectomy

b. with cephalopelvic disproportion

c. with fetal malpresentation

d. with suspicion or evidence of fetal distress

e. who have had more than three full term deliveries eg a Para 4 or more

f. previous surgery or rupture of the cervix

4. When there is current pelvic inflammatory disease, unless adequate prior treatment has been instituted.

5. When there is hypersensitivity to dinoprostone or to any of the excipients.

6. When there is placenta praevia or unexplained vaginal bleeding during the current pregnancy.

Cautions (for Propess®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. On admission, perform antenatal check:
    a. Full Mews
    b. Confirm cephalic presentation and engagement
    c. CTG to assess fetal wellbeing

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Ensure Propess pessary is administered within 20 minutes from removal from freezer.

4. Insert Propess high into the posterior fornix using aquagel, lying transversely

5.After Propess has been inserted the excess tape is placed in the lower part of the vagina to ensure that it can be removed.

6.Women to remain semi recumbent or left lateral for 30 minutes after insertion of pessary

7.If propess falls out and there is no regular contractions and cervix unfavourable then Propess can be re-inserted for remainder of period up to 24 hours maximum

8.Review at 12 hours to assess uterine activity and need for CTG or VE

9.Women should be reviewed and the Propess pessary removed at 24 hours with a cervical assessment.

Side effects of Propess®

Nausea, vomiting and diarrhoea are most commonly reported.
Uterine hypercontractility or hpertonus, uterine hyperstimulation, abruption, rapid cervical dilation, fetal bradycardia / fetal distress.

Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Genital oedema.
Rarely hypersensitivity reactions including anaphylaxis, uterine rupture ad cardiac arrest and disseminated intravascular coagulation.

Indications for removal of Propess®
Propess should be removed and the woman transferred to the labour ward in the following situations

- Established labour diagnosed
- BS ≥ 7
- There is evidence of uterine tachysystole, hypertonus or hyperstimulation
  Tachysystole = ≥5 contractions in 10 minutes with reassuring CTG
  Hypertonus = painful contraction lasting ≥ 90 seconds with reassuring CTG
  Hyperstimulation = tachysystole or hypertonus with non reassuring CTG
- Concerns about the fetal heart rate /CTG
- Vaginal bleeding
- There is evidence of maternal systemic adverse effect

Management if there is spontaneous rupture of membranes with Propess insitu

Inpatient:
Commence CTG
Assess contractions
If contractions >3:10 minutes then remove Propess, perform a VE to assess cervix and transfer to labour ward if in established labour.
If no contractions leave propess insitu up to a maximum of 12 hours post SRM or 24 hours post initial insertion.
If BS<7 Propess can be left in place until woman can be transferred to labour ward for oxytocinon.
If BS>7 then propess to be removed and transfer to labour ward.

Outpatient:
Patient to telephone hospital
Staff to ask the following questions:
Colour of liquor
Fetal movements
Are the contractions 3 or more in 10 minutes
Ask to attend
If contractions 3 or more in 10 minutes then ask patient to remove propess immediately.

Induction using Dinoprostone tablets

Dinoprostone tablets may be used for induction for women with **Parity 4 and 5** needing prostaglandin induction (only after Consultant Obstetrician review and consideration has been given to balloon induction). It may be used as a 2nd line agent if Propess where amniotomy is not possible (see appendix 3)

Contraindications to Dinoprostone tablet

Dinoprostine is not recommended in the following circumstances:

Same as Propess except

1. Grand multiparity with over 5 previous term pregnancies
2. Women with ruptured membranes

Cautions for dinoprostone

Same as propess

Procedure and Side Effects

Same as propess – follow flow chart (appendix 3)

Induction by Amniotomy

Amniotomy and oxytocin infusion should not be used as the primary method of induction unless there are specific indications eg, grand multiparity, contraindications to vaginal prostaglandin.
Booking and criteria as previously described.

Induction with Oxytocinon will be the first line in following cases

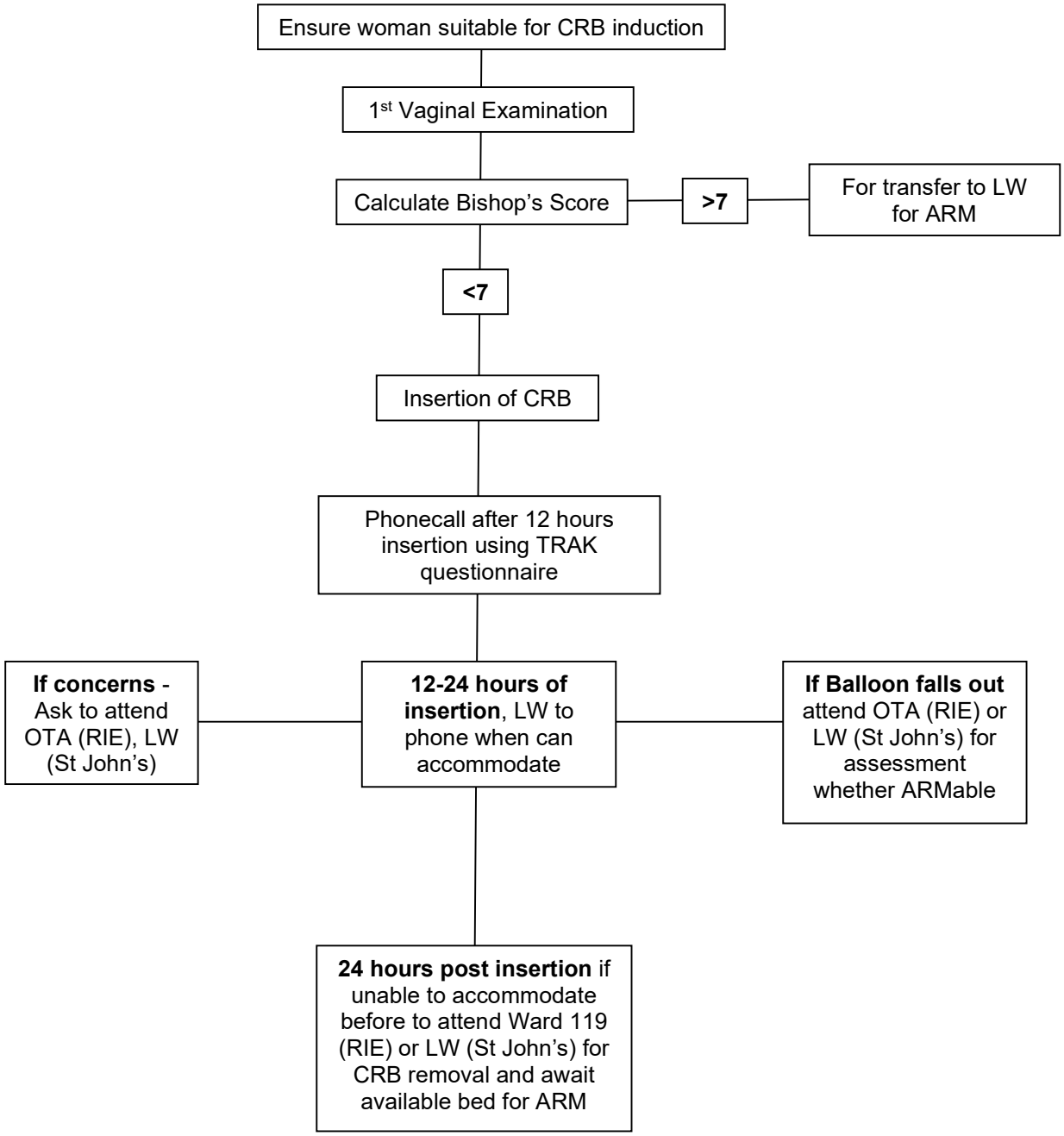
1. Women with SROM and evidence of chorioamnionitis
2. Women with GBS and Pre labour SRM

1. Record the fetal heart rate before amniotomy
2. Record the colour and amount of liquor
3. A fetal heart rate should be obtained immediately following ARM
4. If FHR normal then the woman should be encouraged to mobilise
5. In primigravida with no uterine activity commence oxytocin immediately after amniotomy
6. In parous women, assess uterine activity after 2 hours

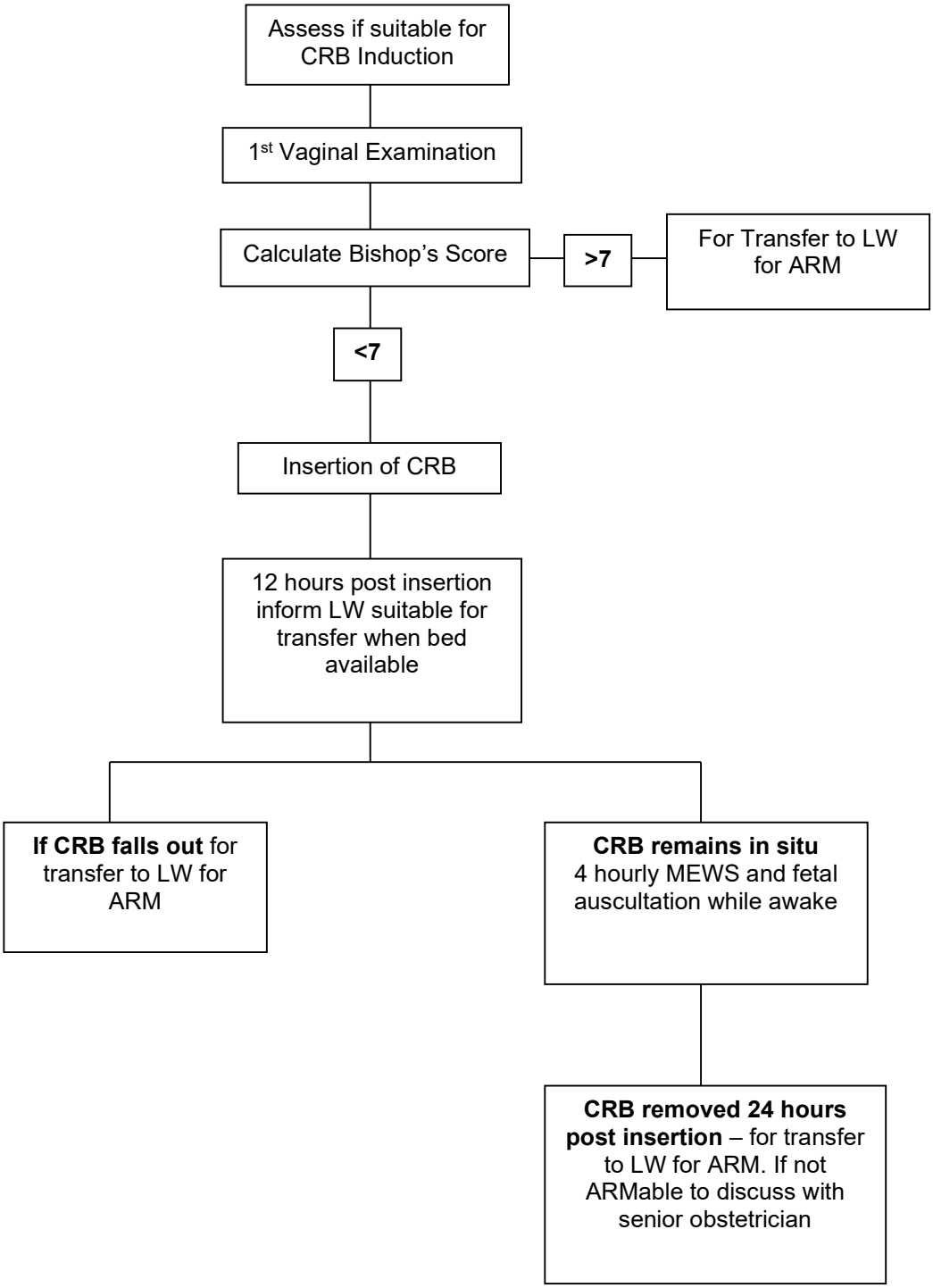
    - If contracting 3:10, then VE 4 hours after ARM
    - If contractions are < 3:10, then start oxytocin infusion

Once the oxytocin infusion has started a continuous CTG is required.
See separate guideline for use of Oxytocinon.

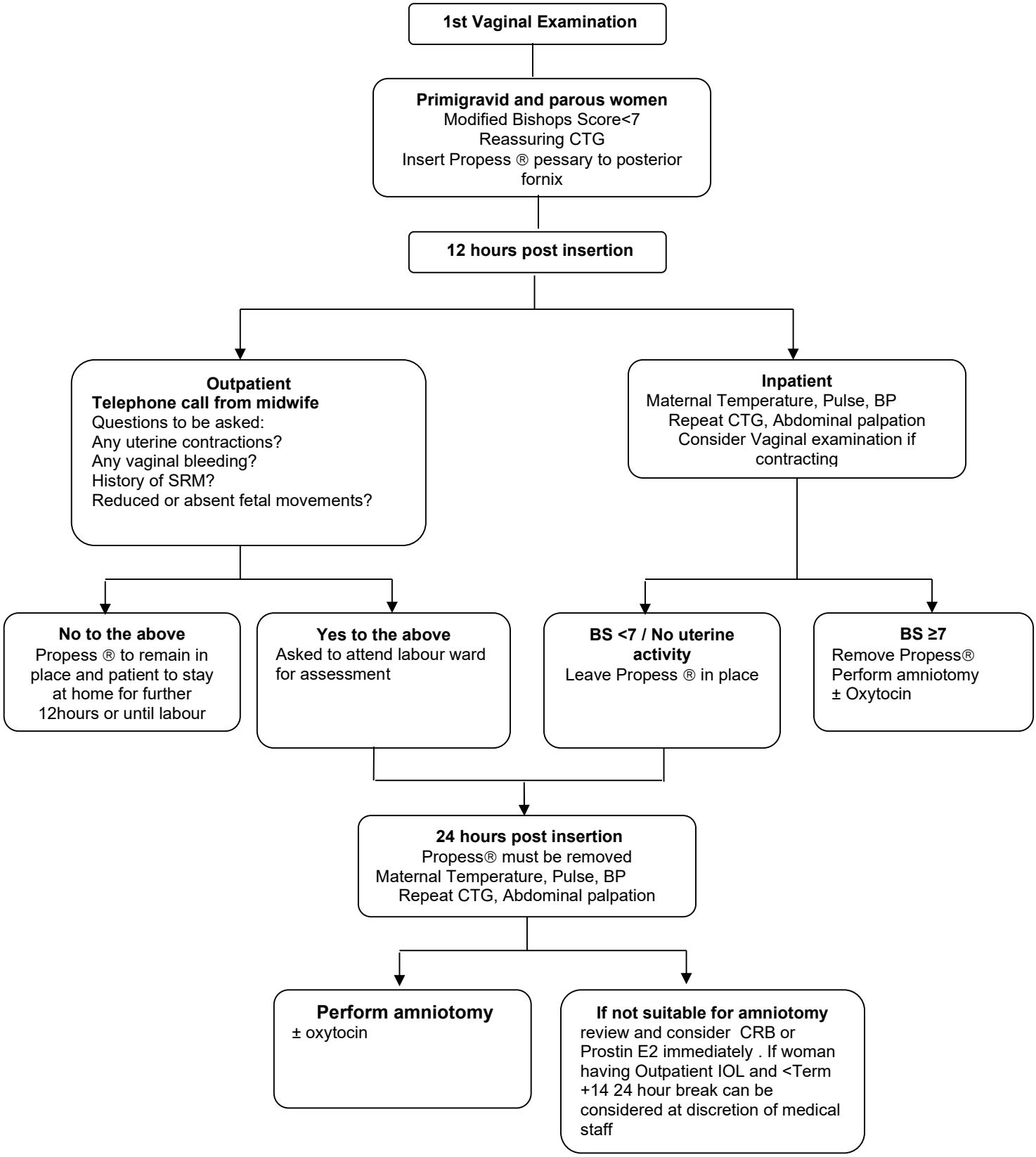
Appendix 1a – Induction of Labour using Cervical Ripening Balloon (Outpatient)



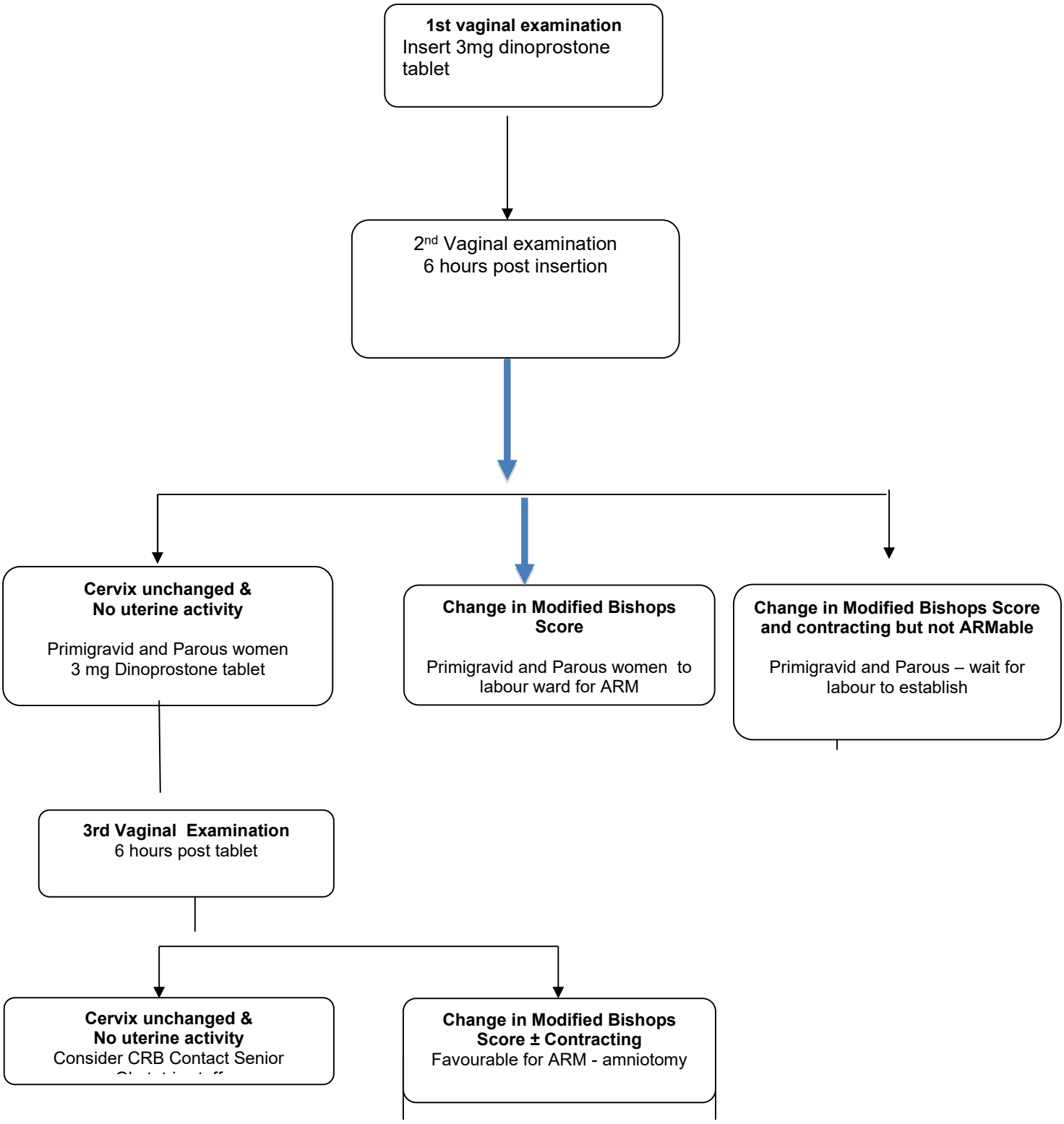
Appendix 1b – Induction of Labour using Cervical Ripening Balloon (Inpatient)



Appendix 2- Induction process using Propess® (Women Para 3 or less)



Appendix 3- Induction using Dinoprostone tablets – usually in primigravid or parous, following Propess® 24 hours and no uterine activity or unsuitable for ARM

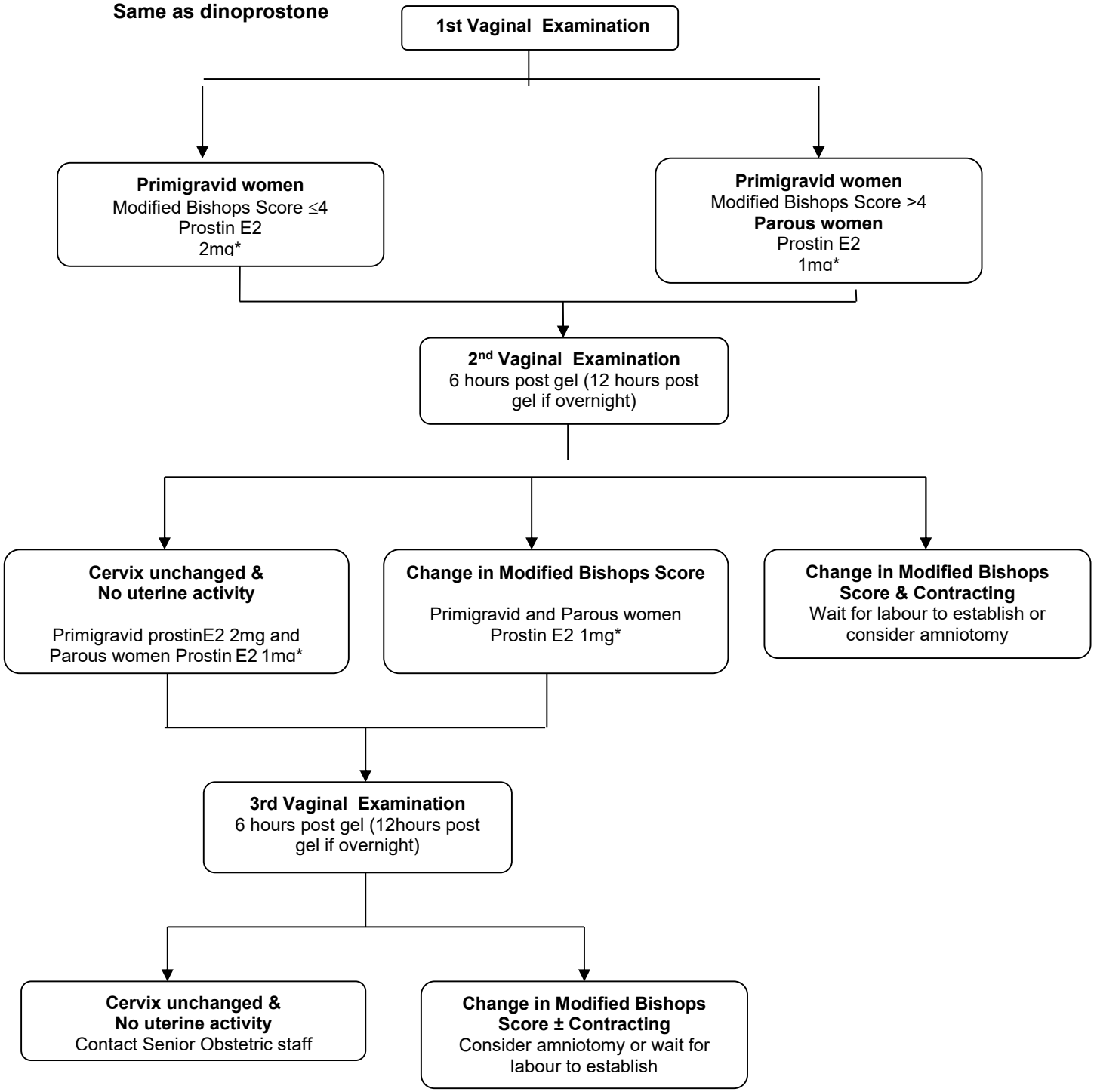


* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

Appendix 4
Induction using of Prostin E2® vaginal gel
(Replacement agent when no dinoprostone tablets in stock)

Contraindications to Prostin E2®
Same as propess
Cautions (for Prostin E2®)
Same as propess

Procedure
Same as dinoprostone



* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

ASSOCIATED DOCUMENTS:

Uterine Hyperstimulation guideline
Fetal monitoring guideline
Prelabour rupture membranes at term guideline
Group B streptococcus management
PGD Propess and Dinoprostone
Induction with cervical ripening balloon
http://intranet.lothian.scot.nhs.uk/NHSLothian/Healthcare/A-Z/MedicinesManagement/PatientGroupDirections/Documents/Acute%20Services%20PGDs/PGD%20236v1%20-%20Dinoprostone%20-%20Propess%20for%20induction%20of%20Labour%20%20-%20Midwives.pdf

5. REFERENCES:

[1] NICE Induction of labour Clinical Guideline 2015
[2] NICE Intrapartum care Clinical Guideline 2015
[4]eMC- Prostin E2 Vaginal gel 1mg, 2mg- Summary of product characteristics (SPC)
[4]eMC- Propess 10mg- Summary of product characteristics (SPC)
[4]eMC- Syntocinon - Summary of product characteristics (SPC)
Insertion of a double balloon catheter for induction of labout in pregnant women without previous caesarean section
Interventional procedures guidance [PG528] 2015

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Induction of labour
Maternity Services Lothian
Guideline

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Induction of labour – criteria and booking

Introduction:

Induction of labour is the most commonly performed obstetric intervention and associated with increased intervention rates. It is required in around 26% of pregnancies when the risks of continuing the pregnancy outweigh the benefits. This guideline aims to prevent inappropriate induction of labour and provide a standard of care pathway for those induced. In NHS Lothian Cervical Ripening balloon is the first line of induction. Propess can be used for those who do not meet the criteria for a Cervical Ripening balloon or those who choose to be induced using propess.

Staff should ensure women are given time to make decisions after balance and comprehensive discussion about risks and benefits of induction. Induction process can take 24-72 hours. Please provide a supportive environment with options of birthing balls, water immersion and peaceful setting for rest and sleep.

Encourage women to be mobile and active during the process of induction.

Maternal and Fetal Indications:

The decision to undertake IOL in these circumstances needs to be clear and clinically justified. Discussion with an experienced obstetrician and requires an individual documented induction plan.

- Post dates (41+0-42+0)
- Maternal age over 40
- Preterm Pre labour rupture of membranes
- Prelabour rupture of membranes at term
- Diabetes; PIH/PET/Essential hypertension
- Obstetric cholestasis
- Intrauterine Growth Restriction
- Reduced fetal movements
- IVF or ICSI pregnancy after discussion with consultant (See AN pathway guideline)

This list is not exhaustive.

Contraindications to induce labour

Absolute: Any contraindication to vaginal birth: e.g.

- Severe Intra uterine growth retardation with evidence of fetal compromise
- Abnormal fetal lie/presentation (transverse, oblique)
- Placenta praevia

- Active genital herpes infection
- Invasive cervical carcinoma
- Previous classical Caesarean section of myomectomy with breach of cavity
- More than 2 previous caesarean sections
- Absolute Cephalopelvic disproportion (Pelvic Deformity)

Relative:

- Previous Caesarean section x2
- Grand multiparity (Para 6 or more)

All women should be offered a cervical assessment at 40 weeks which includes the bishop score, offer of membrane sweep, discussion regarding IOL process and provision of the patient information leaflet. All the above information should be documented on Maternity TRAK.

Who can book IOL?

Community and Hospital Midwifery staff are able to organise induction of labour for low risk women who are **Para 3 or less**.

Medical staff would need to authorise induction of labour for high risk women and grand multiparous (Para 4 or more). They must also complete the induction assessment questionnaire on Maternity TRAK.

Booking appointments
To book induction slots phone:

RIE Inpatient: Ward 119 - 0131 242 1194/0131 242 1191
RIE In patient: Labour Ward – 0131 242 2542/0131 242 2544 (for ruptured membranes with GBS/ Meconium/ suspected chorioamnitis or ARM'able)
Outpatient: DAU - 0131 242 2656 (Low risk from 41 weeks)

St John's: Ward 11 01506 524111

If Outpatient Induction of labour is being considered with propess ensure that the patient has an appointment for a liquor volume scan prior to attending for induction. This is not needed for outpatient induction with Cervical Ripening Balloon.

Where does the Induction of labour take place?

Induction of labour can be done as an outpatient if specific criteria are met or as an inpatient. Each induction of labour method will have a specific criteria which will be detailed later. However, the prerequisite for outpatient setting for induction of labour, regardless of method are:

1. Singleton pregnancy
2. Cephalic presentation
3. Availability of private transport

4. Availability of home landline or mobile phone

5. Ability to communicate in English

Hospital Procedure on Admission for Induction of labour

On arrival for induction of labour the midwife should continue the induction assessment questionnaire ensuring that she has completed the risk assessments questions and performed a Modified Bishops Score. If all risk assessment questions are answered 'Yes' and the Modified Bishops Score is <7 then the midwife may administer cervical ripening balloon or Propess (which can be administered under PGD).

If Induction is medically indicated but the patient declines induction then a discussion with a senior obstetrician should take place and an individualised care plan agreed.

Postdates

This is the most common indication aiming at reducing the risk of late stillbirth. There is a small increased risk of stillbirth from 1/1000 to 2-3/1000 pregnancies after 42 weeks. IOL for that indication is offered between 41-42 weeks, when induction reduces perinatal mortality without increasing the caesarean section rate.

Maternal age 40yrs or more at time of booking

In this group the risk of stillbirth is increased and therefore induction of labour at term should be considered. Therefore at term IOL will be discussed and offered and the individualised care plan documented on TRAK.

Previous Caesarean Section

Spontaneous labour is preferred where possible, but when IOL indicated the method will be limited to cervical ripening balloon, membrane sweep +/- amniotomy +/- syntocinon.

All patients should have been seen by an obstetrician antenatally and a full discussion highlighting potential maternal and fetal risks of labour outlined and documented on TRAK.

Maternal Request

Induction of labour should not be routinely offered on maternal request only. The patient should have a discussion with their consultant and the risks and benefits documented. Induction of labour in those circumstances might be considered at or after 40 weeks.

Methods of Induction of labour

1) Membrane sweep

2) Cervical ripening balloon

3) Prostaglandins

4) Amniotomy

See separate guideline for use of oxytocinon.

Women should be advised as to their induction options in the antenatal period and be included in the decision making process for their induction having been given advice and the patient information leaflet.
The aim for induction should always be to use the least intervention needed. Each woman should have an individualised induction plan to optimise her care.

Mechanical Induction of labour with Cervical Ripening Balloon (CRB) is the first line method and should be suitable for most women unless contraindicated or declined by patient.
Each patient should have clearly documented on Maternity TRAK the first line chosen and further management plan should that method fail.

Membrane sweep

20% of women go into labour following membrane sweep. It is thought to be effective by increasing local endogenous production of prostaglandins. Evidence suggests benefit from repeated outpatient membrane sweeps resulting in **increased SVD rate, reduced induction to delivery interval, reduced use of oxytocinon and improved women's satisfaction.**

To perform a sweep, a finger is inserted as high as possible through the internal cervical os and the membranes are swept off the lower pole of the uterus by a complete circular sweep of the finger, once clockwise and once anticlockwise. If the internal os is closed the cervical canal should be 'swept'. During this process a modified Bishops score should be calculated and clearly documented in Maternity Trak. The fetal heart should be auscultated prior to and after the membrane sweep and documented.

At both 40 and 41 weeks women should be offered a vaginal examination for membrane sweep. Additional membrane sweeping may be offered if labour does not start spontaneously. This may be done prior to 40 weeks if authorised by medical staff.

Induction using Cervical Ripening Balloon

The Cook Cervical Ripening Balloon (CRB) is a silicone double balloon catheter with an adjustable-length malleable stylet. The Cook Cervical Ripening Balloon is indicated for mechanical dilation of the cervical canal when the cervix is unfavourable for induction. Pharmacological agents have associated risk of hyperstimulation (3-20%) where as the balloon induction does not cause significant uterine contraction or systemic side effects.

Studies have shown both methods are equally effective with CRB having a slightly shorter insertion to delivery interval, infection rates and no adverse neonatal effects.

The Cook Balloon Device

- Silicone double balloon catheter with stylet
- One balloon in Uterus (inflating valve marked U)
- One balloon in Vagina (inflating valve marked V)
- A blue valve marked S for Stylet
- Each balloon could be filled in with sterile water / saline up to maximum of 80ml
- Single use device supplied in sterile package

Indications

Outpatient use (>= 37 weeks)

Any patient requiring Induction of labour in the absence of fetal or maternal compromise

1. Postdate
2. Gestational Diabetes Mellitis of Type 2 Diabetes with stable blood sugar monitoring
3. Previous Lower Segment Caesarean Section (x1)
4. Previous precipitate labour with prostaglandin use
5. Obstetric Cholestasis
6. Tailing off fetal growth above the 10th centile with normal dopplers and Liquor volume
7. Essential Hypertension or non proteinuric PIH with stable Blood Pressure (medicated or not) and normal bloods
8. Maternal age
9. Symphysis Pubis Dysfunction
10. Reduced Fetal Movement with normal growth and liquor volume

Inpatient use (Any Gestation)

1. Suspected fetal compromise i.e. SGA/oligohydramnios (< 5cm AFI/ <2cm DVP)
2. Type 1 Diabetes
3. Grand Multiparous (Para >=4)
4. Post failed Induction of Labour with prostaglandins
5. Preeclampsia
6. Consultant decision
7. Patient request

Contraindications

1. Non-cephalic fetal presentation
2. Free/ ballotable head
3. Multiple pregnancy
4. Sepsis
5. Active genital herpes infection
6. Ruptured membranes
7. Any contraindication to induction of labour

pWho can insert it?
The CRB can be inserted by any healthcare professional (medical or midwifery) who has received the appropriate training

Booking and Admission procedure for CRB IOL (see flowchart 1)

1. IOL questionnaire filled on TRAK
2. Book a slot on Ward 119 (for inpatient) at RIE or DBU at SJH for the desired date and a slot the following day for removal (Minimum 12h; Max 24 Hours).
3. On admission, perform antenatal check:
   a. Full MEWS
   b. Confirm cephalic presentation
   c. CTG to assess fetal wellbeing

Procedure

Most staff will insert Cervical Ripening Balloon digitally under vaginal examination.

Equipment required:

1. Sterile Gloves and lubricating gel
2. 500ml bag of sodium chloride 0.9%
3. Red Filter Needle
4. 2 x 60ml Syringes, 4 x 20ml syringes
5. Red and Green Pen to mark syringes (not mandatory)
6. Wedge available if anticipating difficulty inserting

If unable to insert Cervical Ripening Balloon digitally a Speculum may have to be used to insert the Balloon under direct vision.

If inserting under direct vision

1. Lithotomy poles (Stirrups) – **Not mandatory.**
2. Speculum
3. Sterile Rampley's forceps
4. Sterile aquagel (optional)
5. 500ml bag of sodium chloride 0.9%
6. Red Filter Needle
7. 2 x 60ml Syringes, 4 x 20ml Syringes
8. Light source
9. Pre-packed CRB device

Patient preparation:

1. Procedure discussed with patient and verbal consent obtained
2. Encourage sustainable and comfortable position – consider use of wedge if anticipating difficult insertion
3. Vaginal examination, with consent, to determine if CRB is required
4. Open CRB pack and assemble stylet
5. During vaginal examination maintain hold of cervix using fingers to introduce CRB.

If inserting under direct vision

1. Procedure discussed with patient and verbal consent obtained
2. Place patient in lithotomy position (**Not mandatory**)
3. Open the CRB pack and assemble the stylet if required
4. Insert the speculum in vagina to fully visualise the cervix
5. Clean the cervix with wet gauze/ cotton roll
6. Use Rampley's Forceps to hold cervix in place while inserting stylus

Device placement:

1. Insert the device into the cervix and advance it until both balloons have entered the cervical canal (aquagel can be used as lubricant)
2. If the stylet is used then it should be withdrawn as soon as the 1st balloon is no longer in view or felt if not under direct vision.
3. Inflate the uterine balloon with 40 ml of sodium chloride through the blue valve marked '**U'**
   then pull the device back until the balloon abuts the internal os
4. The vaginal balloon is now visible (or felt) outside the external os. Inflate it with 20 ml of water through the green valve marked **'V'**
5. Remove the speculum
6. Add 40 ml water through valve **U** and 60 ml through valve **V.** The aim is to have 80mls in each balloon
7. If patient uncomfortable: reduce volume of fluid in vaginal balloon first, by 10ml increments
8. Advise use of 2 pairs of underwear – 1 with pad and valves passing through leg hole, then gently fold valves upwards and 2nd pair holding in place.

Post insertion monitoring:

1. Auscultation using sonicaid.
2. If normal, patient can go home and return 12-24 hours later to have it removed. At 12 hour point phone call from Ward 119 at RIE or Labour Ward at St John's to ensure well being. If bed available to return to labour ward for balloon removal. If bed not available at this point, phone call will be made from labour ward at both sites between 12 and 24 hours to notify when bed is available. If Labour Ward not able to accommodate by 24 hour point to return to Ward for balloon removal.
3. Can mobilise, eat and drink at leisure; should pass urine without difficulty. Please ensure can pass urine prior to discharge
4. Patient to contact OTA at RIE or LW at SJH and attend if: RFM, SRM, PV bleed, regular painful contractions (every 5 minutes), pain, CRB falls out, urine retention
5. If urine retention: withdraw 10mls from vaginal balloon until able to pass urine.

CRB removal (see flowchart 2)

- After minimum 12 hours (but no longer than 24 hours).
- Remove sooner if SRM or regular painful contractions >= 4:10 minutes

Procedure

- Check maternal observation
- Deflate both balloons and remove the device
- Allow a maximum of an hour to mobilise and for presenting part to descend
- Perform a VE to assess Bishop Score and suitability for ARM and do a membrane sweep.
- Auscultate Fetal Heart for 1 minute. CTG is not required unless abnormal auscultation
- Advise patient to mobilise
- If favourable for ARM discuss with labour ward for timing of transfer
  Liaise with LW for timing of transfer
- If not favourable for ARM proceed with any pre-agreed plan, or to be reviewed by/discussed with obstetrician for ongoing care

Outpatient induction of labour with Propess

Criteria
Low risk (no significant maternal or fetal risk factors)
Post dates (Term+10-14)
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 72 hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

Post treatment
After insertion of the Propess® pessary women should remain recumbent for 30 minutes. Thereafter, a 30 minute CTG should be performed. If reassuring, no further monitoring is required unless SRM or uterine activity occurs. Women may go home and be managed on an outpatient basis. Ensure they have the IOL patient information leaflet prior to going home and are advised to contact the relevant hospital if uterine activity occurs, SRM or any other concerns eg. reduced fetal movements, vaginal bleeding and women should be advised to remove the Propess® pessary and **attend the hospital immediately**. Women are asked to contact the hospital by telephone after 12 hours

Inpatient induction of labour with Propess

Where inpatient induction of labour is being undertaken for maternal or fetal reasons the indication should be documented on TRAK.
Prior to the onset of uterine activity the fetal heart should be auscultated as a minimum every 2 hours, when awake. CTG monitoring should commence with onset of regular painful contractions.

Induction of labour for women with pre labour rupture of membranes at term

SEE SEPARATE GUIDELINE

Induction using Propess®

Propess is the second line if Cervical Ripening Balloon cannot be used, or patient preference.

Contraindications to Propess® (as per SPC)

Propess® should not be used in women:

1. When labour has started.

2. When oxytocin drugs are being given.

3. When strong prolonged uterine contractions would be inappropriate such as in patients:

a. who have had previous major uterine surgery, e.g. caesarean section, myomectomy

b. with cephalopelvic disproportion

c. with fetal malpresentation

d. with suspicion or evidence of fetal distress

e. who have had more than three full term deliveries eg a Para 4 or more

f. previous surgery or rupture of the cervix

4. When there is current pelvic inflammatory disease, unless adequate prior treatment has been instituted.

5. When there is hypersensitivity to dinoprostone or to any of the excipients.

6. When there is placenta praevia or unexplained vaginal bleeding during the current pregnancy.

Cautions (for Propess®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. On admission, perform antenatal check:
    a. Full Mews
    b. Confirm cephalic presentation and engagement
    c. CTG to assess fetal wellbeing

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Ensure Propess pessary is administered within 20 minutes from removal from freezer.

4. Insert Propess high into the posterior fornix using aquagel, lying transversely

5.After Propess has been inserted the excess tape is placed in the lower part of the vagina to ensure that it can be removed.

6.Women to remain semi recumbent or left lateral for 30 minutes after insertion of pessary

7.If propess falls out and there is no regular contractions and cervix unfavourable then Propess can be re-inserted for remainder of period up to 24 hours maximum

8.Review at 12 hours to assess uterine activity and need for CTG or VE

9.Women should be reviewed and the Propess pessary removed at 24 hours with a cervical assessment.

Side effects of Propess®

Nausea, vomiting and diarrhoea are most commonly reported.
Uterine hypercontractility or hpertonus, uterine hyperstimulation, abruption, rapid cervical dilation, fetal bradycardia / fetal distress.

Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Genital oedema.
Rarely hypersensitivity reactions including anaphylaxis, uterine rupture ad cardiac arrest and disseminated intravascular coagulation.

Indications for removal of Propess®
Propess should be removed and the woman transferred to the labour ward in the following situations

- Established labour diagnosed
- BS ≥ 7
- There is evidence of uterine tachysystole, hypertonus or hyperstimulation
  Tachysystole = ≥5 contractions in 10 minutes with reassuring CTG
  Hypertonus = painful contraction lasting ≥ 90 seconds with reassuring CTG
  Hyperstimulation = tachysystole or hypertonus with non reassuring CTG
- Concerns about the fetal heart rate /CTG
- Vaginal bleeding
- There is evidence of maternal systemic adverse effect

Management if there is spontaneous rupture of membranes with Propess insitu

Inpatient:
Commence CTG
Assess contractions
If contractions >3:10 minutes then remove Propess, perform a VE to assess cervix and transfer to labour ward if in established labour.
If no contractions leave propess insitu up to a maximum of 12 hours post SRM or 24 hours post initial insertion.
If BS<7 Propess can be left in place until woman can be transferred to labour ward for oxytocinon.
If BS>7 then propess to be removed and transfer to labour ward.

Outpatient:
Patient to telephone hospital
Staff to ask the following questions:
Colour of liquor
Fetal movements
Are the contractions 3 or more in 10 minutes
Ask to attend
If contractions 3 or more in 10 minutes then ask patient to remove propess immediately.

Induction using Dinoprostone tablets

Dinoprostone tablets may be used for induction for women with **Parity 4 and 5** needing prostaglandin induction (only after Consultant Obstetrician review and consideration has been given to balloon induction). It may be used as a 2nd line agent if Propess where amniotomy is not possible (see appendix 3)

Contraindications to Dinoprostone tablet

Dinoprostine is not recommended in the following circumstances:

Same as Propess except

1. Grand multiparity with over 5 previous term pregnancies
2. Women with ruptured membranes

Cautions for dinoprostone

Same as propess

Procedure and Side Effects

Same as propess – follow flow chart (appendix 3)

Induction by Amniotomy

Amniotomy and oxytocin infusion should not be used as the primary method of induction unless there are specific indications eg, grand multiparity, contraindications to vaginal prostaglandin. Booking and criteria as previously described.

Induction with Oxytocinon will be the first line in following cases

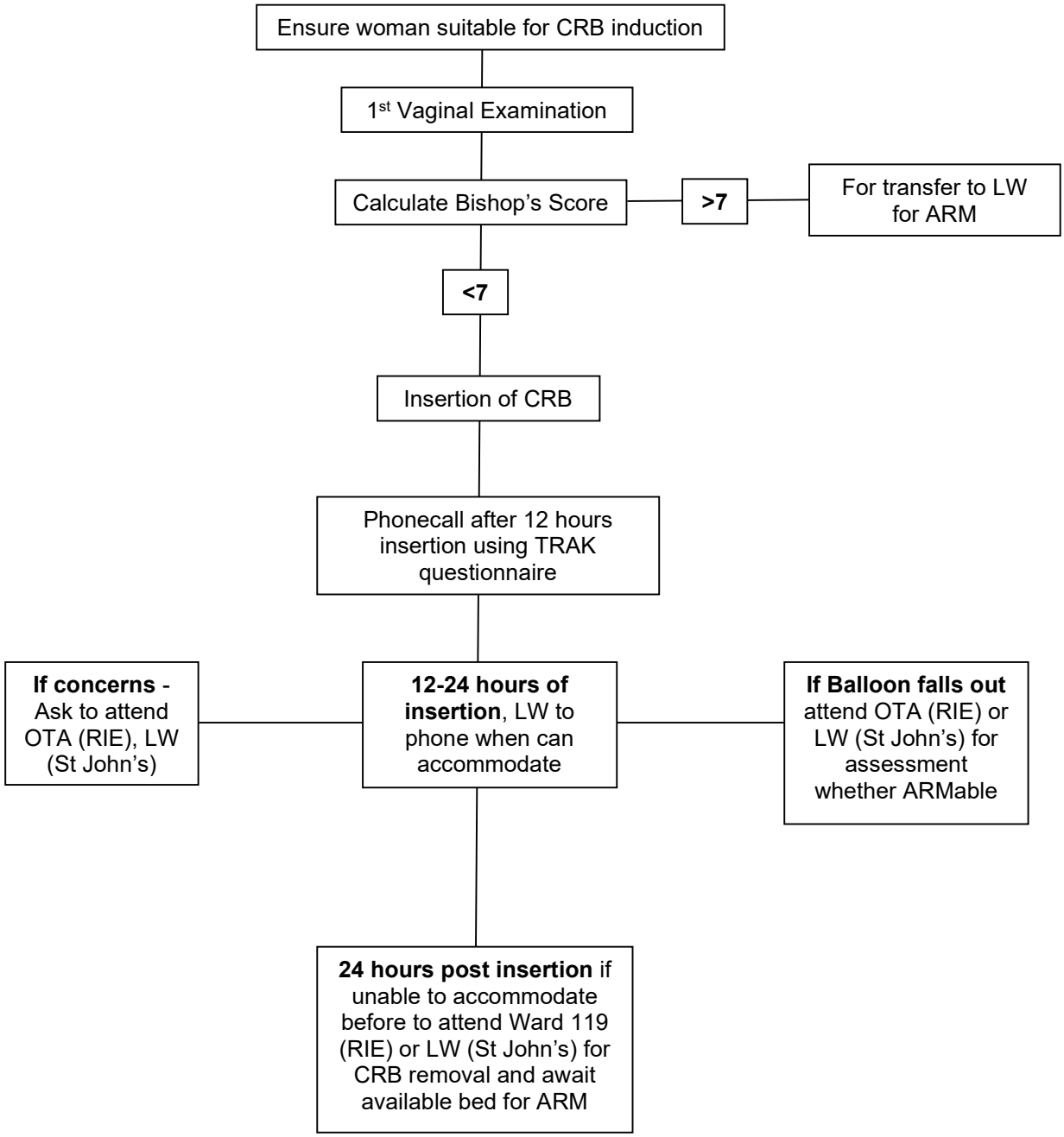
1. Women with SROM and evidence of chorioamnionitis
2. Women with GBS and Pre labour SRM
3. Meconium stained liquor

1. Record the fetal heart rate before amniotomy
2. Record the colour and amount of liquor
3. A fetal heart rate should be obtained immediately following ARM
4. If FHR normal then the woman should be encouraged to mobilise
5. In primigravida with no uterine activity commence oxytocin immediately after amniotomy
6. In parous women, assess uterine activity after 2 hours

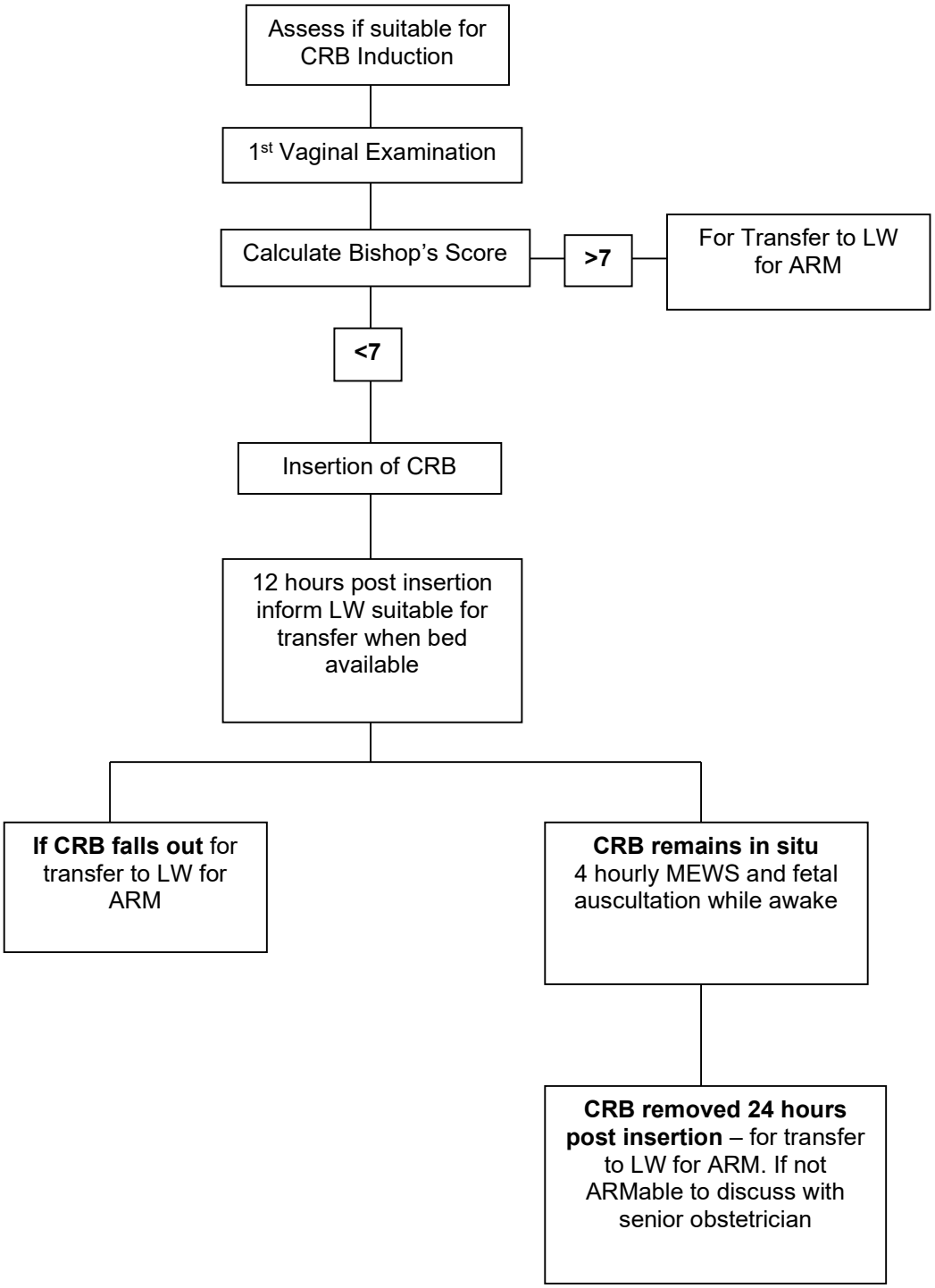
    - If contracting 3:10, then VE 4 hours after ARM
    - If contractions are < 3:10, then start oxytocin infusion

Once the oxytocin infusion has started a continuous CTG is required.
See separate guideline for use of Oxytocinon.

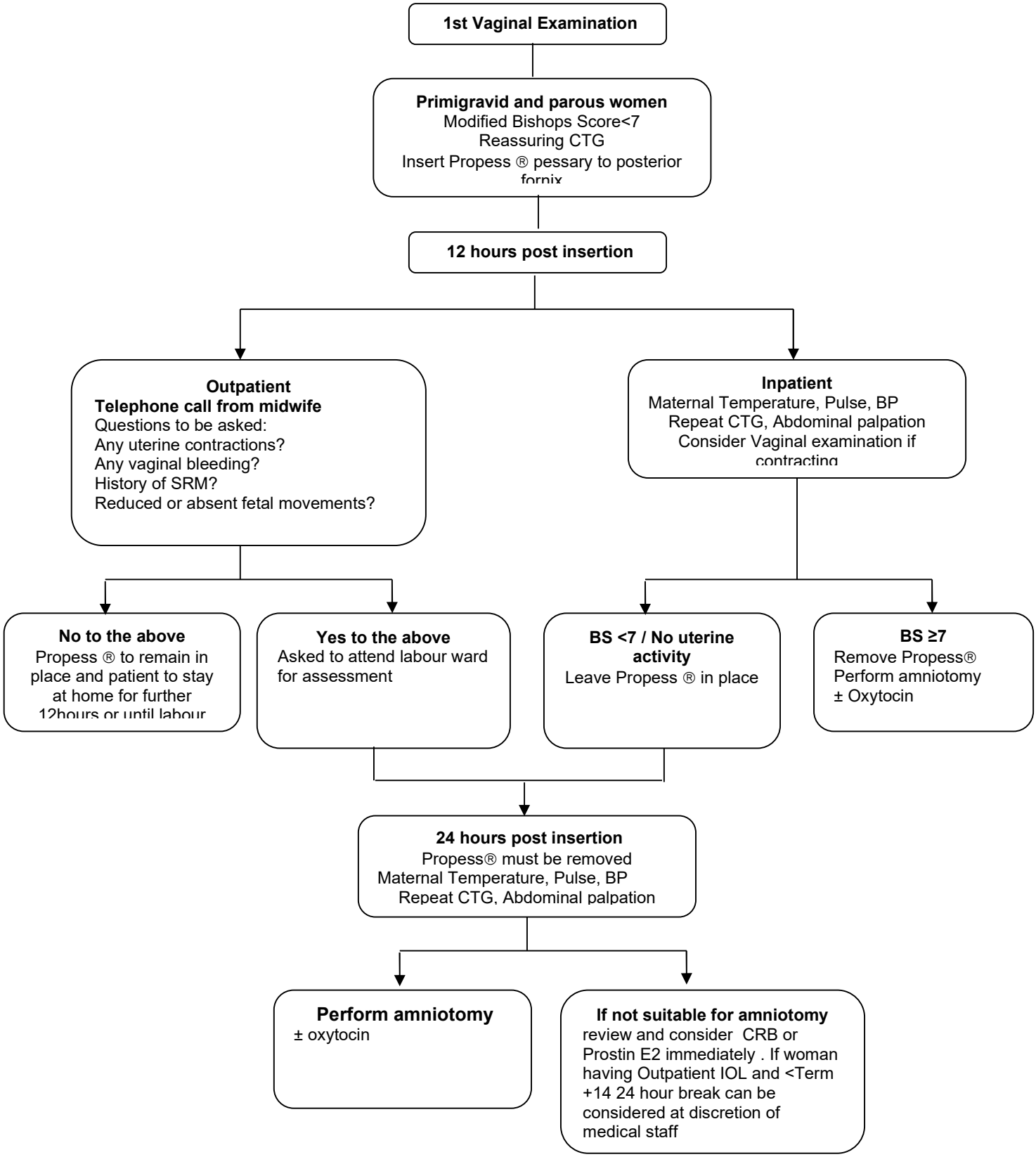
Appendix 1a – Induction of Labour using Cervical Ripening Balloon (Outpatient)



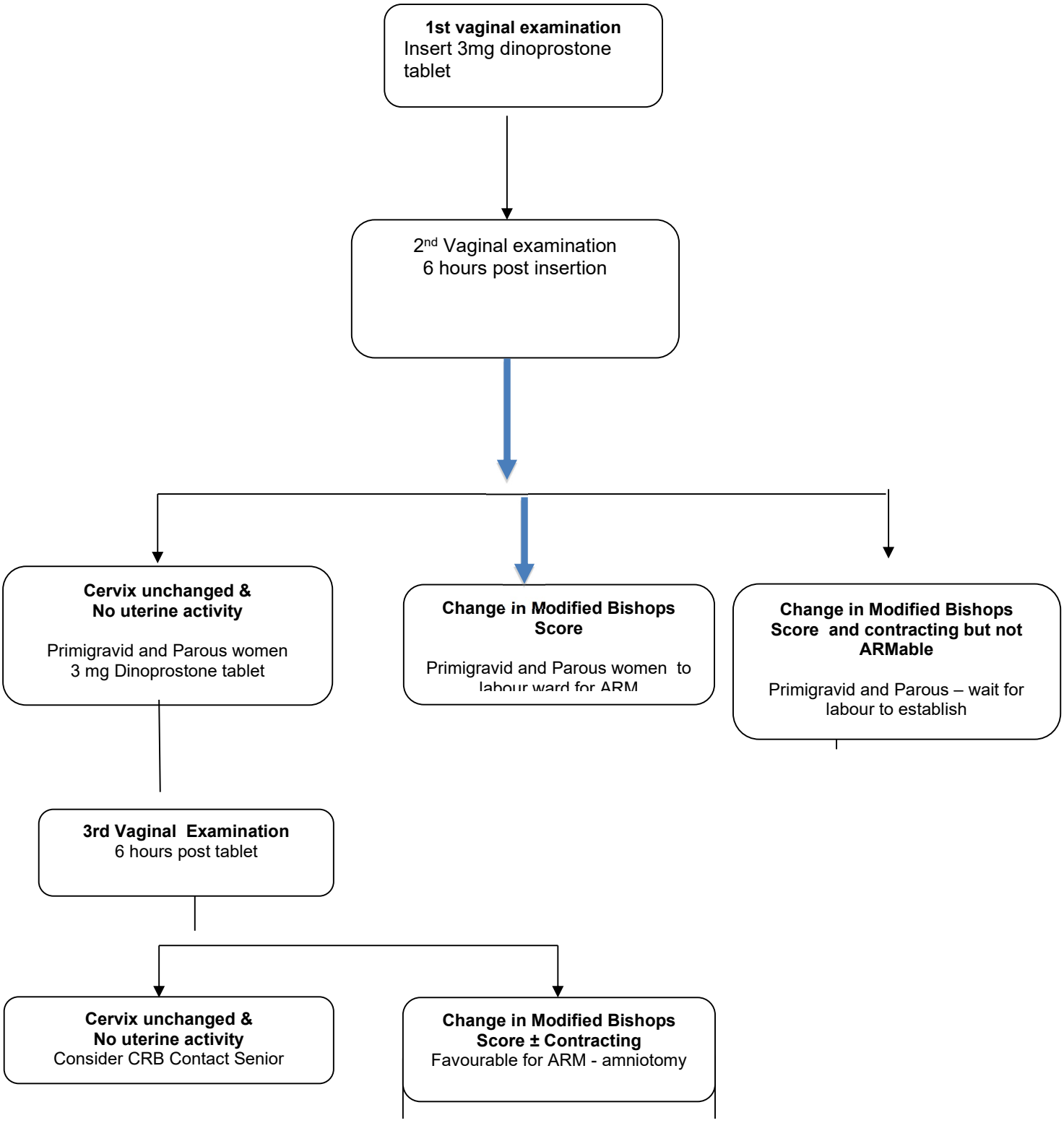
Appendix 1b – Induction of Labour using Cervical Ripening Balloon (Inpatient)



Appendix 2- Induction process using Propess® (Women Para 3 or less)



Appendix 3- Induction using Dinoprostone tablets – usually in primigravid or parous, following Propess® 24 hours and no uterine activity or unsuitable for ARM

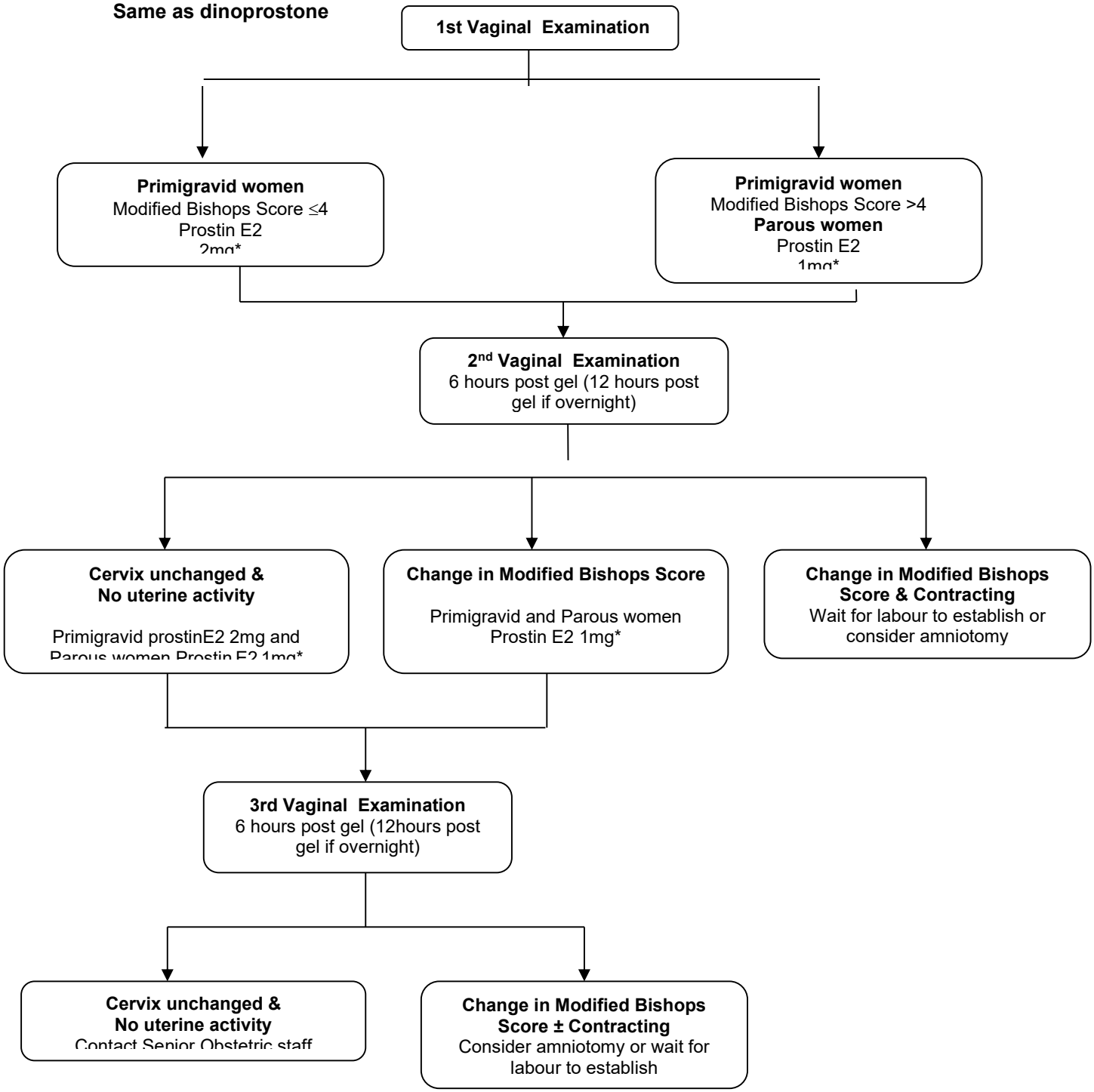


* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

Appendix 4
Induction using of Prostin E2® vaginal gel
(Replacement agent when no dinoprostone tablets in stock)

Contraindications to Prostin E2®
Same as propess
Cautions (for Prostin E2®)
Same as propess

Procedure
Same as dinoprostone



* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

ASSOCIATED DOCUMENTS:

Uterine Hyperstimulation guideline
Fetal monitoring guideline
Prelabour rupture membranes at term guideline
Group B streptococcus management
PGD Propess and Dinoprostone
Induction with cervical ripening balloon
http://intranet.lothian.scot.nhs.uk/NHSLothian/Healthcare/A-Z/MedicinesManagement/PatientGroupDirections/Documents/Acute%20Services%20PGDs/PGD%20236v1%20-%20Dinoprostone%20-%20Propess%20for%20induction%20of%20Labour%20%20-%20Midwives.pdf

5. REFERENCES:

[1] NICE Induction of labour Clinical Guideline 2015
[2] NICE Intrapartum care Clinical Guideline 2015
[4]eMC- Prostin E2 Vaginal gel 1mg, 2mg- Summary of product characteristics (SPC)
[4]eMC- Propess 10mg- Summary of product characteristics (SPC)
[4]eMC- Syntocinon - Summary of product characteristics (SPC)
Insertion of a double balloon catheter for induction of labout in pregnant women without previous caesarean section
Interventional procedures guidance [PG528] 2015

6. AUTHOR/S:

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Author 8: NHS Lothian Guideline Group

RIE INDUCTION OF LABOUR
CLINIC REFERRAL FORM

MIDWIFERY TEAM:

CONTACT NAME: CONTACT NUMBER:

Patient Details

NAME: _____
FORENAME *SURNAME*

CHI: DATE OF REFERRAL: GESTATIONAL AGE AT REFERRAL
CHI NUMBER

CONTACT NUMBER:

Clinic Details

HOSPITAL: PATIENT INFORMED OF REFERRAL BY COMMUNITY MIDWIFE :

CONSULTANT:
CONSULTANT'S INITIALS OR CLINIC CODE IF KNOWN

REASON FOR INDUCTION

INTERPRETER REQUIRED: LANGUAGE:

EXPECTED DELIVERY DATE:

Additional information:

Please return form to
loth.inductionslabourrie@nhslothian.scot.nhs.uk

Induction of labour
Maternity Services Lothian
Guideline

Contents:

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Page 13 Appendix 1a CRB outpatient

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Induction of labour – criteria and booking

Introduction:

Induction of labour (IOL) is the most commonly performed obstetric intervention and is associated with increased intervention rates. It is required in around 26% of pregnancies when the risks of continuing the pregnancy outweigh the benefits. This guideline aims to prevent inappropriate induction of labour and provide a standard of care pathway for those induced. In NHS Lothian, Cervical Ripening balloon is the first line of induction. Propess® can be used for those who do not meet the criteria for a Cervical Ripening balloon or those who choose to be induced using Propess®.

Staff should ensure women are given time to make decisions after a balanced and comprehensive discussion about risks and benefits of induction. The induction process can take 24-72 hours. Please provide a supportive environment with options of birthing balls, water immersion and peaceful setting for rest and sleep.

Encourage women to be mobile and active during the process of induction.

Maternal and Fetal Indications:

The decision to undertake IOL needs to be clear and clinically justified. It should be discussed with a senior obstetrician and the individualised plan clearly documented.

- Post dates (41+0-42+0)
- Maternal age over 40
- Preterm pre-labour rupture of membranes
- Prelabour rupture of membranes at term
- Diabetes; PIH/PET/Essential hypertension
- Obstetric cholestasis
- Fetal growth restriction
- Reduced fetal movements >39 weeks
- IVF or ICSI pregnancy after discussion with consultant (See AN pathway guideline)

This list is not exhaustive.

Contraindications to induction of labour

Absolute: Any contraindication to vaginal birth: e.g.

- Severe fetal growth restriction with evidence of fetal compromise
- Non cephalic presentation
- Placenta praevia
- Active genital herpes infection

- Invasive cervical carcinoma
- Previous classical caesarean section or breach of uterine cavity e.g. myomectomy with breach
- More than 2 previous caesarean sections
- Absolute cephalopelvic disproportion (pelvic deformity)

Relative:

- Previous caesarean section x2
- Grand multiparity (Para 6 or more)

All women should be offered a cervical assessment at 40 weeks which includes the Bishop score, offered a membrane sweep, discussion regarding IOL process and provision of the patient information leaflet. All the above information should be documented on Maternity TRAK.

Who can book IOL?

Community and Hospital Midwifery staff are able to organise induction of labour for low-risk women who are **Para 3 or less**.

Medical staff would need to authorise induction of labour for high risk women and grand multiparous (Para 4 or more). They must also complete the induction assessment questionnaire on Maternity TRAK.

Booking appointments
To book induction slots phone:

RIE Inpatient: Ward 119 - 0131 242 1194/0131 242 1191
Outpatient: DAU - 0131 242 2656 (Low risk from 41 weeks)

St John's: Ward 11 01506 524111
Day bed – 01506 524024 (Low risk from 41 weeks)

If Outpatient Induction of labour is being considered with Propess® ensure that the patient has an appointment for a liquor volume scan prior to attending for induction. This is not needed for outpatient induction with Cervical Ripening Balloon.

Where does the Induction of labour take place?

Induction of labour can be done as an outpatient if specific criteria are met, or as an inpatient. Each induction of labour method has specific inclusion criteria which will be detailed later. However, the prerequisite for outpatient setting for induction of labour, regardless of method are:

1. Singleton pregnancy
2. Cephalic presentation
3. Availability of private transport
4. Availability of home landline or mobile phone

5. Ability to communicate in English

6. Patient consent

Hospital procedure on admission for induction of labour

On arrival for induction of labour, the midwife should continue the induction assessment questionnaire ensuring that they have completed the risk assessments questions and performed a Modified Bishops Score. If all risk assessment questions are answered 'Yes' and the Modified Bishops Score is <7 then the midwife may administer cervical ripening balloon or Propess® (which can be administered under PGD).

If induction is medically indicated but the patient declines induction, then a discussion with a senior obstetrician should take place and an individualised care plan agreed.

Postdates

This is the most common indication aiming at reducing the risk of late stillbirth. There is a small increased risk of stillbirth from 1/1000 to 2-3/1000 pregnancies after 42 weeks. IOL is offered for that reason from 41 weeks, when induction reduces perinatal mortality without increasing the caesarean section rate.

Maternal age 40yrs or more at time of booking

In this group the risk of stillbirth is increased and therefore induction of labour at term should be considered. Therefore at term IOL will be discussed and offered and the individualised care plan documented on TRAK.

Previous caesarean section

Spontaneous labour is preferred where possible, but when IOL is indicated the method will be limited to cervical ripening balloon, membrane sweep +/- amniotomy +/- syntocinon.

All patients should have been seen by an obstetrician antenatally and a full discussion highlighting potential maternal and fetal risks of labour outlined and documented on TRAK.

Maternal Request

Induction of labour should not be routinely offered on maternal request only. The patient should have a discussion with their consultant and the risks and benefits documented. Induction of labour in those circumstances might be considered at or after 40 weeks.

Methods of induction of labour

1) Membrane sweep

2) Cervical ripening balloon

3) Prostaglandins

4) Amniotomy

See separate guideline for use of oxytocin.

Women should be given advice on induction of labour and the patient information leaflet in the antenatal period, and then be included in the decision-making process for their induction.

The aim for induction should always be to use the least intervention needed. Each woman should have an individualised induction plan to optimise her care.

Mechanical induction of labour with Cervical Ripening Balloon (CRB) is the first line method and should be suitable for most women unless contraindicated or declined by patient.
Each patient should have clearly documented on Maternity TRAK the first line chosen and further management plan should that method fail.

Membrane sweep

There is established evidence that membrane sweeps at term significantly reduce the need for induction. It is thought to be effective by increasing local endogenous production of prostaglandins. Evidence suggests benefit from repeated outpatient membrane sweeps resulting in **increased SVD rate, reduced induction to delivery interval, reduced use of oxytocin and improved women's satisfaction.**

To perform a sweep, a finger is inserted as high as possible through the internal cervical os and the membranes are swept off the lower pole of the uterus by a complete circular sweep of the finger, once clockwise and once anticlockwise. If the internal os is closed the cervical canal should be 'swept'. During this process a modified Bishops score should be calculated and clearly documented in Maternity Trak. The fetal heart should be auscultated prior to and after the membrane sweep and documented.

At both 40 and 41 weeks women should be offered a vaginal examination for membrane sweep. Additional membrane sweeping may be offered if labour does not start spontaneously. This may be done prior to 40 weeks if authorised by medical staff.

Induction using Cervical Ripening Balloon

The Cook Cervical Ripening Balloon (CRB) is a silicone double balloon catheter with an adjustable-length malleable stylet. The Cook Cervical Ripening Balloon is indicated for mechanical dilation of the cervical canal when the cervix is unfavourable for induction. Pharmacological agents have associated risk of hyperstimulation (3-20%) whereas the balloon induction does not cause significant uterine contraction or systemic side effects.

Studies have shown both methods are equally effective with CRB having a slightly shorter insertion to delivery interval, infection rates and no adverse neonatal effects.

The Cook Balloon Device

- Silicone double balloon catheter with stylet
- One balloon in uterus (inflating valve marked U)
- One balloon in vagina (inflating valve marked V)
- A blue valve marked S for stylet
- Each balloon could be filled in with sterile water / saline up to maximum of 80ml
- Single use device supplied in sterile package

Indications

Outpatient use (>= 37 weeks)

Any patient requiring induction of labour in the absence of fetal or maternal compromise

1. Postdates
2. Gestational diabetes mellitus or type 2 diabetes with stable blood sugar monitoring
3. Previous lower segment caesarean section (x1)
4. Previous precipitate labour with prostaglandin use
5. Obstetric cholestasis
6. Essential hypertension or non-proteinuric PIH with stable blood pressure (medicated or not) and normal bloods
7. Maternal age
8. Symphysis pubis dysfunction
9. Reduced fetal movement with normal growth and liquor volume

Inpatient use (Any Gestation)

1. Fetal growth restriction small for gestational age(SGA), oligohydramnios (< 5cm AFI/ <2cm DVP)
2. Type 1 diabetes
3. Grand multiparous (Para >=4)
4. Unsuccessful induction of labour with prostaglandins
5. Preeclampsia
6. Consultant decision
7. Patient request

Contraindications

1. Non-cephalic fetal presentation
2. Free/ ballotable head
3. Sepsis
4. Active genital herpes infection
5. Ruptured membranes
6. Any contraindication to induction of labour

Who can insert it?

The CRB can be inserted by any healthcare professional (medical or midwifery) who has received the appropriate training

Booking and admission procedure for CRB IOL (see flowchart 1)

1. IOL questionnaire completed on TRAK
2. Book a slot on Ward 119 (for inpatient) at RIE or DBU at SJH for the desired date and a slot the following day for removal (Minimum 12h; Max 24 Hours).
3. On admission, perform antenatal check:
   a. Full MEWS
   b. Confirm cephalic presentation
   c. CTG to assess fetal wellbeing

Procedure

Most staff will insert Cervical Ripening Balloon digitally under vaginal examination.

Equipment required:

1. Sterile Gloves and lubricating gel
2. 500ml bag of sodium chloride 0.9%
3. Red filter needle
4. 2 x 60ml syringes, 4 x 20ml syringes
5. Red and green en to mark syringes (not mandatory)
6. Wedge available if anticipating difficulty inserting

If unable to insert Cervical Ripening Balloon digitally a speculum may have to be used to insert the balloon under direct vision.

If inserting under direct vision

1. Lithotomy poles (stirrups) – **Not mandatory.**
2. Speculum
3. Sterile Rampley's forceps
4. Sterile aquagel (optional)
5. 500ml bag of sodium chloride 0.9%
6. Red filter needle
7. 2 x 60ml syringes, 4 x 20ml syringes
8. Light source
9. Pre-packed CRB device

Patient preparation:

1. Procedure discussed with patient and verbal consent obtained
2. Encourage sustainable and comfortable position – consider use of wedge if anticipating difficult insertion
3. Vaginal examination, with consent, to determine if CRB is required
4. Open CRB pack and assemble stylet
5. During vaginal examination maintain hold of cervix using fingers to introduce CRB.

If inserting under direct vision

1. Procedure discussed with patient and verbal consent obtained
2. Place patient in lithotomy position (**Not mandatory**)
3. Open the CRB pack and assemble the stylet if required
4. Insert the speculum in vagina to fully visualise the cervix
5. Clean the cervix with wet gauze/ cotton roll
6. Use Rampley's Forceps to hold cervix in place while inserting stylus

Device placement:

1. Insert the device into the cervix and advance it until both balloons have entered the cervical canal (aquagel can be used as lubricant)
2. If the stylet is used then it should be withdrawn as soon as the 1st balloon is no longer in view or felt if not under direct vision.
3. Inflate the uterine balloon with 40 ml of sodium chloride through the blue valve marked '**U'**
   then pull the device back until the balloon abuts the internal os
4. The vaginal balloon is now visible (or felt) outside the external os. Inflate it with 20 ml of water through the green valve marked **'V'**
5. Remove the speculum
6. Add 40 ml water through valve **U** and 60 ml through valve **V.** The aim is to have 80mls in each balloon
7. If patient uncomfortable: reduce volume of fluid in vaginal balloon first, by 10ml increments
8. Advise use of 2 pairs of underwear – 1 with pad and valves passing through leg hole, then gently fold valves upwards and 2nd pair holding in place.

Post insertion monitoring:

1. CTG to be performed
2. If normal, patient can go home and return 12-24 hours later to have it removed. At 12 hour point phone call from Ward 119 at RIE or Labour Ward at St John's to ensure well being. If bed available to return to labour ward for balloon removal. If bed not available at this point, phone call will be made from labour ward at both sites between 12 and 24 hours to notify when bed is available. If Labour Ward not able to accommodate by 24 hour point to return to Ward for balloon removal.
3. Can mobilise, eat and drink at leisure; should pass urine without difficulty. Please ensure can pass urine prior to discharge
4. Patient to contact OTA at RIE or LW at SJH and attend if: RFM, SRM, PV bleed, regular painful contractions (every 5 minutes), pain, CRB falls out, urinary retention
5. If urinary retention: withdraw 10mls from vaginal balloon until able to pass urine.

CRB removal (see flowchart 2)

- After minimum 12 hours (but no longer than 24 hours).
- Remove sooner if SRM or regular painful contractions >= 4:10 minutes

Procedure

- Check maternal observation
- Deflate both balloons and remove the device
- CTG should be performed post removal of CRB
- Allow a maximum of an hour to mobilise and for presenting part to descend
- Perform a VE to assess bishop score and suitability for ARM and do a membrane sweep.
- If favourable for ARM discuss and liaise with labour ward for timing of transfer
- If not favourable for ARM proceed with any pre-agreed plan, or to be reviewed by/discussed with obstetrician for ongoing care

Outpatient induction of labour with Propess®

Criteria
Low risk (no significant maternal or fetal risk factors)
Post dates 41- 42 weeks
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 72 hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

Post treatment
After insertion of the Propess® pessary women should remain recumbent for 30 minutes. Thereafter, a 30 minute CTG should be performed. If reassuring, no further monitoring is required unless SRM or uterine activity occurs. Women may go home and be managed on an outpatient basis. Ensure they have the IOL patient information leaflet prior to going home and are advised to contact the relevant hospital if uterine activity occurs, SRM or any other concerns e.g., reduced fetal movements, vaginal bleeding and women should be advised to remove the Propess® pessary and **attend the hospital immediately**. Women are asked to contact the hospital by telephone after 12 hours

Inpatient induction of labour with Propess®

Where inpatient induction of labour is being undertaken for maternal or fetal reasons the indication should be documented on TRAK.
Prior to the onset of uterine activity the fetal heart should be auscultated as a minimum every 2 hours, when awake. CTG monitoring should commence with onset of regular painful contractions.

Induction of labour for women with pre labour rupture of membranes at term

SEE SEPARATE GUIDELINE

Induction using Propess®

Propess® is the second line if Cervical Ripening Balloon cannot be used, or patient preference.

Contraindications to Propess® (as per SPC)

Propess® should not be used in women:

1. When labour has started.

2. When oxytocin drugs are being given.

3. When strong prolonged uterine contractions would be inappropriate such as in patients:

a. who have had previous major uterine surgery, e.g. caesarean section, myomectomy

b. with cephalopelvic disproportion

c. with fetal malpresentation

d. with suspicion or evidence of fetal distress

e. who have had more than three full term deliveries e.g., a Para 4 or more

f. previous surgery or rupture of the cervix

4. When there is current pelvic inflammatory disease, unless adequate prior treatment has been instituted.

5. When there is hypersensitivity to dinoprostone or to any of the excipients.

6. When there is placenta praevia or unexplained vaginal bleeding during the current pregnancy.

Cautions (for Propess®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. On admission, perform antenatal check:
   a. Full Mews
   b. Confirm cephalic presentation and engagement
   c. CTG to assess fetal wellbeing

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Ensure Propess® pessary is administered within 20 minutes from removal from freezer.

4. Insert Propess® high into the posterior fornix using aquagel, lying transversely

5.After Propess®has been inserted the excess tape is placed in the lower part of the vagina to ensure that it can be removed.

6.Women to remain semi recumbent or left lateral for 30 minutes after insertion of pessary

7.If Propess® falls out and there is no regular contractions and cervix unfavourable then it can be re-inserted for remainder of period up to 24 hours maximum

8.Review at 12 hours to assess uterine activity and need for CTG or VE

9.Women should be reviewed and the Propess® pessary removed at 24 hours with a cervical assessment.

Side effects of Propess®

Nausea, vomiting and diarrhoea are most commonly reported.
Uterine hypercontractility or hypertonus, uterine hyperstimulation, abruption, rapid cervical dilation, fetal bradycardia / fetal distress.

Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Genital oedema.
Rarely hypersensitivity reactions including anaphylaxis, uterine rupture ad cardiac arrest and disseminated intravascular coagulation.

Indications for removal of Propess®
Propess® should be removed and the woman transferred to the labour ward in the following situations

- Established labour diagnosed
- BS ≥ 7
- There is evidence of uterine tachysystole, hypertonus or hyperstimulation
  Tachysystole = ≥5 contractions in 10 minutes with reassuring CTG
  Hypertonus = painful contraction lasting ≥ 90 seconds with reassuring CTG
  Hyperstimulation = tachysystole or hypertonus with non-reassuring CTG
- Concerns about the fetal heart rate /CTG
- Vaginal bleeding
- There is evidence of maternal systemic adverse effect

Management if there is spontaneous rupture of membranes with Propess® insitu

Inpatient:
Commence CTG
Assess contractions
If contractions >3:10 minutes then remove Propess®, perform a VE to assess cervix and transfer to labour ward if in established labour.
If no contractions leave Propess® insitu up to a maximum of 12 hours post SRM or 24 hours post initial insertion.
If BS<7 Propess® can be left in place until woman can be transferred to labour ward for oxytocin.
If BS>7 then Propess® to be removed and transfer to labour ward.

Outpatient:

Patient to telephone hospital
Staff to ask the following questions:
Colour of liquor
Fetal movements
Are the contractions 3 or more in 10 minutes
Ask to attend
If contractions 3 or more in 10 minutes then ask patient to remove Propess® immediately.

Induction using Dinoprostone tablets

Dinoprostone tablets may be used for induction for women with **Parity 4 and 5** needing prostaglandin induction (only after Consultant Obstetrician review and consideration has been given to balloon induction). It may be used as a 2nd line agent if Propess® or? amniotomy is not possible (see appendix 3)

Contraindications to Dinoprostone tablet

Dinoprostone is not recommended in the following circumstances:

Same as Propess®except

1. Grand multiparity with over 5 previous term pregnancies
2. Women with ruptured membranes

Cautions for dinoprostone

Same as Propess®

Procedure and Side Effects

Same as Propess® – follow flow chart (appendix 3)

Induction by amniotomy

Amniotomy and oxytocin infusion should not be used as the primary method of induction unless there are specific indications e.g., grand multiparity, contraindications to vaginal prostaglandin. Booking and criteria as previously described.

Induction with oxytocin will be the first line in following cases

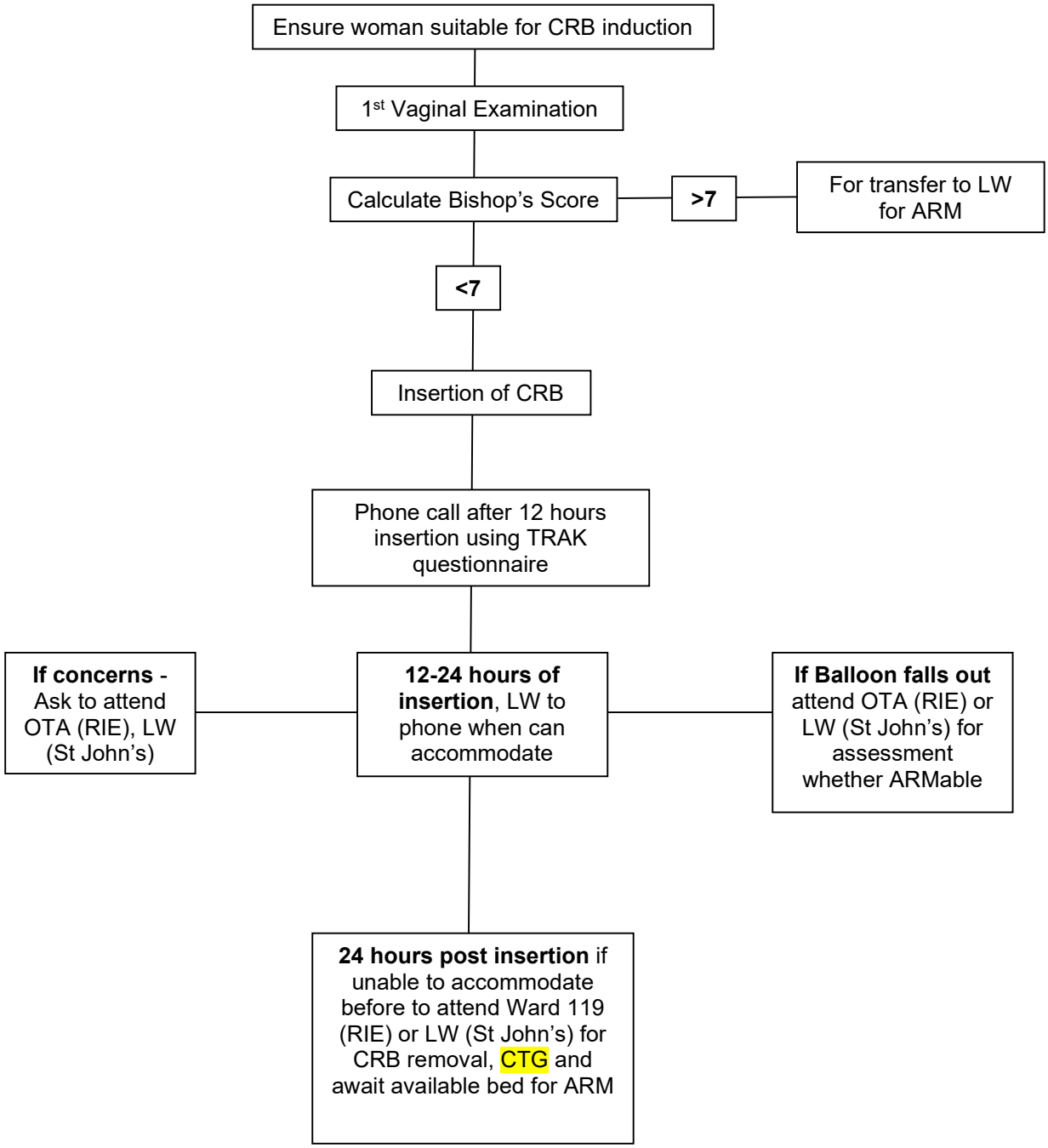
1. Women with SRM and evidence of chorioamnionitis
2. Women with GBS and pre labour SRM

1. Record the fetal heart rate before amniotomy
2. Record the colour and amount of liquor
3. A fetal heart rate should be obtained immediately following ARM
4. If FHR normal then the woman should be encouraged to mobilise
5. In primigravida with no uterine activity commence oxytocin immediately after amniotomy
6. In parous women, assess uterine activity after 2 hours

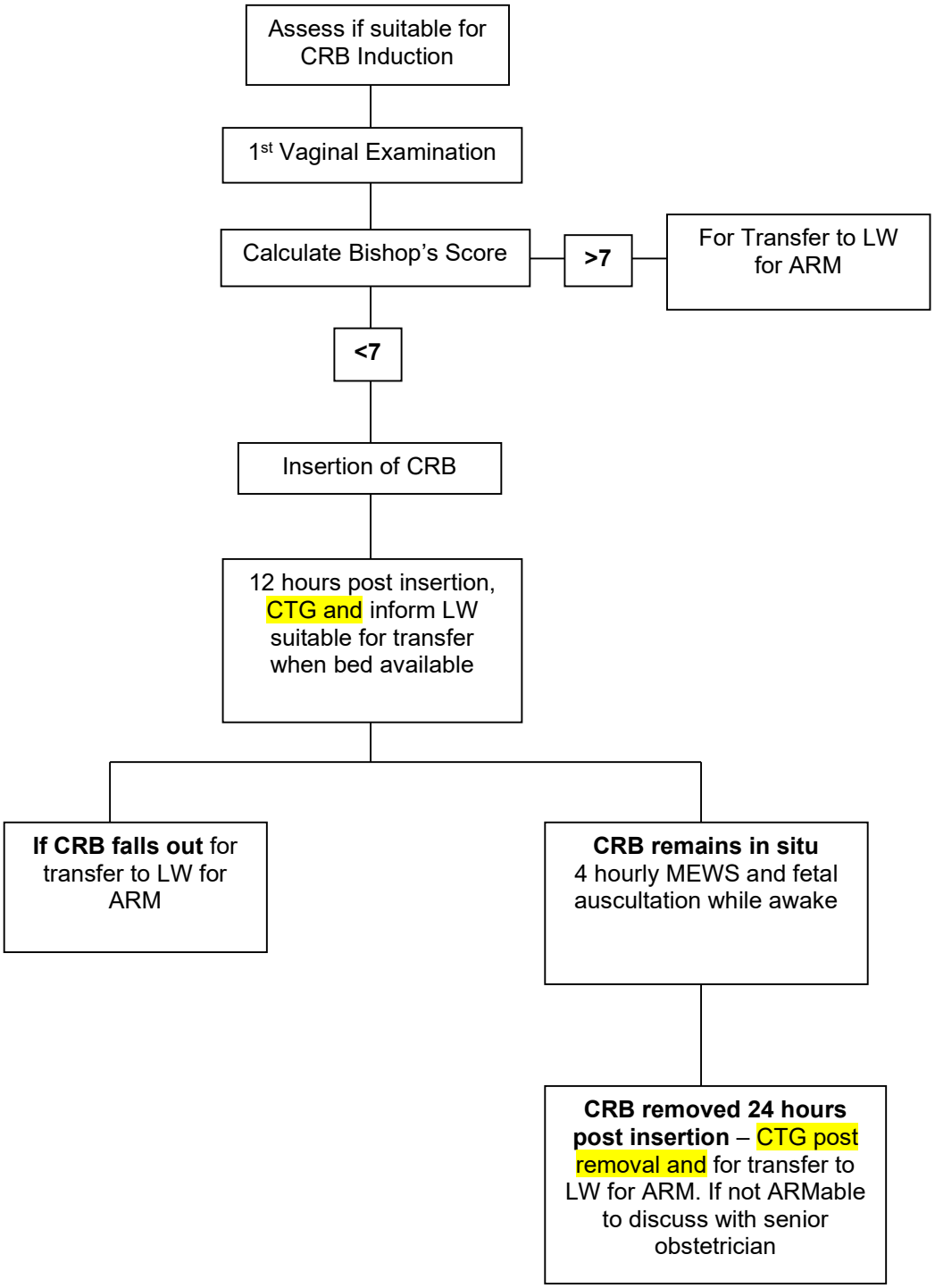
    - If contracting 3:10, then VE 4 hours after ARM
    - If contractions are < 3:10, then start oxytocin infusion

Once the oxytocin infusion has started a continuous CTG is required.
See separate guideline for use of oxytocin

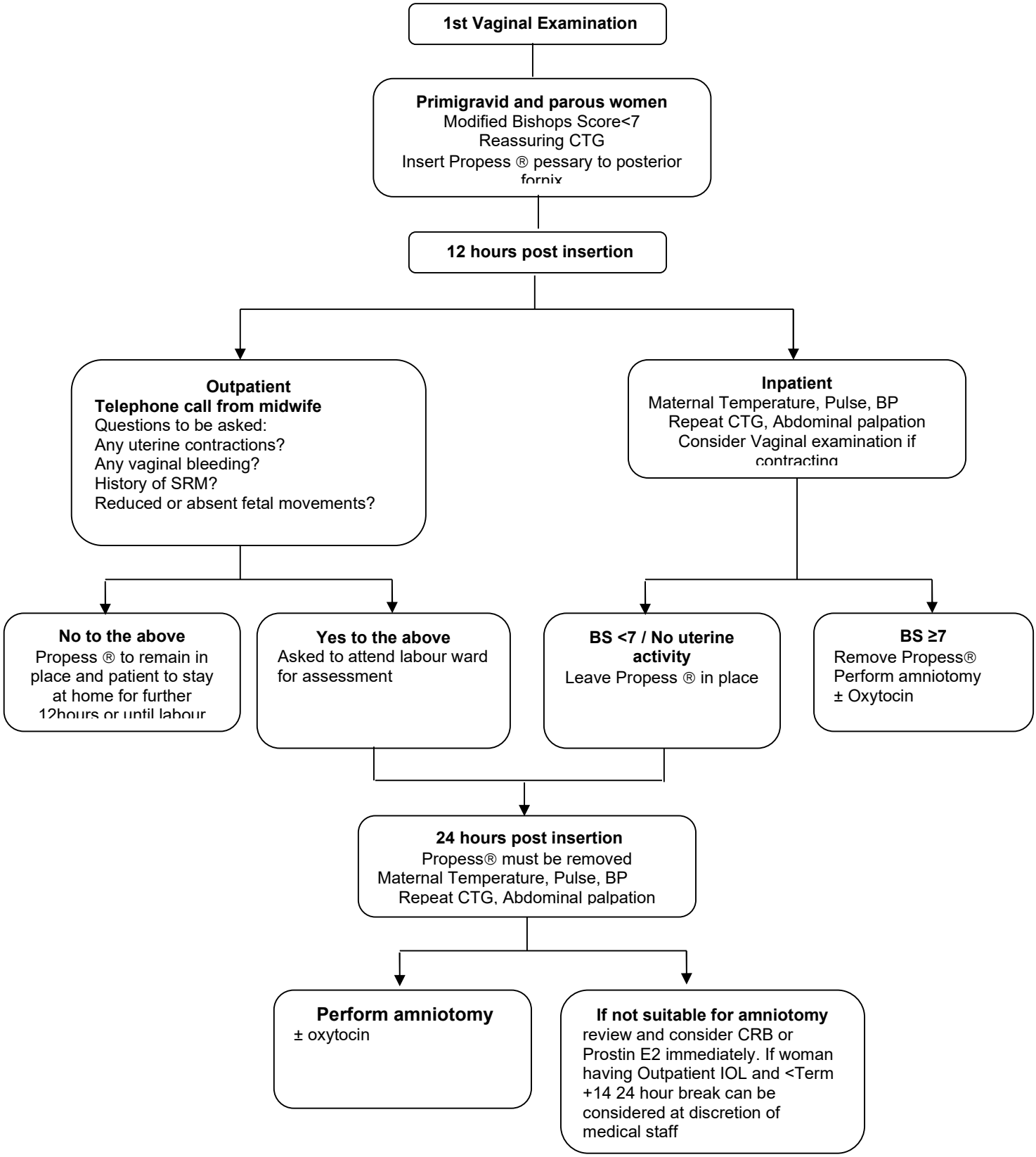
Appendix 1a – Induction of labour using Cervical Ripening Balloon (Outpatient)



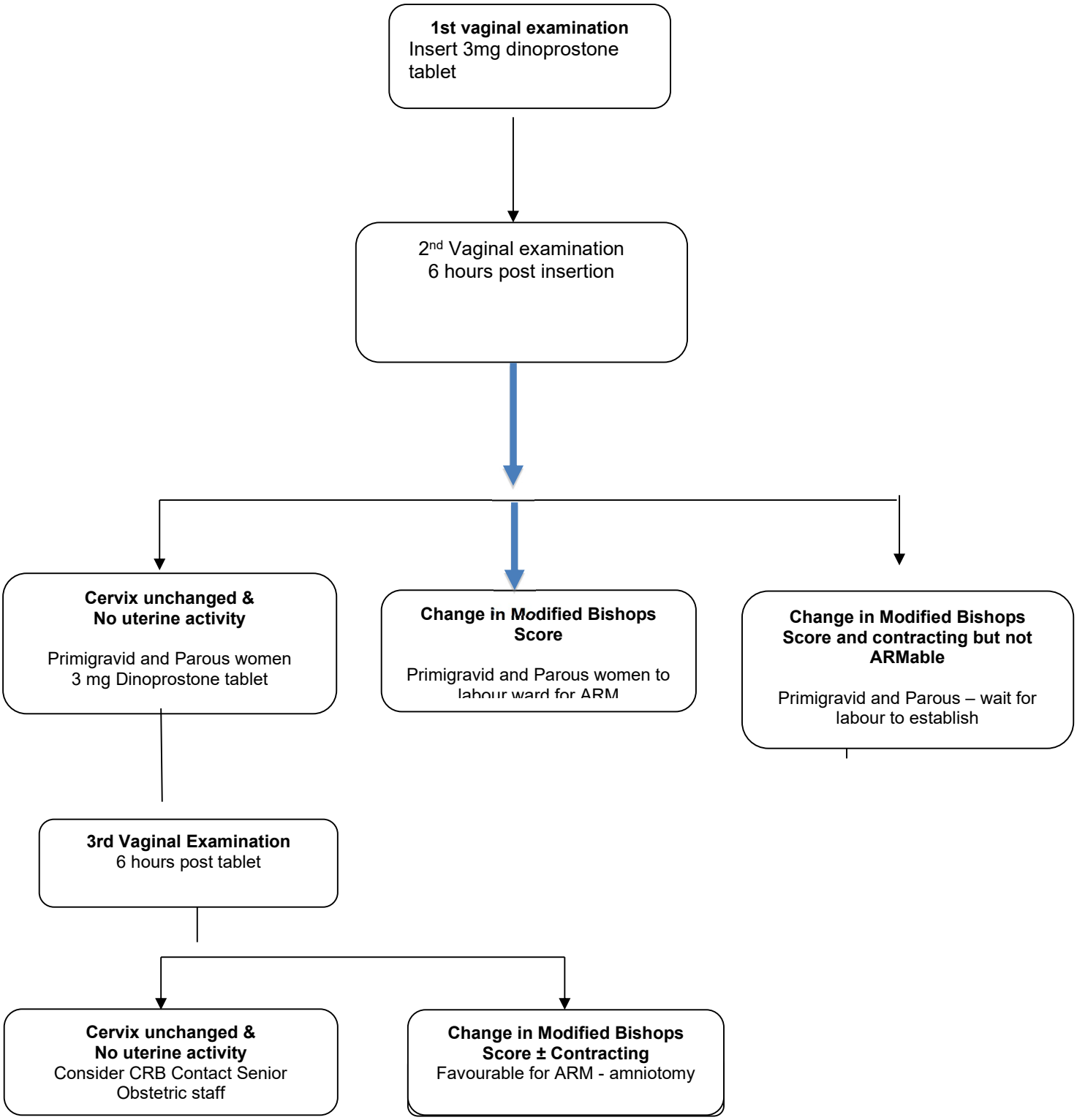
Appendix 1b – Induction of labour using Cervical Ripening Balloon (Inpatient)



Appendix 2- Induction process using Propess® (Women Para 3 or less)



Appendix 3- Induction using Dinoprostone tablets – usually in primigravid or parous, following Propess® 24 hours and no uterine activity or unsuitable for ARM

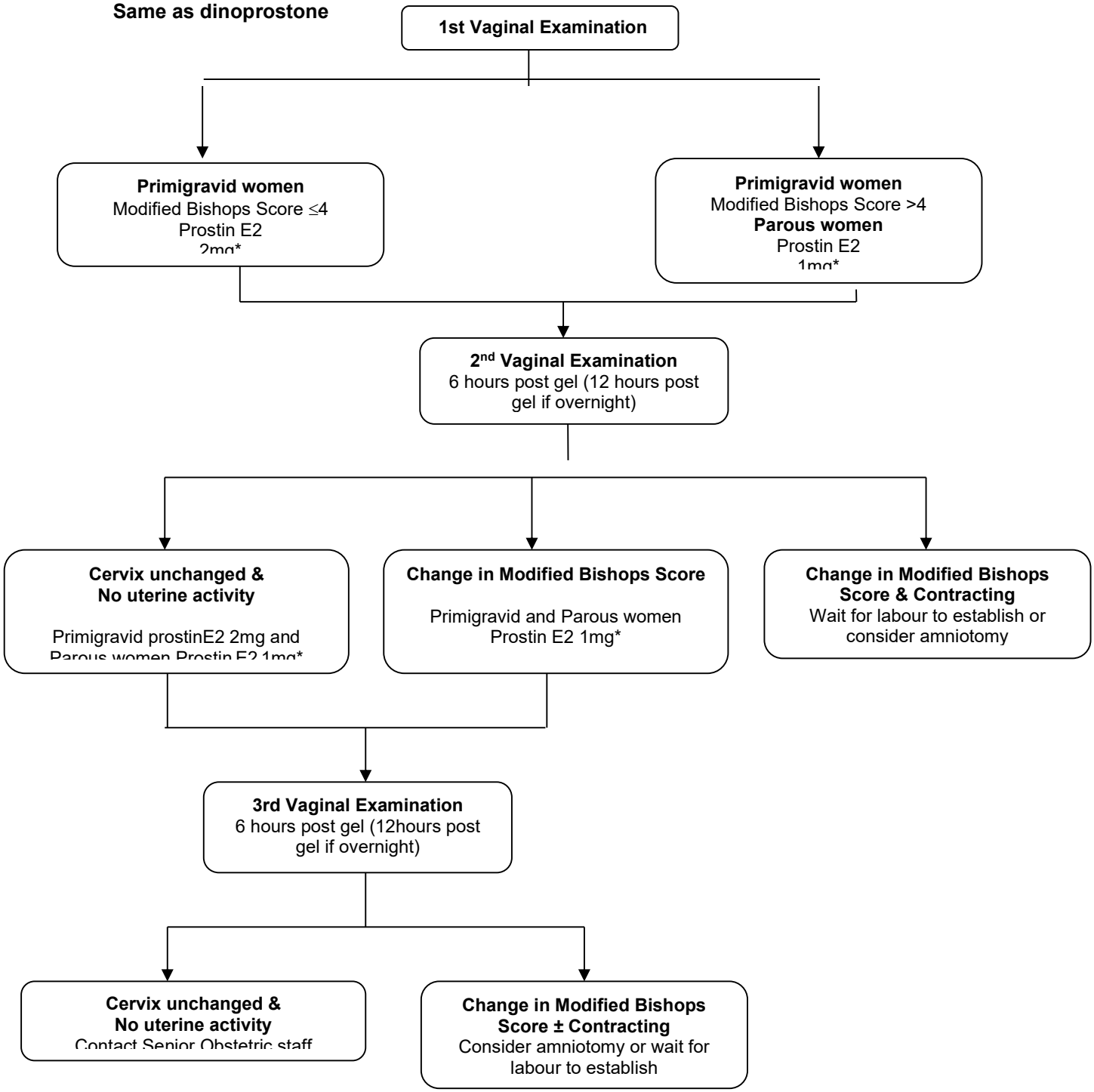


* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

Appendix 4
Induction using of Prostin E2® vaginal gel
(Replacement agent when no dinoprostone tablets in stock)

Contraindications to Prostin E2®
Same as Propess®
Cautions (for Prostin E2®)
Same as Propess®

Procedure
Same as dinoprostone



* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

ASSOCIATED DOCUMENTS:

Uterine Hyperstimulation guideline
Fetal monitoring guideline
Prelabour rupture membranes at term guideline
Group B streptococcus management
PGD Propess® and Dinoprostone
Induction with cervical ripening balloon
http://intranet.lothian.scot.nhs.uk/NHSLothian/Healthcare/A-Z/MedicinesManagement/PatientGroupDirections/Documents/Acute%20Services%20PGDs/PGD%20236v1%20-%20Dinoprostone%20-%20Propess%20for%20induction%20of%20Labour%20%20-%20Midwives.pdf

5. REFERENCES:

[1] NICE Induction of labour Clinical Guideline 2015
[2] NICE Intrapartum care Clinical Guideline 2015
[4]eMC- Prostin E2 Vaginal gel 1mg, 2mg- Summary of product characteristics (SPC)
[4]eMC- Propess® 10mg- Summary of product characteristics (SPC)
[4]eMC- Syntocinon - Summary of product characteristics (SPC)
Insertion of a double balloon catheter for induction of labour in pregnant women without previous caesarean section
Interventional procedures guidance [PG528] 2015

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Author 8: NHS Lothian Guideline Group

Induction of labour
Maternity Services Lothian
Guidelines

1. INTRODUCTION:

Induction of labour is common and associated with increased intervention rates. This guideline aims to prevent inappropriate induction of labour and provide a standard care pathway for those induced.

2. AIM:

To provide all staff in maternity care with access to clear guidance on the indications for induction of labour, the referral pathway and the process of labour induction.

3. GUIDELINES:

Induction of labour-criteria and booking	page 2
Membrane sweeping	page 5
Outpatient induction	page 6
Inpatient induction	page 6
Induction using Propess®	Page 7
Induction using vaginal Prostin E2® gel	page 9
Induction by amniotomy	page 11
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Non-routine use of oxytocin for induction of labour	page 14
Augmentation for pre-labour rupture of membranes	page 15
Appendix 1 Induction process using Propess®	page 16
Appendix 2 Insertion of Propess®	page 17
Appendix 3 Spontaneous rupture of membranes with Propess®	page 17
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Appendix 5-Induction for women Para 4 or 5	page 19
Appendix 5-Management of pre-labour rupture of membranes at term	page 20

Induction of labour – criteria and booking

1) Postdates

The most frequent indication is for prolonged pregnancy to avoid late stillbirth that occurs in 2-3/1000 pregnancies at 42 weeks. Staff may offer induction between 10-14 days post EDD, when induction reduces perinatal mortality without increasing the caesarean section rate[1]. Staff are able to refuse unless gestation is at least T+10 AND a vaginal examination has been performed in the clinic to assess the Bishops score. All women should be offered a membrane sweep at this VE unless this has already been performed.

Midwifery staff are able organise induction of labour for low risk women who are **Para 3 or less**. They must complete the Induction assessment questionnaire (Maternity TRAK) and if all the induction risk assessment questions are answered 'Yes' then induction can be booked.

The following criteria have to be met for outpatient induction of labour to be appropriate:
Low risk (no significant maternal or fetal risk factors)
Post dates (Term+10-14)
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 48hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

On arrival for induction of labour the midwife should complete a new induction assessment questionnaire ensuring that she has completed the risk assessments questions and performed a Modified Bishops Score. If all risk assessment questions are answered 'Yes' and the Modified Bishops Score is <7 then the midwife may administer Propess under PGD

All women who are **Para 4 or more** should have an appointment with a senior Obstetrician between Term and Term+12. This group of women are not suitable for outpatient induction of labour

2) Maternal age over 40yrs

In this group induction is recommended at T+7 in primigravids, and in parous women whose last delivery was more than 10 years ago. In parous women whose last delivery was less then 10 years ago, induction should be planned at T+10-14. All these women should be discussed with a Consultant Obstetrician

Women over 40 years declining IOL

Fetal monitoring should start at T+14 (or T+7 for primips over 40yrs). This should be a CTG and LV performed on that day or nearest Friday/ Monday if falls on a weekend. This should then continue every second day until delivery AND further discussion arranged with a Consultant.

3) <u>Maternal and fetal reasons.</u>

Although a variety of specific circumstances may indicate the need for induction of labour with a greater or lesser degree of urgency, the essential judgement that the clinician and the pregnant woman must make is whether the interests of the mother or the baby, or both, will be better served by ending or continuing the pregnancy[1]. The decision to undertake IOL in these circumstances needs to be clear and clinically justified and discussed with a Consultant and requires an individual documented induction plan.

Contraindications to Induction of labour

Absolute:

Severe Intra uterine growth retardation with evidence of fetal compromise

Relative:

Previous uterine surgery

Grand multiparity (Para 6 or more)

Booking appointments

To book induction slots phone

- Ward 119 tel 0131 2422475/2421191 at RIE
- Day Assessment unit tel. 01506 524024 at St Johns

If outpatient induction IOL being considered ensure that the patient has an appointment for a liquor volume scan prior to attending for induction.

Methods of Induction of labour

1) Membrane sweep

2) Propess® pessary (see page 6)

3) Prostin E2® gel (see page 8)

4) Amniotomy (see page 10)

5) Oxytocin infusion (see page 11)

Membrane sweeping

It is already well established and routine practice to offer membrane sweeps to women prior to admission for induction as this significantly reduces the need for induction and improves the modified Bishops score (Cochrane 2005). It is thought to be effective by increasing local endogenous production of prostaglandins.

There is evidence to suggest that membrane sweeping at the initiation of induction of labour increases the SVD rate, reduces the induction to delivery interval, reduces the use of oxytocin. Women's satisfaction with the process is improved even though the sweep is associated with greater discomfort at the time of insertion of prostaglandins or amniotomy (Tan 2006). There is also evidence suggesting benefits from repeated membrane sweeping.

To perform a sweep, a finger is inserted as high as possible through the internal cervical os and the membranes are swept off the lower pole of the uterus by a complete circular sweep of the finger, once clockwise and once anticlockwise. If the internal os is closed the cervical canal should be 'swept'. During this process a modified Bishops score should be calculated and clearly documented in Maternity Trak. The fetal heart should be auscultated prior to and after the membrane sweep and documented.

At both 40 and 41 weeks women should be offered a vaginal examination for membrane sweeping. Additional membrane sweeping may be offered if labour does not start spontaneously.

Outpatient induction of labour

Criteria
Low risk (no significant maternal or fetal risk factors)
Post dates (Term+10-14)
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 48hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

Post treatment
After insertion of the Propess® pessary women should remain recumbent for 30 minutes. Thereafter, a 30 minute CTG should be performed. If reassuring, no further monitoring is
required unless SRM or uterine activity occurs. Women may go home and be managed on an outpatient basis. Ensure they have the IOL patient information leaflet prior to going home. Women should be advised to contact the relevant hospital if uterine activity occurs, SRM or any other concerns eg. Reduced fetal movements, vaginal bleeding and women should be advised to remove the Propess® pessary and attend the hospital immediately. Women are asked to contact the hospital by telephone after 12 hours

Inpatient induction of labour

Where inpatient induction of labour is being undertaken for maternal or fetal reasons an individualised plan for induction should be clearly documented in the patient's medical records. These women need a medical review before commencing the induction process
Prior to the onset of uterine activity the fetal heart should be auscultated as a minimum every 2 hours, when awake.

Induction of labour for women with pre labour rupture of membranes at term

Induction of labour is appropriate approximately 24 hours after rupture of membranes. The interval between rupture of membranes and commencement of the induction process should not exceed 36 hours, unless the woman specifically requests this. Women wishing to wait longer than 72 hours should be discussed with their Consultant Obstetrician and offered an appointment with a Senior Obstetrician. If propess used it is in situ for maximum 12 hours (see appendix 6).

Women with meconium stained liquor or Group B Sreptococcus should be augmented immediately.

Induction using Propess®

NICE[1] recommends that IOL with vaginal prostaglandin is the preferred method of induction unless there are specific clinical reasons for not using it eg. the risk of uterine hyperstimulation or previous caesarean section.
Propess® is the first line prostaglandin for use in induction in women with Parity 3 or less if there is no contra-indication.

Contraindications to Propess®

Propess® should not be used in women:

1. When labour has started.

2. When oxytocin drugs are being given.

3. When strong prolonged uterine contractions would be inappropriate such as in patients:

a. who have had previous major uterine surgery, e.g. caesarean section, myomectomy

b. with cephalopelvic disproportion

c. with fetal malpresentation

d. with suspicion or evidence of fetal distress

e. who have had more than three full term deliveries eg a Para 4 or more

f. previous surgery or rupture of the cervix

4. When there is current pelvic inflammatory disease, unless adequate prior treatment has been instituted.

5. When there is hypersensitivity to dinoprostone or to any of the excipients.

6. When there is placenta praevia or unexplained vaginal bleeding during the current pregnancy.

Cautions (for Propess®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension
- uterine hypertony
- multiple pregnancy (as no studies have been undertaken with Propess in this patient group)
- see page 2

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG-this must be reassuring

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart for insertion of Propess® (Appendix 1and 2):

4. Woman to remain semi-recumbent for 30 minutes after insertion of pessary.

5. CTG- this must be reassuring

6. Women who are being managed as an outpatient should be instructed to inform the hospital if:

i) Contractions become painful or regular (every 5 minutes)
ii) Vaginal bleeding
iii) SRM
iv)Reduced fetal movements
v) Propess® falls out

Staff should tell women to remove the pessary and attend the hospital immediately.

7. Telephone call or if inpatient review at 12 hours

8. Women should be reviewed and the Propess® pessary should removed 24 hours after insertion.

Side effects of Propess®

Nausea, vomiting and diarrhoea are most commonly reported. Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Genital oedema.
Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypotonus, uterine hyperstimulation, abruptio placentae, rapid cervical dilation.

- on the neonate fetal bradycardia /fetal distress, low Apgar scores, stillbirth, neonatal death

- on breast feeding no hazard at recommended dose.

Indications for removal of Propess®

- Propess should be removed and the woman referred to the labour ward in the following situations
- Regular painful contractions (3 or more in 10 minutes)
- BS ≥ 7
- There is evidence of uterine tachysystole, hypertonus or hyperstimulation
  Tachysystole = ≥5 contractions in 10 minutes with reassuring CTG
  Hypertonus = painful contraction lasting ≥ 90 seconds with reassuring CTG
  Hyperstimulation = Tachysystole or hypertonus with non reassuring CTG
- Concerns about the fetal heart rate /CTG
- Vaginal bleeding
- There is evidence of maternal systemic adverse effect such as severe nausea or vomiting

Induction using of Prostin E2® vaginal gel

NICE[1] recommends that IOL with vaginal prostaglandin is the preferred method of induction unless there are specific clinical reasons for not using it eg. the risk of uterine hyperstimulation or previous caesarean section.

Prostin E2® gel may be used as 1st line for induction for women with **Parity 4 and 5** needing prostaglandin induction (after Consultant Obstetrician review). It may be used as a 2nd line agent if Propess® has failed in women with parity 0-3 where amniotomy is not possible (See Appendix 1 and 4).

Contraindications to Prostin E2®

Dinoprostone is not recommended in the following circumstances:

1. For women in whom oxytocic drugs are generally contraindicated:

a. previous caesarean section or major uterine surgery

b. cephalopelvic disproportion

c. fetal malpresentation

d. suspicion or evidence of fetal distress

e. grand multiparity with over 5 previous term pregnancies

2. Women with ruptured membranes

3. Past history of or existing, pelvic inflammatory disease, unless adequate prior treatment has been instituted

4. Clinical suspicion or definite evidence of placenta praevia or explained vaginal bleeding during pregnancy

5. Active cardiac, pulmonary, renal or hepatic disease

6. When there is hypersensitivity to prostaglandins or to any of the excipients.

Cautions (for Prostin E2®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension
- uterine hypertony
- see page 2

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. CTG

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Follow flow chart (Appendix 2):

4. Woman to remain semi-recumbent for 30 minutes after each dose of gel.

5. CTG

Side effects of Prostin E2®
Nausea, vomiting and diarrhoea are most commonly reported. Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Rarely hypersensitivity reactions including anaphylaxis, uterine rupture and cardiac arrest and disseminated intravascular coagulation.

- on labour uterine hypercontractility or hypotonus, uterine hyperstimulation, abruptio placentae, rapid cervical dilation.

- on the neonate fetal bradycardia /fetal distress, low Apgar scores, stillbirth, neonatal death
- on breast feeding no hazard at recommended dose.

Induction by amniotomy

Amniotomy and oxytocin infusion should not be used as the primary method of IOL unless there are specific indications eg, grand multiparity, contraindications to vaginal prostaglandin. Booking and criteria as previously described.
Performed when the cervix is at least 2cm dilated and effacing and the fetal head is engaged.

1. Record the fetal heart rate before amniotomy

2. Record the colour and amount of liquor

3. A fetal heart rate should be obtained immediately following ARM

4. If FHR normal then the woman should be encouraged to mobilise

5. Assess uterine activity after 2 hours

- If contracting 3:10, then VE 4 hours after ARM
- If contractions are < 3:10, then start oxytocin infusion

Once the oxytocin infusion has started a continuous CTG is required.

Oxytocin use in induction/augmentation of labour

1. Continuous CTG monitoring should be used if an oxytocin infusion is used.

2. Oxytocin infusion must not be started within 6 hours of administering Prostin E2 (dinoprostone) gel or within 30 minutes of removing a Propess® pessary. The dosage regime is as follows:

- Oxytocin 30 IU in 500ml of sodium chloride 0.9%

  1ml/hr=1milliunit oxytocin per minute

The minimum dose possible should be used and this should be titrated against uterine contractions aiming for a maximum of 3 to 4 contractions in 10 minutes.

- Commence at 2ml/hr (2 milliunits per minute)
- Increase at intervals of 30 minutes using regime below

Rate	**Dose**
2ml/hr	2 milliunits per minute
4ml/hr	4 milliunits per minute
8ml/hr	8 milliunits per minute
12ml/hr	12 milliunits per minute
16ml/hr	16 milliunits per minute
20ml/hr	20 milliunits per minute
The licensed maximum dose is 20 milliunits per minute. If higher doses are required discuss with senior medical staff. The maximum dose should not exceed 32 ml/hr (32 millunits per minute)	
24ml/hr	**24 milliunits per minute**
28ml/hr	**28 milliunits per minute**
32ml/hr	**32 milliunits per minute**

In the event of a non reassuring CTG, the oxytocin infusion should be discontinued and senior obstetric advice sought.

Contraindications

- Known hypersensitivity to any constituents of the product
- Hypertonic uterine contractions
- Vaginal delivery contraindicated
- Fetal compromise or malpresentation
- Known cephalopelvic disproportion
- Placenta praevia
- Vasa praevia
- placental abruption
- cord presentation or prolapse

Potential adverse reactions to oxytocin
Administration at too high doses results in uterine overstimulation which may cause foetal distress, asphyxia, and death, or may lead to hypertonicity, tetanic contractions, soft tissue damage or rupture of the uterus.

- Nausea and vomiting
- Headache
- Rash
- Cardiac arrhythmias
- Anaphylactoid reactions
- Uterine hyperstimulation & Ruptured uterus
- Rapid IV administration may lead to acute hypotension
- Water intoxication
-

Cautions

Oxytocin has a slight anti-diuretic activity so prolonged IV use at high doses in conjunction with large volumes of fluid, may cause water intoxication (see side-effects) and hyponatraemia. To avoid this rare complication, the following precautions must be observed: Administer oxytocin in sodium chloride 0.9% (not glucose); restrict fluid intake by mouth.

Special precautions:
- Presence of uterine scar.

- Avoid prolonged use in patients with severe PIH.
- It should not be used for prolonged periods in patients with oxytocin-resistant uterine inertia, severe pre-eclamptic toxaemia or severe cardiovascular disorders.

If a caution applies then decision to use should be made by a Consultant Obstetrician

Non routine use of oxytocin in induction/augmentation of labour

Examples include:

- Presence of uterine scar
- Non-reassuring CTG
- Breech presentation
- Multiple pregnancy
- Grand multiparity
- Severe pre-eclampsia

An oxytocin infusion should only be started after discussion and agreement with a Consultant Obstetrician. This discussion should be clearly documented in Maternity Trak and should include maximum dose and rate of increase and time for further review. In the interest of safety the rate should not exceed 8ml/hour without discussion/review by a Consultant Obstetrician

The minimum dose possible should be used and this should be titrated against uterine contractions aiming for a maximum of 3 to 4 contractions in 10 minutes

Starting oxytocin in the 2nd stage of labour

In the event of oxytocin augmentation being required in the second stage of labour, advice must be sought from senior obstetric staff. The recommended rate of increase should be documented in the patient's notes.

Induction of labour for women with pre labour rupture of membranes at term

Induction of labour is appropriate approximately 24 hours after rupture of membranes. The interval between rupture of membranes and commencement of the induction process should not exceed 48 hours, unless the woman specifically requests this. Women wishing to wait longer than 72 hours should be discussed with their Consultant Obstetrician and offered an appointment with a Senior Obstetrician.

Women with meconium stained liquor or Group B Streptococcus should be augmented immediately.

There is evidence that in women with an unfavourable cervix and ruptured membranes, the use of oxytocin is less effective than vaginal PGE2 in achieving a vaginal birth within 24 hours[1]. See appendix 6.

1. Take temperature, pulse and blood pressure. If temperature >37.5 then perform a septic screen and commence antibiotics

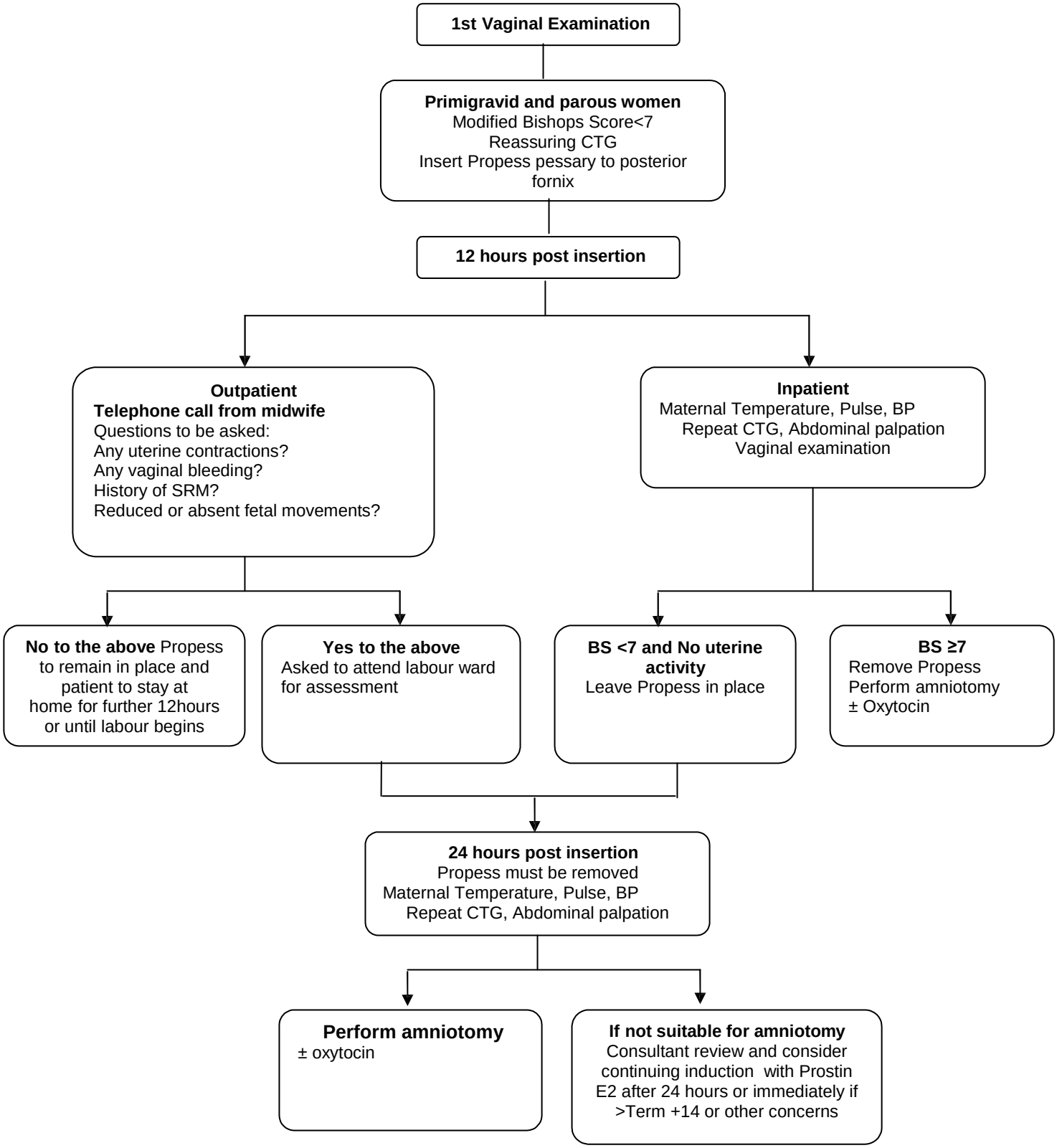
2. CTG. If temperature is elevated then commence continuous fetal heart rate monitoring

3. Vaginal assessment and follow chart (Appendix 5)

Para 3 or less- If cervix unfavourable (Bishops score <7), for Propess pessary and review at 12 hours (See Appendix5)

Para 4 or more-Commence intravenous oxytocin due to risk of hyperstimulation even if cervix is unfavourable

Appendix 1- Induction process using Propess® (Women Para 3 or less)



Appendix 2- Insertion of Propess® pessary

1. Ensure that Propess pessary is adminsistered within 20 minutes after removal form the fridge.

2. Insert Propess high into the posterior fornix using aquagel

3. The pessary should lie transversely in the posterior fornix

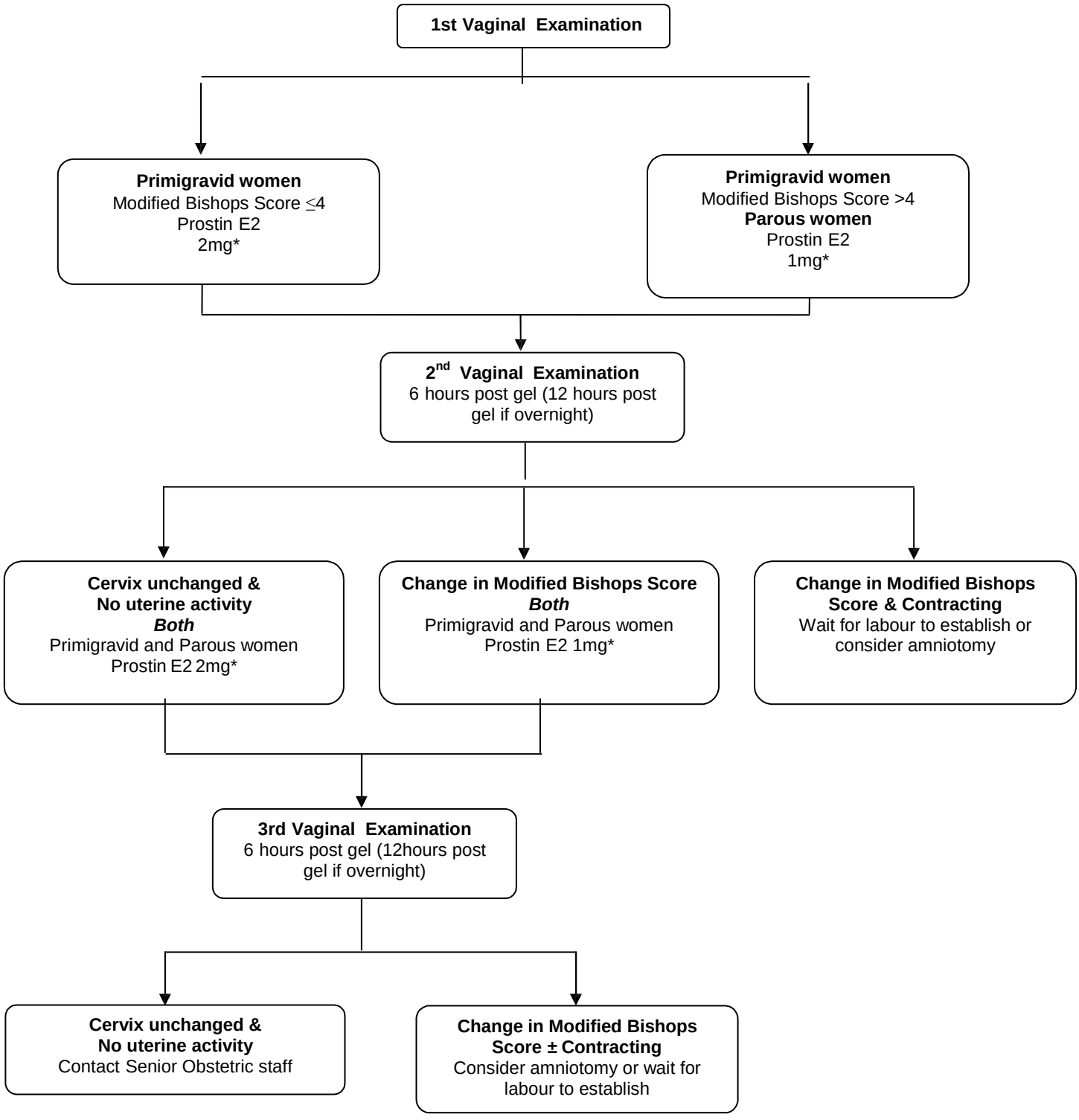
4. After Propess has been inserted the withdrawal tape may be cut or excess tape placed in the lower part of the vagina but ensure that there is sufficient tape outside the vagina to allow removal.

Appendix 3- Management if there is spontaneous rupture of membranes with Propess® in the vagina

Inpatient:
Commence CTG
Assess contractions
If contractions are 3 or more in 10 minutes then remove Propess and transfer to Labour Ward
If there are no contractions perform a speculum examination if this is needed to confirm the diagnosis and then perform VE:
If BS<7, Propess can be left in place until can be transferred to Labour ward for oxytocin
If BS ≥ 7 then Propess to be removed and transfer to Labour ward

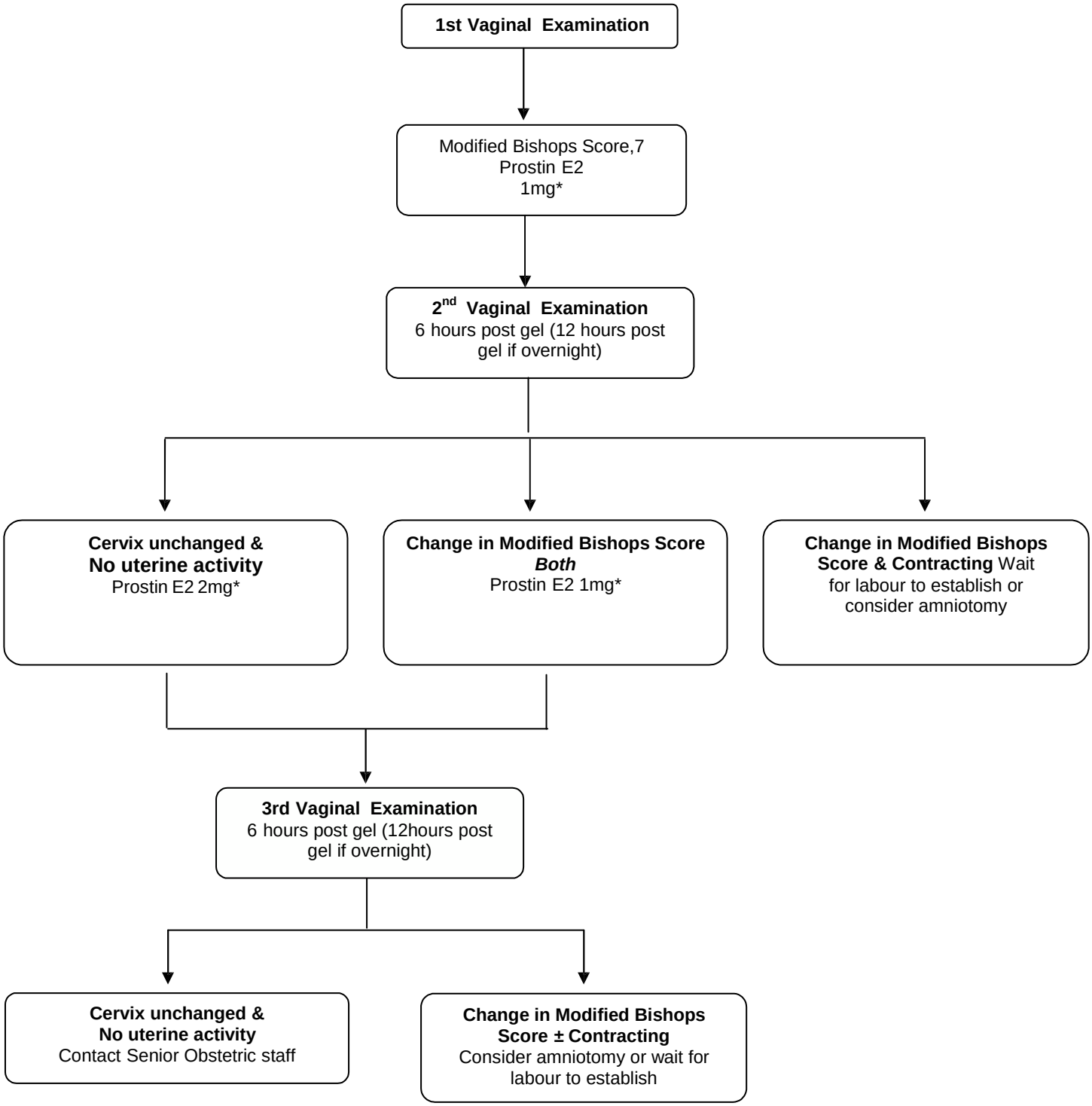
Outpatient
Patient to telephone hospital
Staff to ask the following questions:
Colour of the liquor
Fetal movements
Are the contractions 3 or more in 10 minutes
Ask to attend
If contractions 3 or more in 10 minutes then ask patient to remove Propess immediately

Appendix 4- Induction using Prostin E2® gel (dinoprostone) after use of Propess for Women Para 3 or less



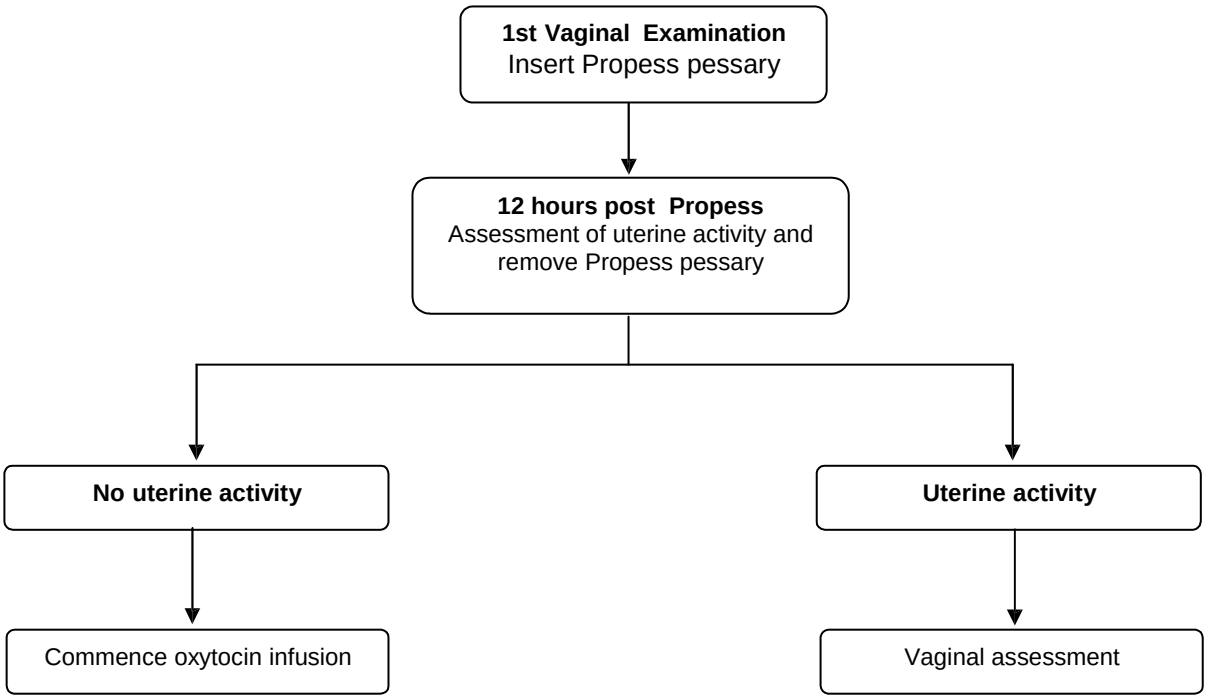
* All Prostin E" should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

Appendix 5- Induction using Prostin E2® gel (dinoprostone) for women Para 4 or 5



Appendix 6- Induction of women with pre-labour rupture of membranes at term

Para 3 or less



Para 4 or more

Should not receive Propess and should commence an oxytocin infusion (See page 8)

4. ASSOCIATED DOCUMENTS:

Uterine Hyperstimulation guideline
Fetal monitoring guideline
Prelabour rupture membranes at term guideline
Group B streptococcus management

5. REFERENCES:

[1] NICE Induction of labour Clinical Guideline 2008
[2] NICE Intrapartum care Clinical Guideline 2007

[4]eMC- Prostin E2 Vaginal gel 1mg, 2mg- Summary of product characteristics (SPC)
[4]eMC- Propess 10mg- Summary of product characteristics (SPC)
[4]eMC- Syntocinon - Summary of product characteristics (SPC)

6. AUTHOR/S:

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Author 3:

Author 4:

Author 5:

Author 6:

Induction of labour
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Induction of labour – criteria and booking

Introduction:

Induction of labour (IOL) is the most commonly performed obstetric intervention and is associated with increased intervention rates. It is required in around 26% of pregnancies when the risks of continuing the pregnancy outweigh the benefits. This guideline aims to prevent inappropriate induction of labour and provide a standard of care pathway for those induced. In NHS Lothian, Cervical Ripening balloon is the first line of induction. Propess® can be used for those who do not meet the criteria for a Cervical Ripening balloon or those who choose to be induced using Propess®.

Staff should ensure women are given time to make decisions after a balanced and comprehensive discussion about risks and benefits of induction. The induction process can take 24-72 hours. Please provide a supportive environment with options of birthing balls, water immersion and peaceful setting for rest and sleep.

Encourage women to be mobile and active during the process of induction.

Maternal and Fetal Indications:

The decision to undertake IOL needs to be clear and clinically justified. It should be discussed with a senior obstetrician and the individualised plan clearly documented.

- Post dates (41+0-42+0)
- Maternal age over 40
- Preterm pre-labour rupture of membranes
- Prelabour rupture of membranes at term
- Diabetes; PIH/PET/Essential hypertension
- Obstetric cholestasis
- Fetal growth restriction
- Reduced fetal movements >39 weeks
- IVF or ICSI pregnancy after discussion with consultant (See AN pathway guideline)

This list is not exhaustive.

Contraindications to induction of labour

Absolute: Any contraindication to vaginal birth: e.g.

- Severe fetal growth restriction with evidence of fetal compromise
- Non cephalic presentation
- Placenta praevia
- Active genital herpes infection

- Invasive cervical carcinoma
- Previous classical caesarean section or breach of uterine cavity e.g. myomectomy with breach
- More than 2 previous caesarean sections
- Absolute cephalopelvic disproportion (pelvic deformity)

Relative:

- Previous caesarean section x2
- Grand multiparity (Para 6 or more)

All women should be offered a cervical assessment at 40 weeks which includes the Bishop score, offered a membrane sweep, discussion regarding IOL process and provision of the patient information leaflet. All the above information should be documented on Maternity TRAK.

Who can book IOL?

Community and Hospital Midwifery staff are able to organise induction of labour for low-risk women who are **Para 3 or less**.

Medical staff would need to authorise induction of labour for high risk women and grand multiparous (Para 4 or more). They must also complete the induction assessment questionnaire on Maternity TRAK.

Booking appointments
To book induction slots phone:

RIE Inpatient: Ward 119 - 0131 242 1194/0131 242 1191
Outpatient: DAU - 0131 242 2656 (Low risk from 41 weeks)

St John's: Ward 11 01506 524111
Day bed – 01506 524024 (Low risk from 41 weeks)

If Outpatient Induction of labour is being considered with Propess® ensure that the patient has an appointment for a liquor volume scan prior to attending for induction. This is not needed for outpatient induction with Cervical Ripening Balloon.

Where does the Induction of labour take place?

Induction of labour can be done as an outpatient if specific criteria are met, or as an inpatient. Each induction of labour method has specific inclusion criteria which will be detailed later. However, the prerequisite for outpatient setting for induction of labour, regardless of method are:

1. Singleton pregnancy
2. Cephalic presentation
3. Availability of private transport
4. Availability of home landline or mobile phone

5. Ability to communicate in English

6. Patient consent

Hospital procedure on admission for induction of labour

On arrival for induction of labour, the midwife should continue the induction assessment questionnaire ensuring that they have completed the risk assessments questions and performed a Modified Bishops Score. If all risk assessment questions are answered 'Yes' and the Modified Bishops Score is <7 then the midwife may administer cervical ripening balloon or Propess® (which can be administered under PGD).

If induction is medically indicated but the patient declines induction, then a discussion with a senior obstetrician should take place and an individualised care plan agreed.

Postdates

This is the most common indication aiming at reducing the risk of late stillbirth. There is a small increased risk of stillbirth from 1/1000 to 2-3/1000 pregnancies after 42 weeks. IOL is offered for that reason from 41 weeks, when induction reduces perinatal mortality without increasing the caesarean section rate.

Maternal age 40yrs or more at time of booking

In this group the risk of stillbirth is increased and therefore induction of labour at term should be considered. Therefore at term IOL will be discussed and offered and the individualised care plan documented on TRAK.

Previous caesarean section

Spontaneous labour is preferred where possible, but when IOL is indicated the method will be limited to cervical ripening balloon, membrane sweep +/- amniotomy +/- syntocinon.

All patients should have been seen by an obstetrician antenatally and a full discussion highlighting potential maternal and fetal risks of labour outlined and documented on TRAK.

Maternal Request

Induction of labour should not be routinely offered on maternal request only. The patient should have a discussion with their consultant and the risks and benefits documented. Induction of labour in those circumstances might be considered at or after 40 weeks.

Methods of induction of labour

1) Membrane sweep

2) Cervical ripening balloon

3) Prostaglandins

4) Amniotomy

See separate guideline for use of oxytocin.

Women should be given advice on induction of labour and the patient information leaflet in the antenatal period, and then be included in the decision-making process for their induction.

The aim for induction should always be to use the least intervention needed. Each woman should have an individualised induction plan to optimise her care.

Mechanical induction of labour with Cervical Ripening Balloon (CRB) is the first line method and should be suitable for most women unless contraindicated or declined by patient.
Each patient should have clearly documented on Maternity TRAK the first line chosen and further management plan should that method fail.

Membrane sweep

There is established evidence that membrane sweeps at term significantly reduce the need for induction. It is thought to be effective by increasing local endogenous production of prostaglandins. Evidence suggests benefit from repeated outpatient membrane sweeps resulting in **increased SVD rate, reduced induction to delivery interval, reduced use of oxytocin and improved women's satisfaction.**

To perform a sweep, a finger is inserted as high as possible through the internal cervical os and the membranes are swept off the lower pole of the uterus by a complete circular sweep of the finger, once clockwise and once anticlockwise. If the internal os is closed the cervical canal should be 'swept'. During this process a modified Bishops score should be calculated and clearly documented in Maternity Trak. The fetal heart should be auscultated prior to and after the membrane sweep and documented.

At both 40 and 41 weeks women should be offered a vaginal examination for membrane sweep. Additional membrane sweeping may be offered if labour does not start spontaneously. This may be done prior to 40 weeks if authorised by medical staff.

Induction using Cervical Ripening Balloon

The Cook Cervical Ripening Balloon (CRB) is a silicone double balloon catheter with an adjustable-length malleable stylet. The Cook Cervical Ripening Balloon is indicated for mechanical dilation of the cervical canal when the cervix is unfavourable for induction. Pharmacological agents have associated risk of hyperstimulation (3-20%) whereas the balloon induction does not cause significant uterine contraction or systemic side effects.

Studies have shown both methods are equally effective with CRB having a slightly shorter insertion to delivery interval, infection rates and no adverse neonatal effects.

The Cook Balloon Device

- Silicone double balloon catheter with stylet
- One balloon in uterus (inflating valve marked U)
- One balloon in vagina (inflating valve marked V)
- A blue valve marked S for stylet
- Each balloon could be filled in with sterile water / saline up to maximum of 80ml
- Single use device supplied in sterile package

Indications

Outpatient use (>= 37 weeks)

Any patient requiring induction of labour in the absence of fetal or maternal compromise

1. Postdates
2. Gestational diabetes mellitus or type 2 diabetes with stable blood sugar monitoring
3. Previous lower segment caesarean section (x1)
4. Previous precipitate labour with prostaglandin use
5. Obstetric cholestasis
6. Essential hypertension or non-proteinuric PIH with stable blood pressure (medicated or not) and normal bloods
7. Maternal age
8. Symphysis pubis dysfunction
9. Reduced fetal movement with normal growth and liquor volume

Inpatient use (Any Gestation)

1. Fetal growth restriction small for gestational age(SGA), oligohydramnios (< 5cm AFI/ <2cm DVP)
2. Type 1 diabetes
3. Grand multiparous (Para >=4)
4. Unsuccessful induction of labour with prostaglandins
5. Preeclampsia
6. Consultant decision
7. Patient request

Contraindications

1. Non-cephalic fetal presentation
2. Free/ ballotable head
3. Sepsis
4. Active genital herpes infection
5. Ruptured membranes
6. Any contraindication to induction of labour

Who can insert it?

The CRB can be inserted by any healthcare professional (medical or midwifery) who has received the appropriate training

Booking and admission procedure for CRB IOL (see flowchart 1)

1. IOL questionnaire completed on TRAK
2. Book a slot on Ward 119 (for inpatient) at RIE or DBU at SJH for the desired date and a slot the following day for removal (Minimum 12h; Max 24 Hours).
3. On admission, perform antenatal check:
   a. Full MEWS
   b. Confirm cephalic presentation
   c. CTG to assess fetal wellbeing

Procedure

Most staff will insert Cervical Ripening Balloon digitally under vaginal examination.

Equipment required:

1. Sterile Gloves and lubricating gel
2. 500ml bag of sodium chloride 0.9%
3. Red filter needle
4. 2 x 60ml syringes, 4 x 20ml syringes
5. Red and green en to mark syringes (not mandatory)
6. Wedge available if anticipating difficulty inserting

If unable to insert Cervical Ripening Balloon digitally a speculum may have to be used to insert the balloon under direct vision.

If inserting under direct vision

1. Lithotomy poles (stirrups) – **Not mandatory.**
2. Speculum
3. Sterile Rampley's forceps
4. Sterile aquagel (optional)
5. 500ml bag of sodium chloride 0.9%
6. Red filter needle
7. 2 x 60ml syringes, 4 x 20ml syringes
8. Light source
9. Pre-packed CRB device

Patient preparation:

1. Procedure discussed with patient and verbal consent obtained
2. Encourage sustainable and comfortable position – consider use of wedge if anticipating difficult insertion
3. Vaginal examination, with consent, to determine if CRB is required
4. Open CRB pack and assemble stylet
5. During vaginal examination maintain hold of cervix using fingers to introduce CRB.

If inserting under direct vision

1. Procedure discussed with patient and verbal consent obtained
2. Place patient in lithotomy position (**Not mandatory**)
3. Open the CRB pack and assemble the stylet if required
4. Insert the speculum in vagina to fully visualise the cervix
5. Clean the cervix with wet gauze/ cotton roll
6. Use Rampley's Forceps to hold cervix in place while inserting stylus

Device placement:

1. Insert the device into the cervix and advance it until both balloons have entered the cervical canal (aquagel can be used as lubricant)
2. If the stylet is used then it should be withdrawn as soon as the 1st balloon is no longer in view or felt if not under direct vision.
3. Inflate the uterine balloon with 40 ml of sodium chloride through the blue valve marked '**U'**
   then pull the device back until the balloon abuts the internal os
4. The vaginal balloon is now visible (or felt) outside the external os. Inflate it with 20 ml of water through the green valve marked **'V'**
5. Remove the speculum
6. Add 40 ml water through valve **U** and 60 ml through valve **V.** The aim is to have 80mls in each balloon
7. If patient uncomfortable: reduce volume of fluid in vaginal balloon first, by 10ml increments
8. Advise use of 2 pairs of underwear – 1 with pad and valves passing through leg hole, then gently fold valves upwards and 2nd pair holding in place.

Post insertion monitoring:

1. CTG to be performed
2. If normal, patient can go home and return 12-24 hours later to have it removed. At 12 hour point phone call from Ward 119 at RIE or Labour Ward at St John's to ensure well being. If bed available to return to labour ward for balloon removal. If bed not available at this point, phone call will be made from labour ward at both sites between 12 and 24 hours to notify when bed is available. If Labour Ward not able to accommodate by 24 hour point to return to Ward for balloon removal.
3. Can mobilise, eat and drink at leisure; should pass urine without difficulty. Please ensure can pass urine prior to discharge
4. Patient to contact OTA at RIE or LW at SJH and attend if: RFM, SRM, PV bleed, regular painful contractions (every 5 minutes), pain, CRB falls out, urinary retention
5. If urinary retention: withdraw 10mls from vaginal balloon until able to pass urine.

CRB removal (see flowchart 2)

- After minimum 12 hours (but no longer than 24 hours).
- Remove sooner if SRM or regular painful contractions >= 4:10 minutes

Procedure

- Check maternal observation
- Deflate both balloons and remove the device
- CTG should be performed post removal of CRB
- Allow a maximum of an hour to mobilise and for presenting part to descend
- Perform a VE to assess bishop score and suitability for ARM and do a membrane sweep.
- If favourable for ARM discuss and liaise with labour ward for timing of transfer
- If not favourable for ARM proceed with any pre-agreed plan, or to be reviewed by/discussed with obstetrician for ongoing care

Outpatient induction of labour with Propess®

Criteria
Low risk (no significant maternal or fetal risk factors)
Post dates 41- 42 weeks
Singleton
Cephalic presentation
Para 3 or less
Bishops score less than 7
No previous uterine surgery or caesarean section
Transport available and lives < 30minute journey
Has a home or mobile telephone
Amniotic fluid index ≥ 5cm (within the last 72 hours) and ≤ 20cm. Intact membranes
Normal pre and post prostaglandin CTGs

Post treatment
After insertion of the Propess® pessary women should remain recumbent for 30 minutes. Thereafter, a 30 minute CTG should be performed. If reassuring, no further monitoring is required unless SRM or uterine activity occurs. Women may go home and be managed on an outpatient basis. Ensure they have the IOL patient information leaflet prior to going home and are advised to contact the relevant hospital if uterine activity occurs, SRM or any other concerns e.g., reduced fetal movements, vaginal bleeding and women should be advised to remove the Propess® pessary and **attend the hospital immediately**. Women are asked to contact the hospital by telephone after 12 hours

Inpatient induction of labour with Propess®

Where inpatient induction of labour is being undertaken for maternal or fetal reasons the indication should be documented on TRAK.
Prior to the onset of uterine activity the fetal heart should be auscultated as a minimum every 2 hours, when awake. CTG monitoring should commence with onset of regular painful contractions.

Induction of labour for women with pre labour rupture of membranes at term

SEE SEPARATE GUIDELINE

Induction using Propess®

Propess® is the second line if Cervical Ripening Balloon cannot be used, or patient preference.

Contraindications to Propess® (as per SPC)

Propess® should not be used in women:

1. When labour has started.

2. When oxytocin drugs are being given.

3. When strong prolonged uterine contractions would be inappropriate such as in patients:

a. who have had previous major uterine surgery, e.g. caesarean section, myomectomy

b. with cephalopelvic disproportion

c. with fetal malpresentation

d. with suspicion or evidence of fetal distress

e. who have had more than three full term deliveries e.g., a Para 4 or more

f. previous surgery or rupture of the cervix

4. When there is current pelvic inflammatory disease, unless adequate prior treatment has been instituted.

5. When there is hypersensitivity to dinoprostone or to any of the excipients.

6. When there is placenta praevia or unexplained vaginal bleeding during the current pregnancy.

Cautions (for Propess®)

Caution should be exercised in the administration of dinoprostone for the induction of labour in patients with:

- asthma or a history of asthma;
- epilepsy or a history of epilepsy;
- glaucoma or raised intra-ocular pressure;
- compromised cardiovascular, lung, hepatic, or renal function;
- hypertension

If a caution applies then decision to use should be made by a Consultant Obstetrician

Procedure

1. On admission, perform antenatal check:
   a. Full Mews
   b. Confirm cephalic presentation and engagement
   c. CTG to assess fetal wellbeing

2. Vaginal examination to assess the modified Bishop's score.

Score	**0**	**1**	**2**	**3**
Dilatation (cm)	<1	1-2	2-4	>4
Length (cm)	>4	2-4	1-2	<1
Consistency	Firm	average	soft	
Position	posterior	mid/anterior		
Station	-3	-2	-1	at/ below spines

3. Ensure Propess® pessary is administered within 20 minutes from removal from freezer.

4. Insert Propess® high into the posterior fornix using aquagel, lying transversely

5.After Propess®has been inserted the excess tape is placed in the lower part of the vagina to ensure that it can be removed.

6.Women to remain semi recumbent or left lateral for 30 minutes after insertion of pessary

7.If Propess® falls out and there is no regular contractions and cervix unfavourable then it can be re-inserted for remainder of period up to 24 hours maximum

8.Review at 12 hours to assess uterine activity and need for CTG or VE

9.Women should be reviewed and the Propess® pessary removed at 24 hours with a cervical assessment.

Side effects of Propess®

Nausea, vomiting and diarrhoea are most commonly reported.
Uterine hypercontractility or hypertonus, uterine hyperstimulation, abruption, rapid cervical dilation, fetal bradycardia / fetal distress.

Other side effects include pulmonary and amniotic fluid embolism, hypertension, bronchospasm/asthma, rash, fever, backache. Vaginal symptoms of warmth, irritation and pain. Genital oedema.
Rarely hypersensitivity reactions including anaphylaxis, uterine rupture ad cardiac arrest and disseminated intravascular coagulation.

Indications for removal of Propess®
Propess® should be removed and the woman transferred to the labour ward in the following situations

- Established labour diagnosed
- BS ≥ 7
- There is evidence of uterine tachysystole, hypertonus or hyperstimulation
  Tachysystole = ≥5 contractions in 10 minutes with reassuring CTG
  Hypertonus = painful contraction lasting ≥ 90 seconds with reassuring CTG
  Hyperstimulation = tachysystole or hypertonus with non-reassuring CTG
- Concerns about the fetal heart rate /CTG
- Vaginal bleeding
- There is evidence of maternal systemic adverse effect

Management if there is spontaneous rupture of membranes with Propess® insitu

Inpatient:
Commence CTG
Assess contractions
If contractions >3:10 minutes then remove Propess®, perform a VE to assess cervix and transfer to labour ward if in established labour.
If no contractions leave Propess® insitu up to a maximum of 12 hours post SRM or 24 hours post initial insertion.
If BS<7 Propess® can be left in place until woman can be transferred to labour ward for oxytocin.
If BS>7 then Propess® to be removed and transfer to labour ward.

Outpatient:

Patient to telephone hospital
Staff to ask the following questions:
Colour of liquor
Fetal movements
Are the contractions 3 or more in 10 minutes
Ask to attend
If contractions 3 or more in 10 minutes then ask patient to remove Propess® immediately.

Induction using Dinoprostone tablets

Dinoprostone tablets may be used for induction for women with **Parity 4 and 5** needing prostaglandin induction (only after Consultant Obstetrician review and consideration has been given to balloon induction). It may be used as a 2nd line agent if Propess® or? amniotomy is not possible (see appendix 3)

Contraindications to Dinoprostone tablet

Dinoprostone is not recommended in the following circumstances:

Same as Propess®except

1. Grand multiparity with over 5 previous term pregnancies
2. Women with ruptured membranes

Cautions for dinoprostone

Same as Propess®

Procedure and Side Effects

Same as Propess® – follow flow chart (appendix 3)

Induction by amniotomy

Amniotomy and oxytocin infusion should not be used as the primary method of induction unless there are specific indications e.g., grand multiparity, contraindications to vaginal prostaglandin. Booking and criteria as previously described.

Induction with oxytocin will be the first line in following cases

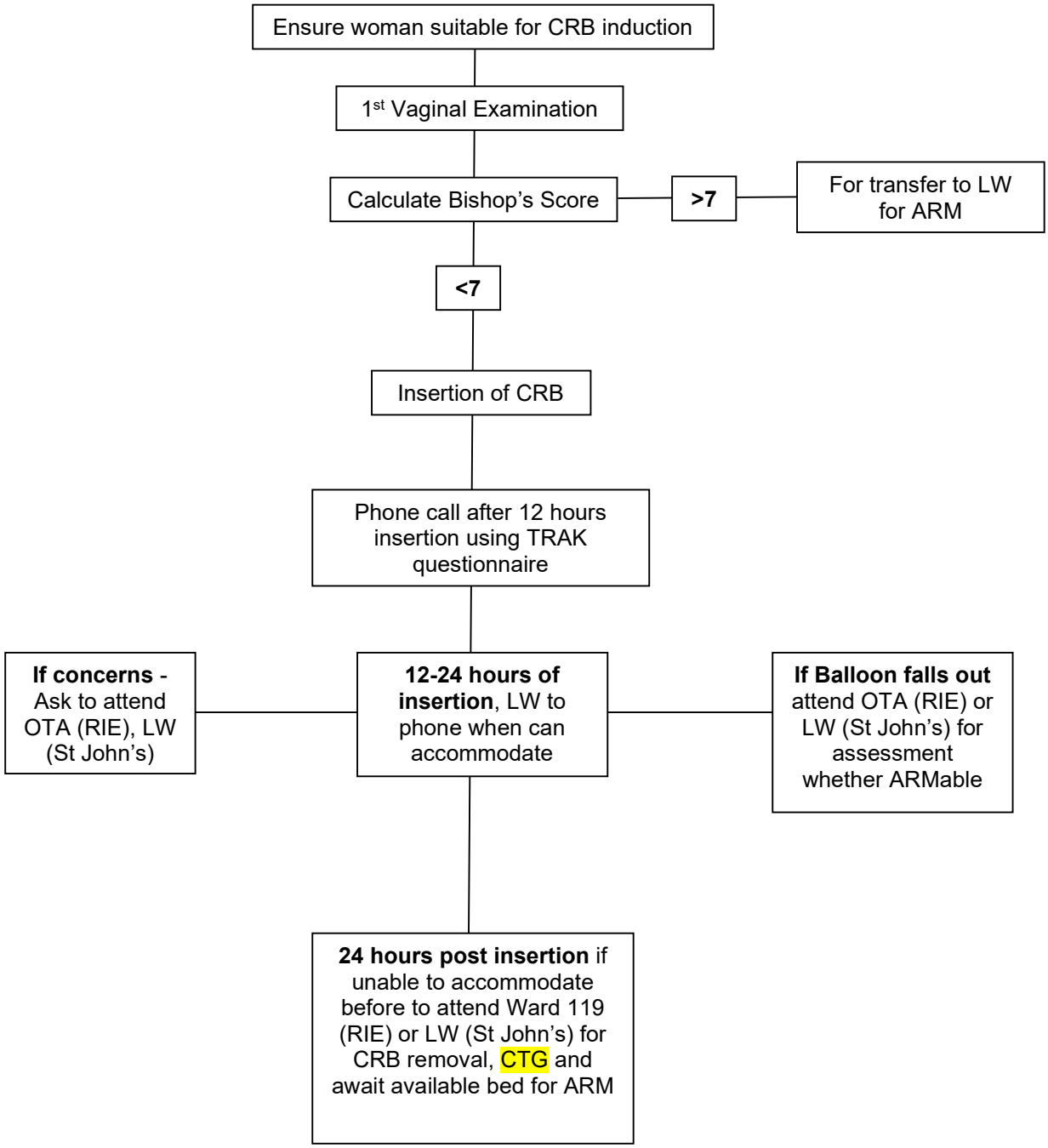
1. Women with SRM and evidence of chorioamnionitis
2. Women with GBS and pre labour SRM

1. Record the fetal heart rate before amniotomy
2. Record the colour and amount of liquor
3. A fetal heart rate should be obtained immediately following ARM
4. If FHR normal then the woman should be encouraged to mobilise
5. In primigravida with no uterine activity commence oxytocin immediately after amniotomy
6. In parous women, assess uterine activity after 2 hours

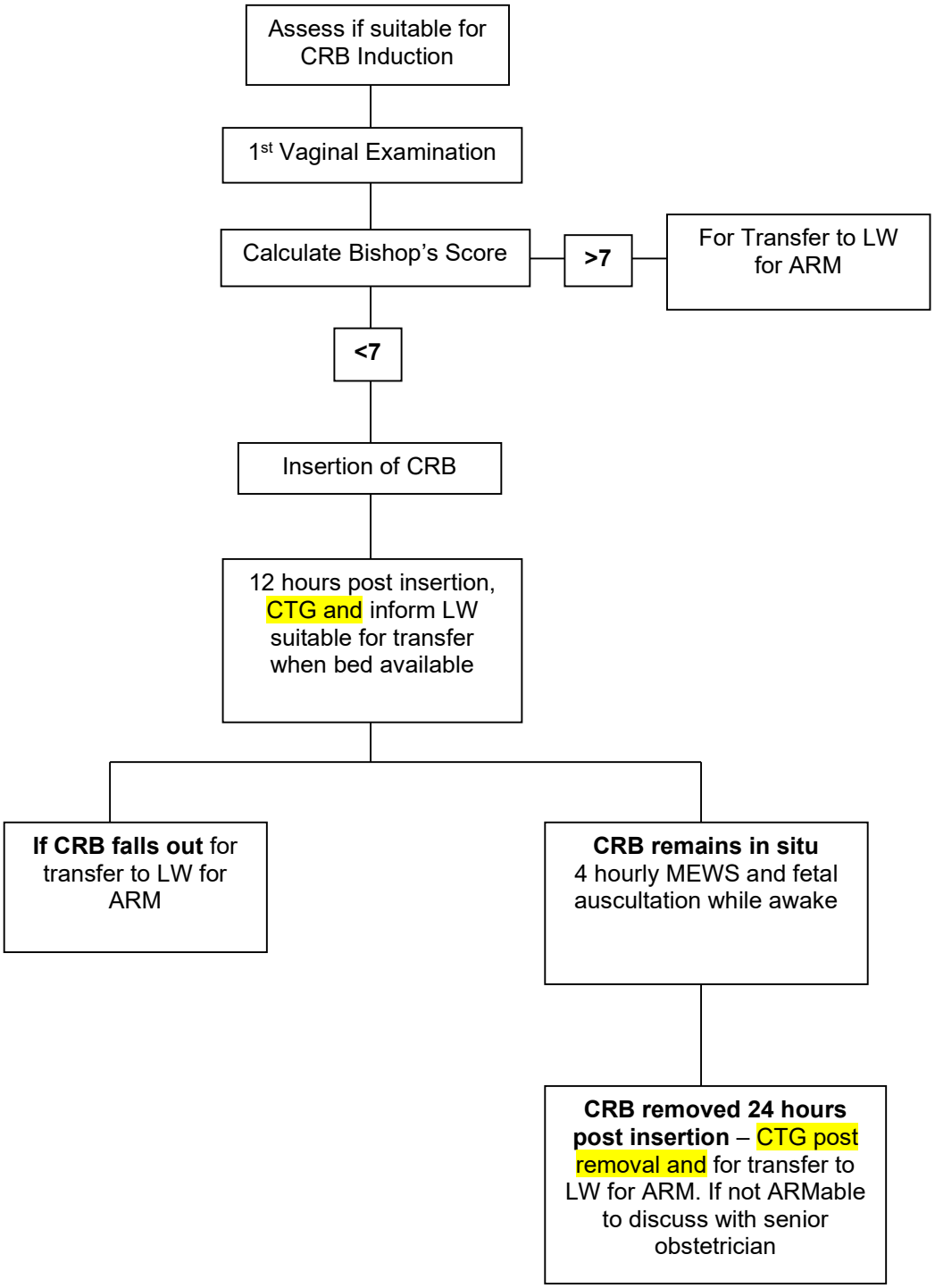
    - If contracting 3:10, then VE 4 hours after ARM
    - If contractions are < 3:10, then start oxytocin infusion

Once the oxytocin infusion has started a continuous CTG is required.
See separate guideline for use of oxytocin

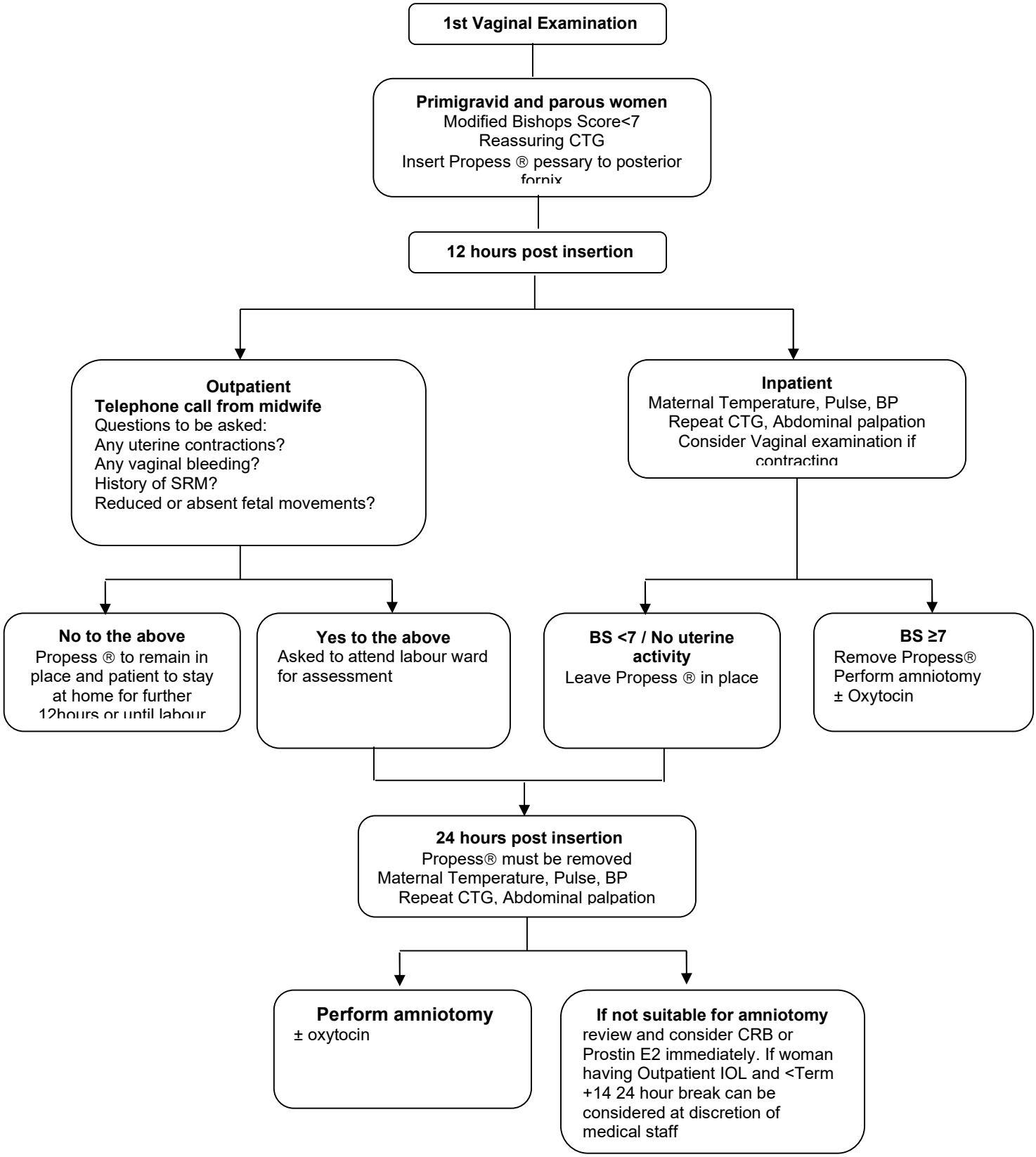
Appendix 1a – Induction of labour using Cervical Ripening Balloon (Outpatient)



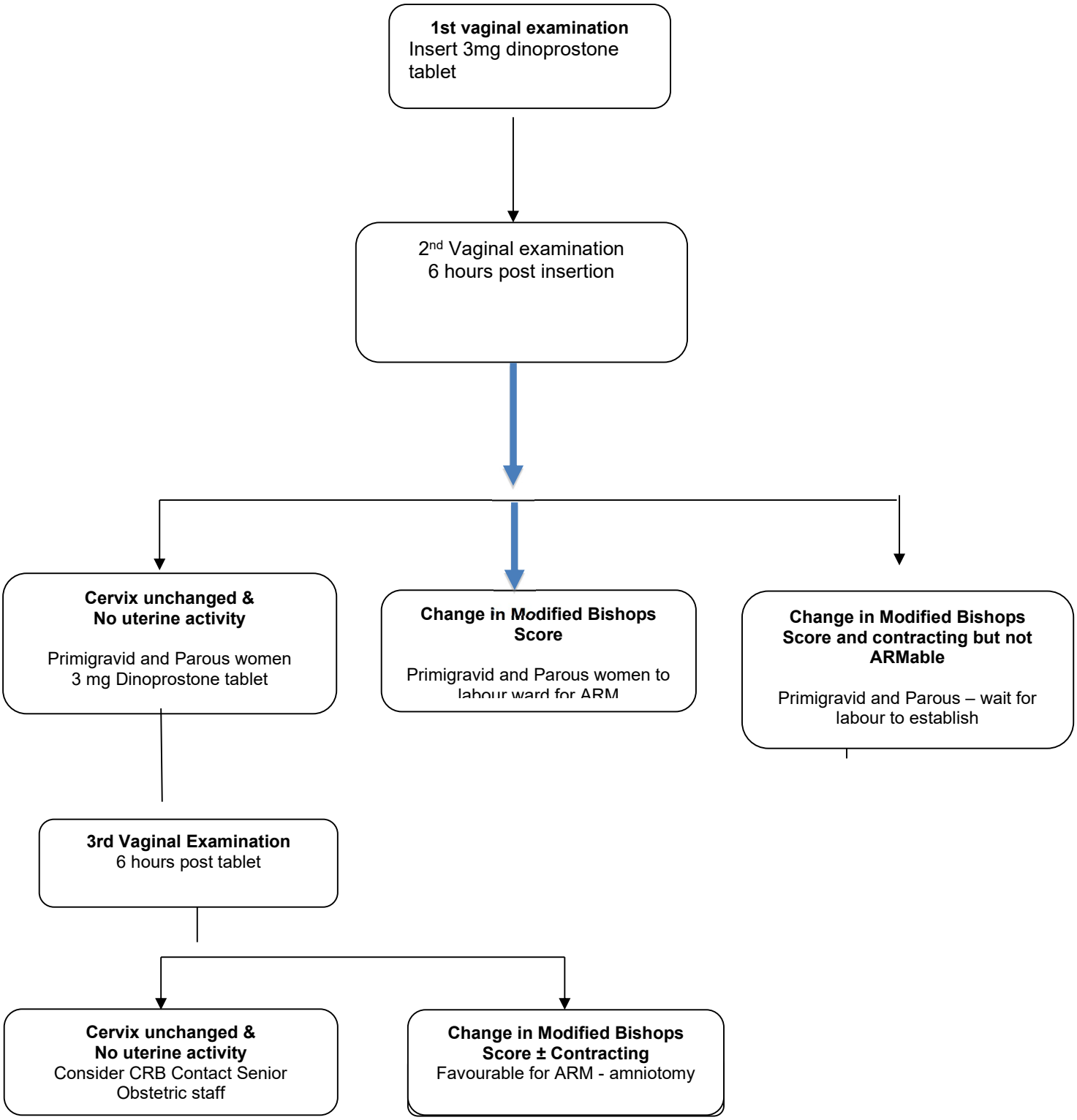
Appendix 1b – Induction of labour using Cervical Ripening Balloon (Inpatient)



Appendix 2- Induction process using Propess® (Women Para 3 or less)



Appendix 3- Induction using Dinoprostone tablets – usually in primigravid or parous, following Propess® 24 hours and no uterine activity or unsuitable for ARM

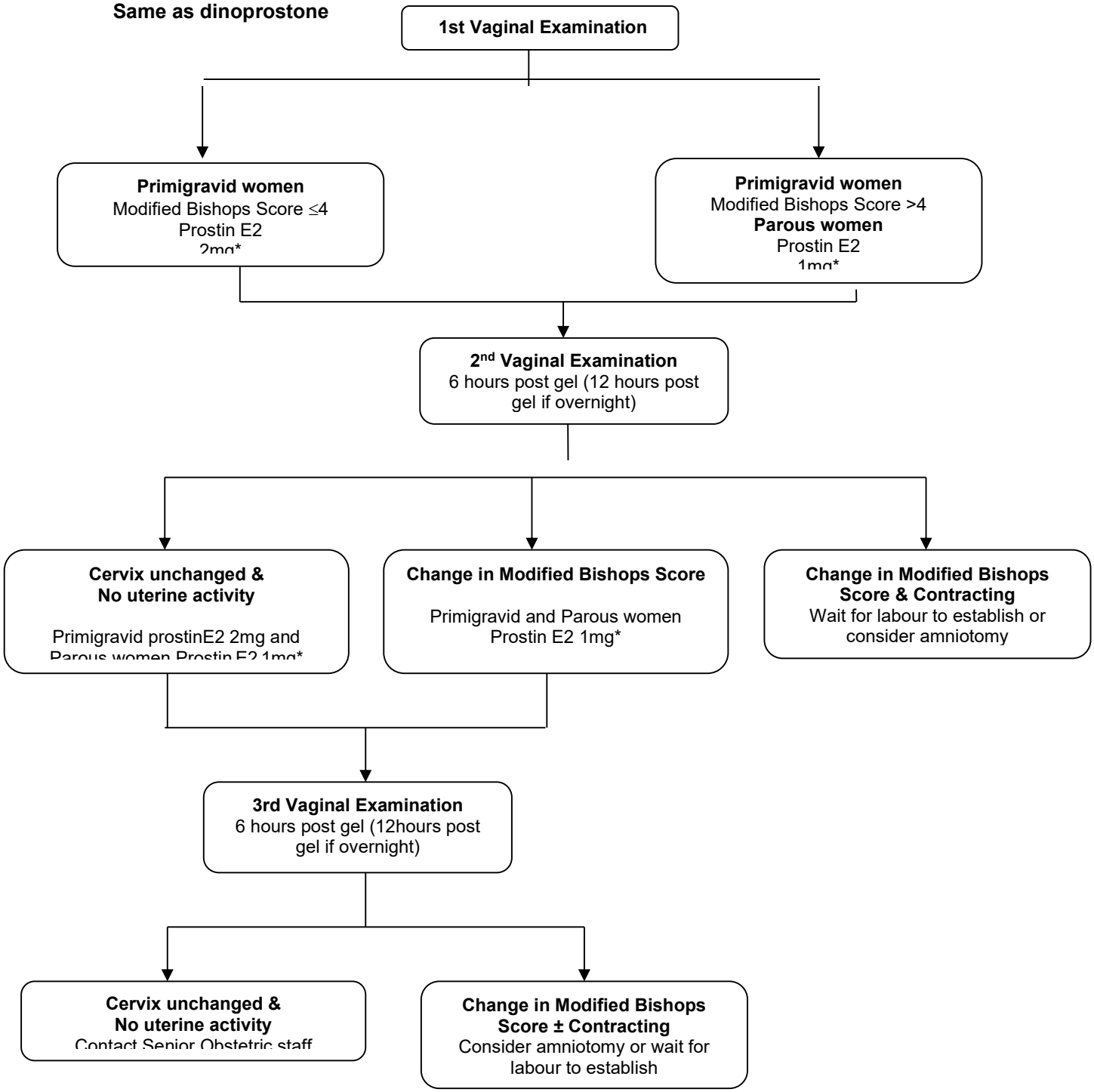


* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

Appendix 4
Induction using of Prostin E2® vaginal gel
(Replacement agent when no dinoprostone tablets in stock)

Contraindications to Prostin E2®
Same as Propess®
Cautions (for Prostin E2®)
Same as Propess®

Procedure
Same as dinoprostone



* All Prostin E2 should be administered high into the posterior vaginal fornix avoiding administration into the cervical canal

ASSOCIATED DOCUMENTS:

Uterine Hyperstimulation guideline
Fetal monitoring guideline
Prelabour rupture membranes at term guideline
Group B streptococcus management
PGD Propess® and Dinoprostone
Induction with cervical ripening balloon
http://intranet.lothian.scot.nhs.uk/NHSLothian/Healthcare/A-Z/MedicinesManagement/PatientGroupDirections/Documents/Acute%20Services%20PGDs/PGD%20236v1%20-%20Dinoprostone%20-%20Propess%20for%20induction%20of%20Labour%20%20-%20Midwives.pdf

5. REFERENCES:

[1] NICE Induction of labour Clinical Guideline 2015
[2] NICE Intrapartum care Clinical Guideline 2015
[4]eMC- Prostin E2 Vaginal gel 1mg, 2mg- Summary of product characteristics (SPC)
[4]eMC- Propess® 10mg- Summary of product characteristics (SPC)
[4]eMC- Syntocinon - Summary of product characteristics (SPC)
Insertion of a double balloon catheter for induction of labour in pregnant women without previous caesarean section
Interventional procedures guidance [PG528] 2015

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OBSTETRIC ULTRASOUND GUIDELINE

NHS LOTHIAN (East Sector)

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Approved by:

Date: November 2024 Version 1

Revised July 2025 Version 1.1

1. Change in pathway for rebooking patients who are too early for booking or booking USS unsuccessful.
   4.1.1.4
   4.1.2.5

2. Presentation

   When mal-presentation is detected from 36/40 onwards i.e. Breech/Transverse lie, please refer the patient to DAU on the same day.

   4.3.1.8
   4.3.5

Revised January 2026 Version 1.2

1. Correction of HC measurement for second trimester screening: **HC ≥ 102mm** replaced with **HC ≥ 101mm.**

4.1.1.4.
4.1.2.5 Notes

Review Date: November 2027

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1. Aim

To provide a framework to enable those Sonographers employed in East Sector NHS Lothian to perform and report obstetric ultrasound examinations independently.

2. Objectives

- To provide a scheme of work outlining the operational management arrangements of the Obstetric Ultrasound Department.
- To provide an agreed set of scanning protocols that comply with Fetal Anomaly and Down's Syndrome Screening Protocols, NHS Scotland (2015) **AND** IMPORTANT CHANGES TO THE SCOTTISH PREGNANCY SCREENING PROGRAMME, Chief Medical Officer Directorate, Scottish Government 13 August 2020
- To standardise the service offered to women across all sites in East Sector NHS Lothian.

3. Scheme of Work

The following scheme of work represents a three-way agreement between Trust management, Clinical Director of Radiology and the Sonographers who work within East Sector NHS Lothian. Scanning protocols have been devised and agreed jointly by the Radiology, Obstetrics and Gynaecology departments.

3.1 Qualification/Training

Sonographers who work independently must possess a post-graduate qualification in obstetric ultrasound.

Trainees must be supervised by an experienced sonographer who is responsible for the examination and issuing the report. The patient should be informed that the person performing the examination is in training and, as technical aspects of the examination may be discussed, be given the opportunity to discuss any concerns. The patient's right to request a qualified sonographer perform the examination should be respected.

3.2 Referrals

Referrals are in accordance with Fetal Anomaly and Down's Syndrome Screening Protocols, NHS Scotland Screening Programmes – Pregnancy and Newborn Screening 2015

https://www.pnsd.scot.nhs.uk/wp-content//2015-Fetal-Anomaly-and-Downs-Syndrome-Screening-Protocols-v-1.pdf - see page 14

Following changes laid out in - IMPORTANT CHANGES TO THE SCOTTISH PREGNANCY SCREENING PROGRAMME, Chief Medical Officer Directorate, Scottish Government 13 August 2020, referrals now include in summary: -

- The expansion of the first trimester screening programme for Down's syndrome (Trisomy 21) to include screening for Edwards' syndrome (Trisomy 18) and Patau's syndrome (Trisomy 13).
- An evaluative roll out of Non-Invasive Prenatal Testing (NIPT) as a second line screening test for those pregnancies with a higher chance result from a primary screen in the first or second trimester.
- The expansion of the screening programme for twin pregnancies to include combined first trimester screening for Down's syndrome, Edwards' syndrome and Patau's syndrome and second trimester quadruple screening for Down's syndrome and NIPT as a second line screen for those pregnancies receiving a higher chance result from the primary screen.

https://www.sehd.scot.nhs.uk/cmo/CMO(2020)20.pdf

All women will be offered routine early pregnancy dating scan/first trimester screening between 11^{+2} and 14^{+1} weeks gestation for chromosomal abnormalities including Down's, Edward's and Patau's syndromes, and a routine fetal anomaly scan between 18^{+0} and 20^{+6} weeks for a variety of structural anomalies (appointments are aimed for as close to 20 weeks as possible). Women with pre-existing diabetes (Type 1 and 2) will be offered routine fetal anomaly screening at 18 weeks and a cardiac scan at 22 weeks due to an increased risk of fetal abnormality.

All other outpatient requests, for example for fetal viability, growth, liquor volume and placental site will be accepted from Obstetricians, Day Assessment, Triage and Community Midwives.

Referrals outside guidelines will be considered on an individual basis and may require input from a Consultant Obstetrician.

Inpatient requests will only be accepted from an Obstetrician.

3.3 Reporting

Following the examination, a report will be issued by the sonographer. The report will identify the sonographer and where the examination has been performed by a trainee, the names of both trainee and supervising sonographer should be made clear on the report.

The report should be written as soon as possible after the examination has been completed. A printed copy should be placed in the patient's handheld obstetric notes. The sonographer should also complete the patient's growth chart where applicable.

3.4 Communication and Disclosure of Ultrasound Findings to Patients

Sonographers should be mindful of women's previous traumatic pregnancy experiences and previous loss. Sonographers are encouraged to look at the Special Features section of Maternity TRAK prior to scanning. Some women may prefer for the screen to be switched off at the start of, or during the scan.

The sonographer will explain the ultrasound findings to the patient and reassure them when all appears well, acknowledging the limitations as not all problems can be seen on ultrasound.

When a problem is detected, the sonographer should inform the patient of any concerns and refer the patient to the relevant department advised in the guidelines below, who will arrange further management. In such cases, the patient and her partner should be given some time in private where possible.

The gender of the fetus may be disclosed VERBALLY TO THE PATIENT OR THEIR PARTNER during the anomaly scan if requested. This information will not be provided in writing or to a third party to protect confidentiality. The sonographer should explain that 100% accuracy cannot be guaranteed.

3.5 People Accompanying Patients During the Scan

An ultrasound examination is a diagnostic test, and the sonographer requires full concentration to reduce the risk of being distracted and the possibility of missing an anomaly during the examination.

People accompanying patients is limited to one adult. The appointment letter advises to take only one adult to the ultrasound appointment. The sonographer requires a high level of concentration therefore no children will be allowed in ultrasound rooms:
- **See Appendix A – Obstetric Ultrasound Scan Letters**

Special allowance should be made for adults with learning needs, women requiring translation, parents with disabled children and other extenuating circumstances. Where a request highlights that an interpreter is required, this will be arranged by the administration team when the appointment is made.

3.6 Ultrasound Images

The sonographer may give up to three ultrasound images per scan. A small donation is suggested for these.

3.7 Safety of Ultrasound

Although diagnostic ultrasound is considered a safe technique, sonographers should make every effort to minimise the length of time that the fetus is exposed to ultrasound in accordance with ALARA principle.

The following publications are available for reference:

https://www.bmus.org/static/uploads/resources/BMUS-Safety-Guidelines-2009-revision-FINAL-Nov-2009.pdf

https://www.bmus.org/static/uploads/resources/STATEMENT_ON_THE_SAFE_USE_AND_POTENTIAL_HAZARDS_OF_DIAGNOSTIC_ULTRASOUND.pdf

3.8 Chaperones

All examinations must be carried out with consideration of the NHS Lothian Policy and procedural guidance on the use of Chaperones during intimate examination and care of Patients (December 2013).

ROLE OF THE CHAPERONE

Patients should be offered a chaperone or be invited to have a relative or friend present with them during any examination or procedure. Their personal preference should be documented in their healthcare record. In particular, patients who are required to undress as part of their management are entitled to have a chaperone present. Likewise, all staff who are involved in intimate examination and / or care are entitled to have a chaperone present. There is no common definition of a chaperone, and their role varies considerably depending on the needs of the patient, the healthcare professional and the examination or procedure being carried out. Broadly speaking, their role may encompass any of the following areas:

• To provide emotional comfort and re-assurance to patients

• To assist in the examination, for example handing instruments during a sterile procedure

• To assist with undressing patients

• To provide protection to healthcare professionals against unfounded allegations of improper behaviour

• To assist in the patient understanding what is going to happen

• In very rare circumstances, to reduce the risk of personal or professional attack against the clinician

• A formal chaperone should be able to identify unusual or unacceptable behaviour on the part of the healthcare professional undertaking the examination. A chaperone is present as a safeguard for all parties (patient and practitioners) and is a witness to continuing consent of the procedure. However, a chaperone cannot be a guarantee of protection for either the examiner or examinee. It is acknowledged within

healthcare settings that every intervention with a patient may not necessitate a chaperone, however a risk assessment of a situation should always be undertaken prior to the commencement. Wherever a chaperone has been offered and declined this should be clearly documented in the healthcare records where the examination has continued.

To view the full outline of the NHS Lothian Chaperone policy, please see the link below.

Chaperoning policy Dec 2013 (nhslothian.scot)

A chaperone MUST be present for all transvaginal ultrasound examinations.

3.9 Patient Identification

All patients MUST have their identification verified PRIOR to the ultrasound scan commencing.

1. Ask the patient to confirm their name
2. Ask the patient to confirm their date of birth
3. Check the name and date of birth corresponds to the Community Health Index (CHI) and name on TRAK
4. Check the name and date of birth corresponds to the CHI and name on the ultrasound machine new patient page
5. Where two patients on the work list have the same or similar names, ask the patient to confirm their address

3.10 Consent

NHS Lothian has a Consent Policy & Guidance Document. This document sets out the standards for NHS Lothian and this along with the available full guidance document will support staff enabling them to comply with current requirements/legislation. This applies to all ultrasound examinations and may be seen in full in the link below:

Consent Policy (nhslothian.scot)

In addition, all obstetric patients will be offered screening tests in accordance with Antenatal Screening Scotland Guidelines. It is the responsibility of the woman's community midwife to discuss the options for 1st and 2nd trimester screening at their booking appointment. The woman's decision regarding consent should be recorded by the community midwife on Maternity TRAK. Consent for screening tests should be confirmed by the Sonographer prior to the examination.

The patient MUST have attended their booking appointment with the community midwife PRIOR to routine obstetric 1st trimester and 2nd trimester booking and screening examinations.

https://www.pnsd.scot.nhs.uk/wp-content//2015-Fetal-Anomaly-and-Downs-Syndrome-Screening-Protocols-v-1.pdf - see page 17 for general consent guidelines.

Verbal consent MUST be obtained for all transvaginal scans and documented in the ultrasound report.

4. Scanning Protocols

4.1 First Trimester Ultrasound Examinations

In accordance with Antenatal Screening Scotland Guidelines, all patients will be offered a dating/booking ultrasound scan between 11^{+2} weeks and 14^{+1} weeks.

4.1.1 Booking/Dating Ultrasound Scan

Purpose

- Localise pregnancy
- Determine single or multiple pregnancy/establish chorionicity
- Assess viability
- Establish estimated delivery date (EDD) - in IVF pregnancies, use the EDD provided by the clinic
- Check fetal anatomy (dependent upon gestation) for major fetal anomalies
- Check adnexa
- Check for fibroids/uterine anomalies

Preparation

- Full bladder

Procedure

The examination should be performed trans-abdominally; however, if an appropriate image is unobtainable the sonographer may wish to consider a transvaginal examination where appropriate. If unable to achieve a satisfactory CRL and/or NT measurement, a repeat appointment should be requested and arranged by the examining sonographer, within the time frame for dating/screening.

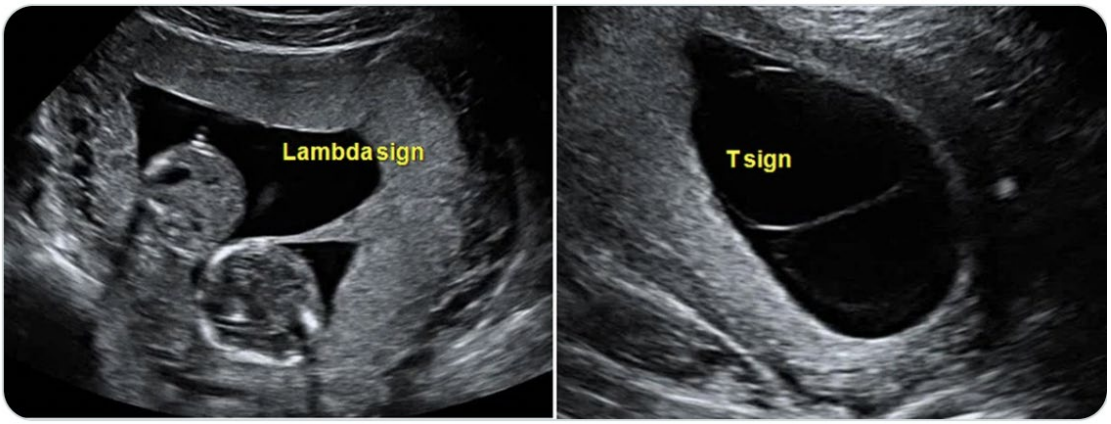
4.1.1.1 Localise the pregnancy

- Identify the bladder and uterus and ensure the gestation sac is intrauterine and correctly positioned within the uterine cavity. If there are any concerns regarding the position of the gestation sac (e.g., within the cervical canal, adherent to a previous scar, or particularly close to the interstitial region of the

uterus), a medical opinion should be obtained via the Pregnancy Support Centre or Gynaecology triage/ on call staff.

4.1.1.2 Determine single or multiple pregnancy

- In twin/multiple pregnancy, determine chorionicity using the lambda sign for dichorionic, and T sign for monochorionic twins. This should be determined at the booking scan (between 11^{+2} and 14^{+1} weeks). **See guideline 5.1.2**
- If there is an apparent demise of one of a pair of monochorionic twins prior to 16 weeks, please seek advice from Fetal Medicine.



References:

https://obgyn.onlinelibrary.wiley.com/doi/10.1002/ijgo.12742

Overview | Twin and triplet pregnancy | Guidance | NICE

ISUOG Practice Guidelines: role of ultrasound in twin pregnancy - Khalil - 2016 - Ultrasound in Obstetrics & Gynecology - Wiley Online Library

4.1.1.3. Assess viability

- If fetal heart activity is present, continue and complete the examination as detailed below.
- **If there is no fetal heart activity,** measure the Crown Rump Length (CRL) and mean sac diameter (MSD) to aid further management options. Referral guidelines are as follows: -
    - Gestation < 12 weeks, refer to Pregnancy Support Centre
    - Gestation ≥ 12 weeks, refer to Obstetric Triage

Please note:

Where the CRL is < 15mm, a transvaginal scan should be offered as per PSC protocol when confirming an early fetal demise.

A second sonographer is required to confirm a fetal demise and their full name documented in the examination report. At least one sonographer is required to be a permanent member of staff. Where this is not possible this should be recorded in the examination report.

The patient's TRAK records should be updated to record all additional examinations, for example, second opinion, failed pregnancy and transvaginal scan where appropriate.

- Asymptomatic haematoma does not require reporting or ultrasound follow up.

4.1.1.4. Determine Gestational Age and Estimated Due Date (EDD)

- Determine gestation using CRL - 45.0mm - 84.0mm (11^{+2} – 14^{+1} weeks). In twin and multiple pregnancies, where there is a size discrepancy between fetuses, the EDD should be calculated using the largest fetus. An EDD should only be generated once a live fetus ≥ 45mm has been identified.
- If the patient is found to be less than 11^{+2} weeks (CRL < 45mm), the obstetric appointment team in SMMP will book a return appointment. If in the community please send an email to the generic email box: SMMP.Ultrasound@nhslothian.scot.nhs.uk
  Please include the patients details and time frame for the next ultrasound scan. The appointments team will put the request on TRAK (as centralised booking would do) and contact the patient with the appointment date and time.
  Record in the ultrasound report: -

  Too early for booking today.

  A repeat ultrasound scan has been requested via the ultrasound appointments team in xx weeks.

- Obtain midline, sagittal section of the fetus, horizontally orientated on the screen so that the line between crown or rump is at 90° to the ultrasound beam. The correct view is a clearly visualised profile.
- The fetus should be in the neural position, with the head in line with the spine, not hyper-extended or flexed, with fluid visible between fetal chin and chest.
- Linear calipers should be used to measure the maximum length, in which the end points of crown and rump are clearly defined. Intersection of calipers (+)

placed on the outer margin of skin borders of the fetal crown and rump. See Figure 1.

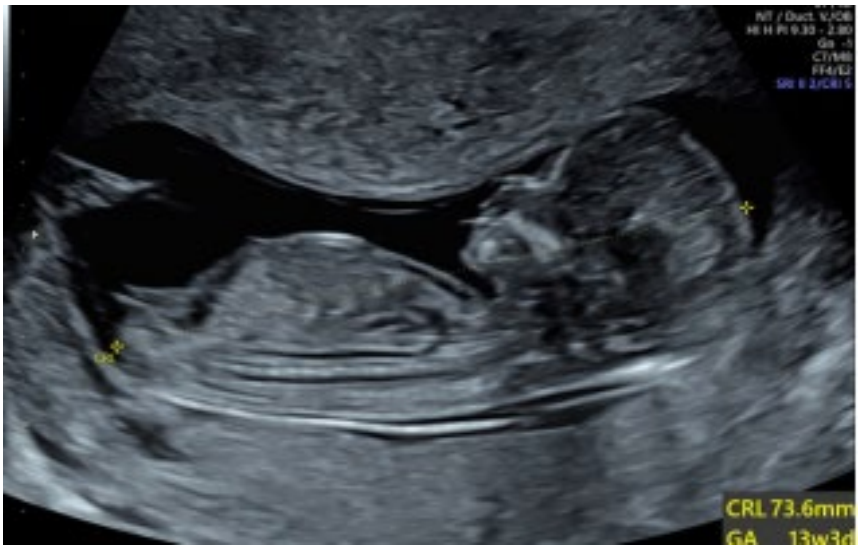


Figure 1

Reference for the above image:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1011680/FASP_ultrasound_handbook_July_2015_090715.pdf (document now withdrawn however image remains relevant)

Where the CRL is >84.0mm a Head Circumference (HC) measurement should be used to determine gestational age. The optimal HC measurement should be a cross-sectional view at the level of the ventricles with the midline echo lying as close as possible to the horizontal plane with the following landmarks:

- Rugby ball shape
- Centrally positioned, continuous midline echo broken at one third of its line by the cavum septum pellucidum.
- Anterior walls of the lateral ventricles centrally placed around the midline
- The choroid plexus should be visible within the posterior horn of the ventricle in the distal hemisphere

To measure the HC, the intersection of the calipers should be placed on the outer border of the occipital and frontal edges of the skull at the point of the midline ('outer to outer') across the longest part of the skull and at the upper and lower parietal bones (outer to outer) across the widest part of the skull. Caliper placement should not include skin. See Figure 2.

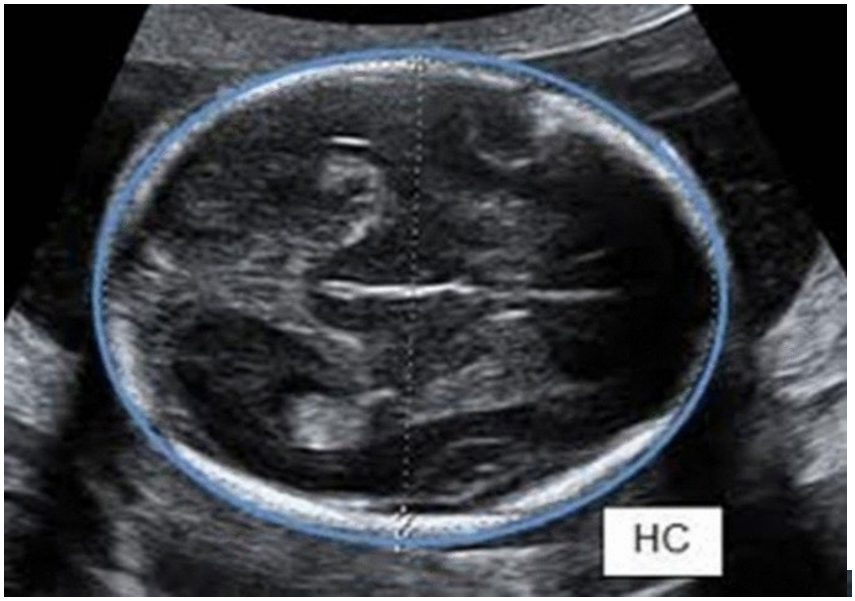


Figure 2

Reference:
https://www.bmus.org/static/uploads/resources/Aug_2009_Fetal_Measurements_D3NApK5.pdf

If the patient has consented to first trimester screening and the CRL is > 84.0mm, the woman should be advised that the gestation is too advanced for 1st trimester screening and that we can offer 2nd trimester screening for Down's syndrome only.

- Where the HC measurement is ≥101mm the patient should be directed to phlebotomy on site for second trimester screening. Please complete an **NHS Bolton Second trimester Down's Syndrome Screening for NHS Scotland form (white form/blue text) - See 5.2 Appendix B**
- Where the HC is ≤ 101mm, the woman should be advised to contact their community midwife to arrange second trimester screening between 14 weeks + 2 days and 20 weeks. Attach the yellow form **Informing Your Midwife (6.3 Appendix C)** to the inside cover of the obstetric notes. The sonographer should make it clear to the woman that first trimester screening has NOT been possible and that it is their responsibility to contact their community midwife to arrange second trimester screening.
- Where the HC is > 172mm, second trimester screening is no longer possible.

4.1.1.5. Review basic anatomy relevant to gestation

- The fetal skull bones should be seen to form a complete ellipse. If the skull bones are not clearly seen or the cross section of the skull does not form an ellipse, or there is no clear midline seen, a medical opinion should be sought to exclude anencephaly/exencephaly or holoprosencephaly.

- Confirm the presence of 2 upper and 2 lower limbs.
- Identify cord insertion and refer to Fetal Medicine if an abdominal wall defect is suspected (most commonly gastroschisis or exomphalos).
- The nuchal translucency (NT) should be evaluated whether screening has been accepted or not. If the NT measures ≥3.5mm or a cystic hygroma is suspected the patient should be advised of the finding as this is outside normal range/findings and a referral to fetal medicine should be made.

4.1.1.6 Imaging

- Midline longitudinal section of uterus to demonstrate intrauterine pregnancy
- Fetal biometry
- Any fetal abnormality
- Any associated maternal pelvic pathology
- In cases of twin/multiple pregnancy – presence/absence of lambda sign or T-sign

4.1.1.7 Report

To include:

- Clinical indication as stated on the request form
- EDD by ultrasound or by IVF (IVF pregnancies to maintain original IVF date)
- Gestation by ultrasound
- Fetus number
- Confirmation of fetal heart pulsations
- Fetal biometry
- Chorionicity in cases of multiple pregnancy
- Confirm fetal anomaly request on TRAK – Yes/No **(advise patient to contact her midwife ASAP if request not on TRAK and record in ultrasound report)**
- Any fetal abnormality identified
- Any maternal pelvic pathology identified.

Please ensure that when reporting on Soliton, the generic booking report proforma that automatically appears is adhered to as the lay out facilitates ongoing audit of booking results.

4.1.1.8 Additional Administration

On completion of a booking ultrasound examination for a viable pregnancy, locate the request for a routine fetal anomaly ultrasound on TRAK. Record the EDD in the processing notes and authorise the examination.

If the pregnancy is confirmed as non-viable, discontinue the fetal anomaly scan and any future examination requests relevant to this pregnancy on TRAK.

4.1.2 First Trimester Nuchal Translucency Screening

4.1.2.1 Consent and Inclusion Criteria

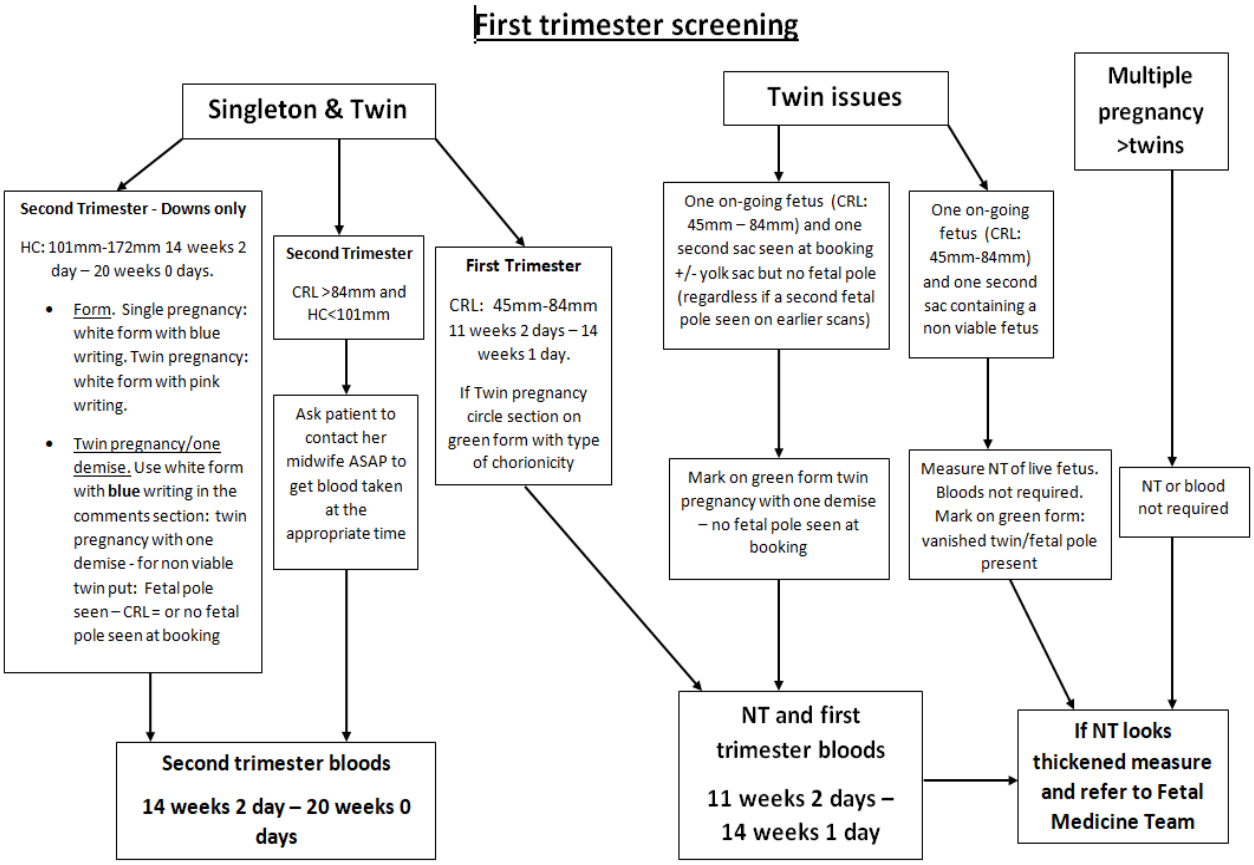
The Nuchal Translucency (NT) should be measured at the time of the dating scan. Prior to obtaining an NT the Sonographer will check on Maternity TRAK if the patient has consented for first trimester screening for chromosomal abnormalities. NHS FASP screening for T21, T18 and T13 is only available for singleton and twin pregnancies. Screening for multiple pregnancies greater than twins is not currently available. If the NT appears prominent and is found to measure **≥ 3.5mm**, please refer to Fetal Medicine.

Where the patient has consented for first trimester screening, NT measurements should be performed when the CRL is ≥ 45mm - ≤ 84mm; using the current BMUS 2009 dating formula.

The gestational age range for NT measurement is from 11^{+2} to 14^{+1} weeks.

Reference:

Loughna P, Chitty L, Evans T, Chudleigh T (2009) *Ultrasound Fetal Size and Dating: Charts Recommended for Clinical Obstetric Practice,* Volume 17 3 British Medical Ultrasound Society: https://www.bmus.org/static/uploads/resources/Aug_2009_Fetal_Measurements_D3NApK5.pdf



4.1.2.2 Procedure

- A midline sagittal section of the fetus should be obtained, with the fetus horizontal on the screen, either supine or prone. The correct view is a clearly visualised profile.
- The fetus should be in the neutral position with the head in line with the spine, neither hyper extended nor flexed.
- The NT should be measured once the magnification of the fetus is made as large as possible before the image is frozen, such that only the fetal head and shoulders are visible on screen. Small movement of the callipers on the magnified image must produce only a 0.1mm change in the measurement. See Figure 3 below. Care must be taken to distinguish between fetal skin and amnion so that the amnion is not included in the measurement because both structures may appear as thin membranes. This is achieved by visualising spontaneous fetal movement away from the amniotic membrane.

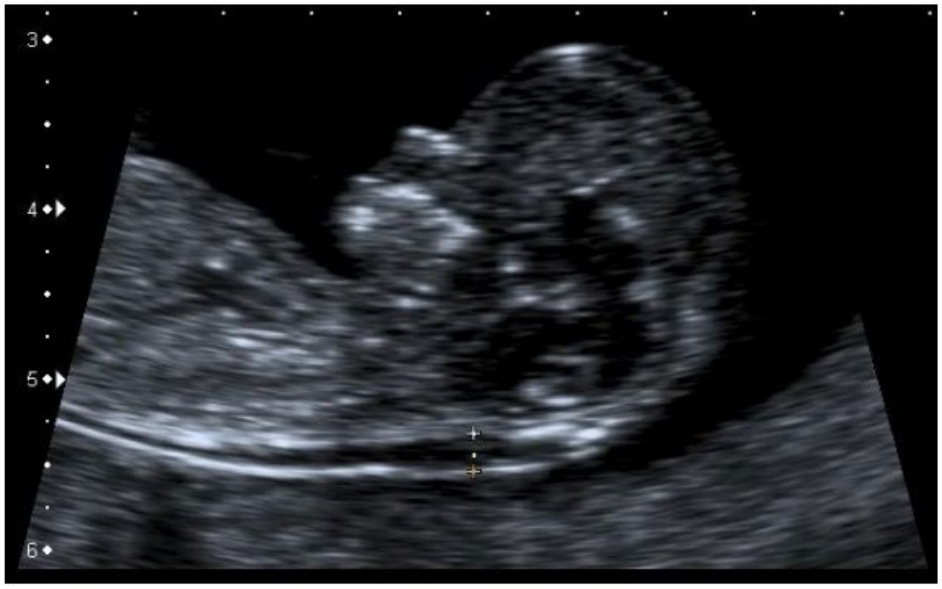


Figure 3

Reference for the above image:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1011680/FASP_ultrasound_handbook_July_2015_090715.pdf (document now withdrawn however imaging remains relevant)

- The maximum thickness of the subcutaneous translucency between the skin and soft tissue over the cervical spine should be measured.
- The calliper selected should be a vertical cross. Measurements should be taken with the horizontal lines of the callipers placed 'on' the lines that defines the NT thickness, not in the line and not in the translucency. See Figure 4.

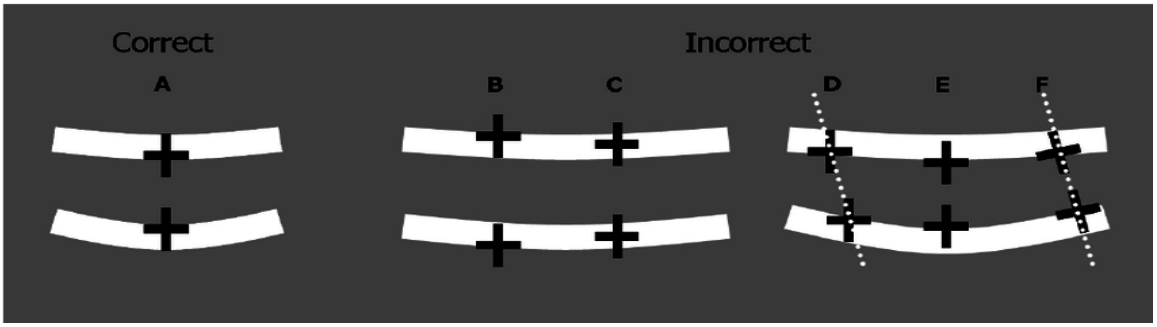


Figure 5

- When magnifying the image, reduce the gain to improve image quality.
- Care must be taken to distinguish between fetal skin and amnion so that the amnion is not included in the measurement because both structures may appear as thin membranes. This is achieved by visualising spontaneous fetal movement away from the amniotic membrane.

- The image should be unfrozen, and the measurement repeated until the optimum image, meeting the above criteria has been obtained.

Reference:

Microsoft Word - 2015 - Fetal Anomaly and Down's Syndrome Screening Protocols - v 1.0 (scot.nhs.uk) - see page 20 - 21

To achieve optimum images, consider adjusting the controls of the machine. The **CLEAR** campaign (2012) gives a handy mnemonic:

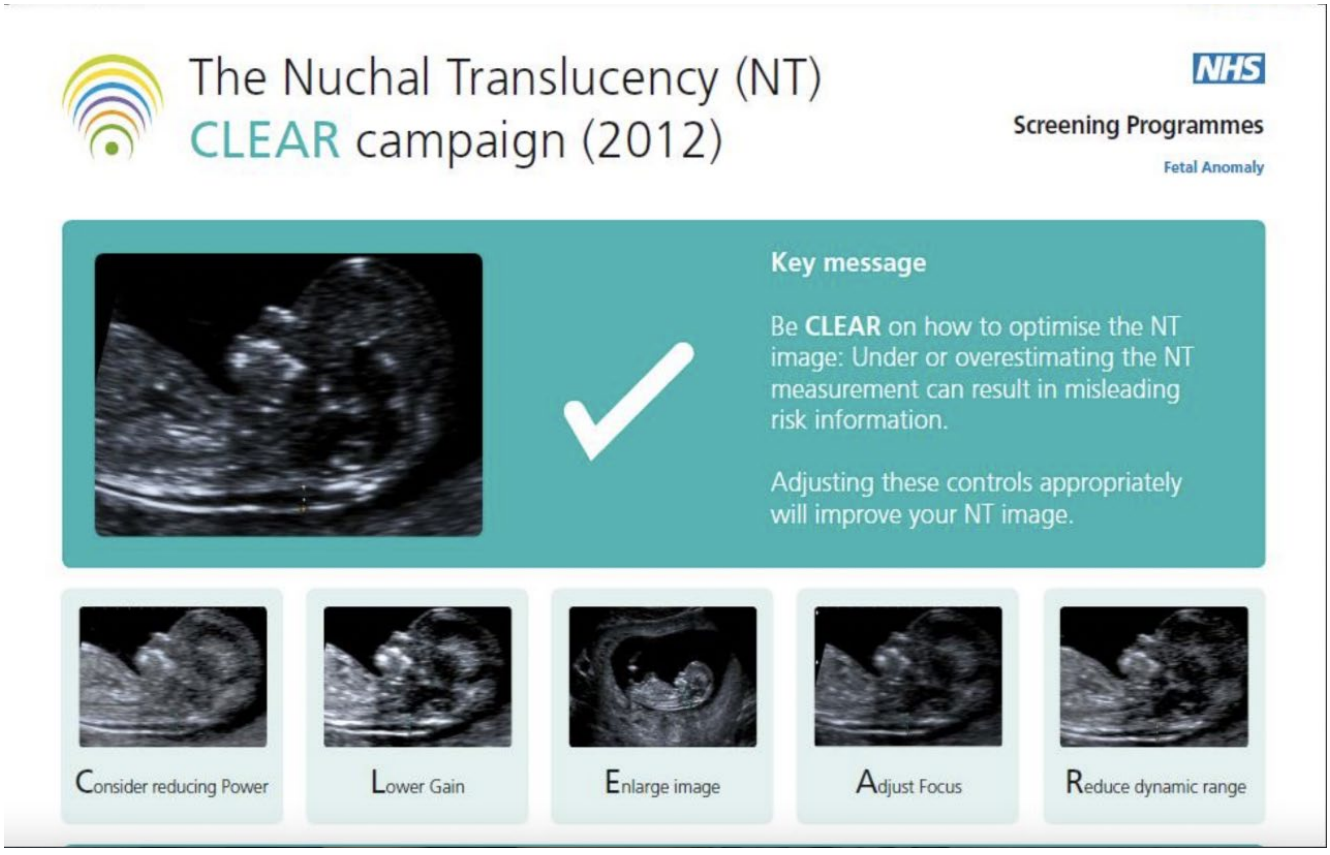
Consider reducing power

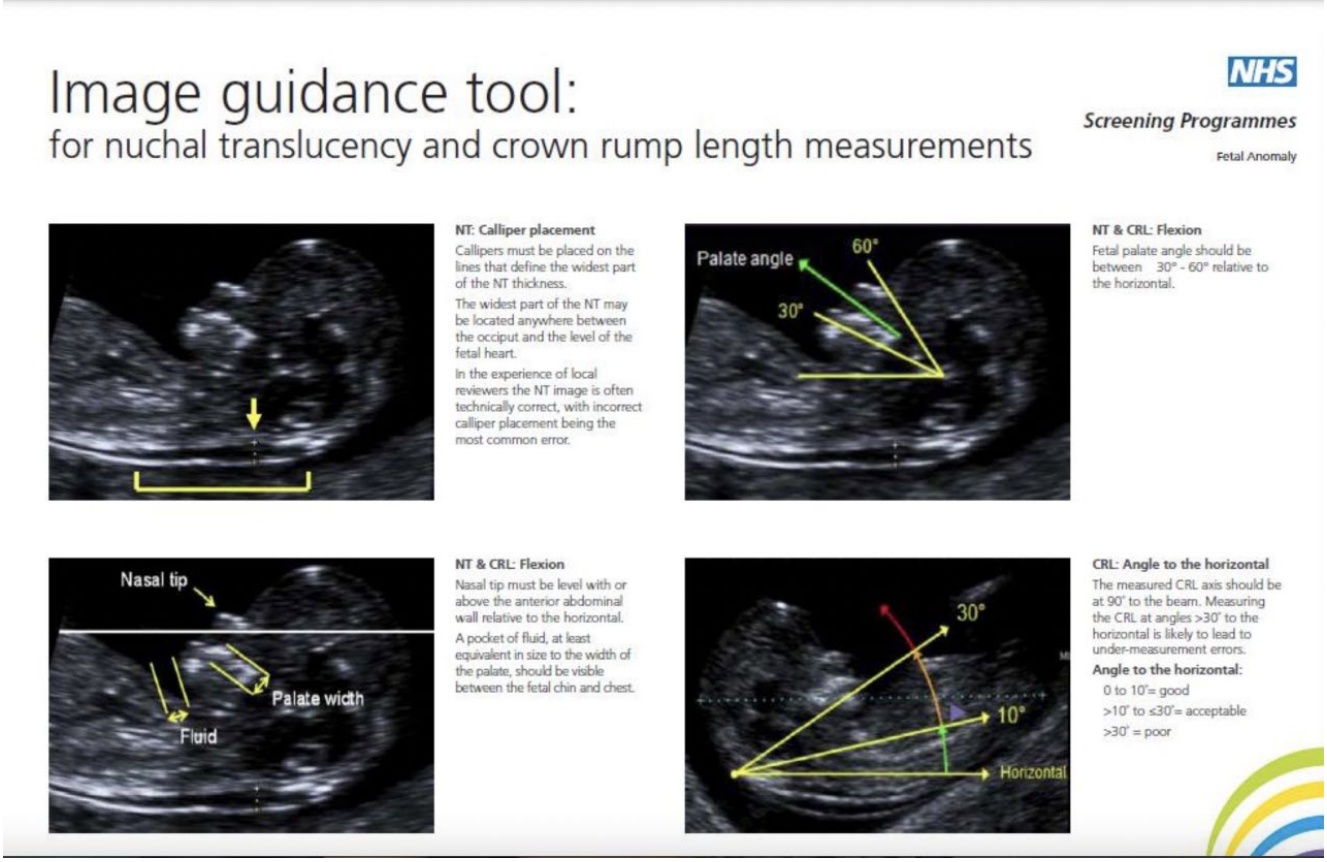
Lower gain

Enlarge image

Adjust focus

Reduce dynamic range





Reference for the above images:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1011680/FASP_ultrasound_handbook_July_2015_090715.pdf
(document now withdrawn however imaging remains relevant)

4.1.2.3 Documentation

In addition to the ultrasound report, the NT measurement should be documented on the first trimester GREEN screening blood form. **See 5.2 Appendix B.** Please include: -

- CRL measurement
- NT measurement
- Sonographer DQASS code
- Number of fetuses
- Any known information regarding assisted conception
- Chorionicity in twin pregnancies
- Presence of a second empty gestation sac **OR** second sac containing a fetal pole (including CRL) with no heart activity.

4.1.2.4 Imaging

- In addition to imaging required for dating/booking ultrasound examination, the optimum image meeting the criteria for NT screening must be retained in accordance with medico-legal requirements for 25 years. Images will be stored on the NHS Lothian Radiology PACS (Picture Archiving and Communication System).

4.1.2.5 Notes

When it is not possible to obtain an NT measurement at the first clinic appointment, women should be offered a return appointment within the required gestational range.

Please instruct the ultrasound booking team to put an NT recall request on TRAK and arrange a future appointment within the required gestational range, as advised by the sonographer. If in the community and there is sufficient time you can email the ultrasound booking team at SMMP.Ultrasound@nhslothian.scot.nhs.uk

If unable to obtain a NT measurement at the subsequent (2^{nd}) appointment **or** the CRL exceeds 84mm, then the woman should be offered second trimester screening.

Referral for Second Trimester Screening Pathway

1.Unable to obtain NT at second attempt and CRL < 84mm, OR CRL >84mm but HC <101mm

- Ensure the woman is aware that first trimester screening has been unsuccessful and advise her to contact their community midwife to arrange second trimester screening. This is based on a blood test only (quadruple screening) and is performed between 14^{+2} and 20^{+0} weeks. The sonographer should attach a yellow advisory letter **(see 6.3 Appendix C Informing Your Midwife)** to the inside cover of the patient's notes as a reminder to both the patient and her midwife that second trimester screening bloods are still required.

2. HC ≥ 101mm

- Ensure the woman is aware that first trimester screening has been unsuccessful due to the gestation of her pregnancy. The patient should be directed to phlebotomy on site for second trimester screening. Please complete an **NHS Bolton Second trimester Down's Syndrome Screening for NHS Scotland form (white form/blue text) - See 5.2 Appendix B.** If a phlebotomist is not on site, advise the patient to contact her community midwife urgently for bloods, attaching the yellow advisory letter **(see 6.3 Appendix C Informing Your Midwife)** to the inside cover of the patient's notes as a reminder to both the patient and her midwife that second trimester screening bloods are still required.

NT ≥3.5mm is a significant early pregnancy ultrasound finding. It is associated with an increased risk of cardiac, genetic and chromosomal abnormalities. The NT should not be routinely measured unless the patient has consented to first trimester screening. However, if a cystic hygroma is present or if the nuchal translucency appears ≥3.5mm; whether found during routine screening or as an incidental finding, it is the responsibility of the sonographer to refer the woman to the Fetal Medicine team for counselling a soon as possible after the examination.

4.1.2.6 Training, Signing Off and the Screening Support Sonographer

- Each Sonographer performing Nuchal Translucency (NT) measurements must have been signed off as competent by the sector Screening Support Sonographer (SSS) within the NHS Lothian sector they are employed, if they have not previously obtained competency. Locum sonographers will be assessed on an individual basis relevant to previous experience/competency.
- Each sonographer will be allocated a unique Scotland DQASS (Down's Syndrome Screening Quality Assurance and Support Service) number/code. The SSS will request the DQASS number once competency, with in-house training, has been obtained.
- DQASS is in place to ensure a safe, accurate and consistent service. DQASS is used in conjunction with other measures such as the detailed training and education requirements for obtaining the CRL and NT measurements.
- The role of the SSS is to assess new members of staff competency, support the continual improvement of the quality of measurement of NT And CRL and to provide additional training needs if required. There is currently no regional support officer and no plan for this post to be replaced.
- The Screening Support Sonographer audits three sets of CRL and NT measurements of each Sonographer monthly (time permitting) each Sonographer is given feedback of the audit and if required additional training and support is provided.
- Each Board's ultrasound service must regularly submit fetal biometry data (including NT measurements) to the National Down's Syndrome Quality Assurance Screening Service (DQASS), so that performance activity can be regularly audited and monitored. This is normally undertaken by the laboratories from the laboratory database. All sonographers/clinicians performing nuchal translucency measurements must have their results subjected to rigorous, valid audit and to external evaluation. Ultrasound services must be able to monitor the reproducibility of fetal biometric measurements and be able to provide data of ultrasound activity. All ultrasound examinations should be documented and archived, and hard copy of all abnormal findings made. Feedback plots for each Sonographer are sent to the SSS for each 6-month cycle. The SSS assesses all the Sonographers results and distributes feedback reports to Sonographers, if any additional training is required the SSS will action it. These plots should also be stored in

a central location so that others can access them when the SSS is unavailable.

Quality Assurance of NT/CRL Measurement

Full details may be found in the link below: -

Reference:

https://www.pnsd.scot.nhs.uk/wp-content//2015-Fetal-Anomaly-and-Downs-Syndrome-Screening-Protocols-v-1.pdf page 6 & 34

4.1.2.7 Patients having or intending to have first trimester non-invasive prenatal testing (NIPT)

Patients may to choose to self-fund NIPT to screen for Down's, Edwards' and Patau's syndrome instead of accepting the first trimester screening offered by the NHS (NT measurement & serum factors). If they attend for booking US following, having had, or intending to have NIPT:

1. *With a low-risk result on NIPT:* discourage the patient from repeating screening and having NHS screening test (NT & serum factors). Please see the explanation below of why this is not a good idea and explain to couple if they question this. Check nuchal region and report and refer to Fetal Medicine if it is ≥ 3.5 mm.

2. *Waiting on the result from NIPT:* save an image with a measured or an image from which it is possible to measure the NT. Do not send the patient for blood test. If the NIPT fails for some reason, we are then able to perform NHS first trimester screening if the patient attends to have blood sample taken.

3. *Waiting to go for NIPT:* as point (2). Also covers the possibility that they change their mind about NIPT or the test cannot be performed for some reason.

Explanation to Patient

There is no benefit in having two screening tests for the same problem. NIPT is a more accurate screening test than first trimester combined screening, in particular for trisomy 21. Having two different results, from different methods, with differing risks can be confusing and may increase the possibility of undergoing unnecessary invasive testing and cause increased anxiety.

Where first trimester screening provided by the NHS is not taken up by a woman for whatever reason, the sonographer will always visualise the nuchal translucency and if not significantly increased, would not formally measure as the only reason to do this is to form part of the data needed to calculate a risk for trisomy 21, 13 and 18. If there were any concerns about the fetal structure or if the NT looked increased a formal measurement would be taken and an immediate referral to the fetal medicine team would be made to discuss any further tests that may be offered.

4.1.2.8 Useful training links:

Education and training for health professionals is being organised at national level by NHS Education for Scotland and supporting resources are available through TURAS:

https://learn.nes.nhs.scot/33524/women-children-and-famillies/expanded-pregnancy-screening-pathways-and-non-invasive-prenatal-testing-nipt

Public Health England eLearning for Sonographers in First Trimester Screening:

https://phescreening.blog.gov.uk/2019/09/17/e-learning-for-sonographers-in-first-trimester-screening/

4.1.2.9 Quality Assurance of NT/CRL Measurement

A full description of Quality Assurance details may be found in the national guidelines in the following link:

NHS Scotland Screening Programmes – Pregnancy and Newborn Screening National Protocols Programme: Fetal Anomaly and Down's syndrome screening Version 1.0 April 2015 https://www.pnsd.scot.nhs.uk/wp-content//2015-Fetal-Anomaly-and-Downs-Syndrome-Screening-Protocols-v-1.pdf

4.1.2.10 Management of Down's, Edwards' and Patau's Syndromes Screening in Twin Pregnancies

In 2020, the first trimester screening programme was expanded for twin pregnancies to include combined first trimester screening for Down's syndrome, Edwards' syndrome and Patau's syndrome and second trimester quadruple screening for Down's syndrome and NIPT as a second line screen for those pregnancies receiving a higher chance result from the primary screen.

- Women known to have a twin pregnancy prior to their early scan should have had specific counselling for screening in twin pregnancy and consented to that screening test prior to their scan – sonographer to check for consent.
- When combined 1st trimester screening in a twin pregnancy is successfully achieved, in Monochorionic twins (same chromosomes and genes) the patient will receive one result for the whole pregnancy. In cases of dichorionic twins, the patient will receive the result for each baby.

- If either CRL is below 45.0mm the sonographer should arrange a repeat ultrasound examination within the same guidelines for a singleton pregnancy **(see 4.1.1.4 p14).**
- If a woman has requested screening for Down's, Edwards' and Patau's syndromes and the process for obtaining both NT measurements is unsuccessful or CRL is greater than 84.0mm the sonographer will refer the woman for second trimester quadruple screening for Down's syndrome.

Quadruple test in twin pregnancies

The quadruple test is offered to a woman with a twin pregnancy to screen for T21 only when one or both of the:

- NT measurements cannot be obtained
- CRL measurements are greater than 84.0mm

The quadruple test in twin pregnancies is not as sensitive as the combined test and the decision-making process can be more difficult for several reasons. Women considering the quadruple test should have a discussion with a healthcare professional with a special interest, experience and knowledge of managing multiple pregnancies. This is to help support personal informed choice.

Monochorionic twins

The performance of the quadruple test in monochorionic twins is comparable to that in singleton pregnancies.

Dichorionic twins

In dichorionic twins where one baby has the condition and the other does not, the performance of the quadruple test is not as sensitive as it is in monochorionic twins.

Quadruple test chance results relate to the pregnancy not to individual babies. They are not interpreted in the usual way but used, with a cut-off of 1 in 150 at term, to define a higher chance group.

Quadruple testing may be performed between 14+2 and 20 weeks, however research suggests it is most accurate between 16 and 18 weeks. As the quadruple test is not as sensitive in twin pregnancies, testing between 16 and 18 weeks is advised where possible to improve accuracy.

Reference:

Practice Bulletin No. 162: Prenatal Diagnostic Testing for Genetic Disorders - PubMed (nih.gov)

4.1.2.11 Management of Down's, Edward's and Patau's Syndromes Screening in Vanished Twin

There has been debate at National screening meetings surrounding research regarding the handling of vanished twins, but there have been no changes to the National screening protocol yet.

The definition of a vanished twin is when one fetus in a twin pregnancy is non-viable. It may be partially or completely reabsorbed.

An ultrasound scan for the combined first trimester or quadruple test may show either:

- an empty second pregnancy sac
- a second pregnancy sac containing a non-viable fetus

Empty second pregnancy sac and the combined test
When there is an empty second pregnancy sac (+ or – a yolk sac), the combined test **CAN** be used to calculate the chance result.

Second pregnancy sac containing a non-viable fetus and the combined test
When there is a second pregnancy sac containing a non-viable fetus, there will be a contribution of the vanished twin to the biochemistry markers that are measured in the blood sample and therefore the combined test should **NOT** be used to calculate the chance result. A calculation is done using maternal age and NT alone and so no blood sample is required.

To help accurate processing, please include the information 'vanished twin/fetal pole present' on the green request form.

The quadruple test
The quadruple test **CAN** be offered to a woman with a vanished twin pregnancy. The Bolton laboratory offer second trimester screening for vanished twins where there is an empty second sac or a second sac containing a non-viable fetus. Please record the CRL of the non-viable fetus and highlight on the request form the type of vanished twin scenario as in these circumstances a high AFP is possible, and they will advise accordingly if required.

Reference:

Screening for Down's syndrome, Edwards' syndrome and Patau's syndrome - GOV.UK (www.gov.uk)

4.1.3 Early First Trimester Ultrasound Scans - Other indications (non-screening)

Reassurance ultrasound scans are not offered in asymptomatic patients.

Under certain circumstances, to guide patient management, an early ultrasound examination may be requested. Examples include: -

- A history of previous ectopic pregnancy. An early scan can be offered at approximately 6 weeks gestation in asymptomatic women and will be performed in PSC. A symptomatic patient must be referred to PSC.
- A woman who is suffering from hyperemesis gravidarum (not morning sickness) **AND** is an inpatient may be scanned in the Ultrasound Department if an early pregnancy scan has not already been performed. This can only be requested by ward doctors.

Reference: -

Microsoft Word - HYPEREMESIS GRAVIDARUM (scot.nhs.uk)

- Patients needing early dating for CVS. Ultrasound may be requested by Fetal Medicine Midwives from 8 weeks gestation (the LMP must be documented where possible).
- Pre-existing diabetes: to optimise diabetic control.
- History of thrombotic disease e.g., lupus, antiphospholipid syndrome, factor V Leiden, protein C deficiency, protein S deficiency and anti- thrombin deficiency. To enable switch from aspirin to heparin once fetal heart pulsations confirmed.
- Other significant maternal conditions such as maternal cardiac abnormality. With such conditions, pregnancy can pose a significant risk to the mother and may significantly alter patient management.

Results

The woman will be given verbal information about the ultrasound findings by the Sonographer.

If no problem is detected, the woman should be reassured that within the limitations of ultrasound, all appears well, and they will remain under the care of her community midwife.

If a problem is detected, for example fetal abnormality or fetal demise, the sonographer should inform the woman of her concerns and arrange for her to be seen as soon as possible.

- fetal demise - see guideline **1.1.3**
- fetal abnormality - refer to Fetal Medicine

If a woman presents for dating/booking ultrasound and the pregnancy is found to be of uncertain viability OR pregnancy of unknown location (PUL), she should be informed of these findings and referred to PSC on the day of the examination to arrange follow-up – **see 4.1.1.3 page 13.**

4.1.4 Management of Women with Ovarian Cysts Identified in Pregnancy

4.1.4.1 Antenatal Care - Ultrasound Assessment

- Note location of cyst (right or left adnexae)
- Measure cyst in 3 planes
- Assess cyst for any of the following features
    1. Septae
    2. Growth/papillae within the cyst
    3. Solid components (measure size)
    4. Shape of cyst (regular/irregular/spherical/elongated)
    5. Vascularity
    6. Assess for free fluid
    7. Assess the other ovary

4.1.4.2 Management

1. **Simple Cyst**

- Simple ovarian cyst ≤ 5cms identified in early pregnancy or booking scan.

ACTION:

Report finding of a simple ovarian cyst <5cm seen on examination. Reassure patient and advise although no routine follow up is required, an attempt will be made to reassess the cyst at subsequent planned obstetric scans.

ACTION FOR MIDWIFE: Please inform the locality obstetric consultant.

2. **Simple Ovarian Cyst > 5cm/Complex ovarian cyst/Bilateral Ovarian Cyst**

ACTION:

Sonographer to enquire if patient is symptomatic. Report findings and refer patient to Obstetric Triage. An attempt will be made to reassess the cysts/s at subsequent planned obstetric scans.

ACTION FOR OBSTETRIC TRIAGE:

If symptomatic: for full assessment including Ca125 and notify Locality Consultant via email.

If asymptomatic: take Ca125 and urgent referral to Locality Consultant via email.

4.1.4.3 Postpartum Follow Up

All women with a known cyst/adnexal mass >5cm should have a repeat ultrasound scan 6 weeks postnatal. The Locality Consultant should request this antenatally.

4.1.5 Fibroids in Pregnancy

The uterus is checked for uterine fibroids particularly at the time of fetal viability, booking and the anomaly scan.

- Document the number and location (close to **OR** within the cervix **OR** clear of the cervix) of the fibroids. Measure the largest fibroid and document the dimensions in 3 planes.

Management

If fibroids are ≤ 6cms at the time of anomaly scan and not within the cervix

- Reassure the patient
- No further scans are indicated

If one or more fibroids are > 6cms at time of anomaly scan, or the fibroids are within the cervix

- Community midwife should refer the patient for growth measurements at 30 weeks and 36 weeks - **see guideline 4.3.1.2 Indications for growth measurements**

4.1.6 Amniotic Bands

Definition

Amniotic bands are typically seen as thin free-floating strands of amnion within the amniotic sac. They are harmless but can occasionally present as amniotic band

syndrome where the developing fetus becomes entangled in them. This can cause limb abnormalities and in severe cases limb or digit amputation.

Management

- If amniotic bands are seen at the time of booking and the fetus appears to be freely moving, this finding does NOT need to be reported and no follow up is required.
- If there is possible fetal involvement i.e., direct involvement of the band around limbs or doubt over fetal development, the patient should be referred to Fetal Medicine.

4.1.7 Patients Presenting with PV Bleeding (or concern regarding fetal viability)

Patients that present with bleeding that are more than 12 weeks' gestation are not eligible for referral to the Pregnancy Support Centre. Patients will be assessed in Obstetric Triage.

A reserved ultrasound slot is available in Ultrasound Room 5 at 9.40am daily for assessment of patients presenting with PV bleeding via Obstetric Triage.

- Between 12 weeks' gestation (whether the patient has booked or not) and 16 weeks, perform viability US (check fetal heart pulsations) for assessment of PV bleeding if requested. If further episode of bleeding and repeat US requested, suggest check of fetal heart by ultrasound in Obstetric Triage if competent staff available.
- Between 16 weeks and anomaly US, midwifery staff to auscultate fetal heart with sonicaid. If the fetal heart is not detected an ultrasound referral to assess viability should be arranged. **If fetal heart pulsations are auscultated in obstetric triage, an ultrasound scan is not indicated.**

Following the ultrasound scan, the patient should return to the referring midwife/clinician in Obstetric Triage for review.

4.2 Second Trimester Ultrasound Examinations

Full details of NHS Scotland's Fetal Anomaly Screening Programme may be found at: -

Reference:

https://www.pnsd.scot.nhs.uk/wp-content//2015-Fetal-Anomaly-and-Downs-Syndrome-Screening-Protocols-v-1.pdf

4.2.4 Routine Fetal Anomaly Scan

- In accordance with Antenatal Screening Scotland Guidelines, all women are offered this ultrasound scan between 18+0 and 20+6 weeks. Examinations will be targeted at a gestation of 20 weeks where possible.
- Patients who are diabetic (Type 1 and Type 2) will be offered the ultrasound scan at 18 weeks with an additional targeted cardiac scan at 22 weeks due to the increased risk of fetal abnormality in this population.
- If the patients BMI is >30, the timing of the ultrasound scan should be delayed until 20 weeks and 6 days to increase the likelihood of all fetal structures being seen at a single visit.
- Consent should be obtained and documented on Maternity TRAK before a fetal anomaly examination is arranged.

4.2.4.1 Purpose

- detect **significant** structural fetal abnormalities
- assess fetal biometry
- provide a baseline for comparison and evaluation of fetal growth
- determine the placental site
- assess liquor volume

4.2.4.2 Preparation

Comfortably full bladder

4.2.4.3 Procedure

The examination is performed trans-abdominally.

Before each fetal anomaly examination, it is good practice for the sonographer to remind the patient of the purpose and limitations of the ultrasound scan and obtain further verbal consent.

If appropriate images cannot be obtained to allow the standard checklist to be completed the woman should be offered one further ultrasound scan. The woman should be informed there are several reasons why this may happen, for example suboptimal fetal position, uterine fibroids or increased body mass index. The second examination should be offered and completed before 23^{+0} weeks gestation. Where it

is not possible for the sonographer to complete the standard checklist on the second attempt, the woman should be informed of this. A third scan will not be arranged.

Any patient who does not consent to an anomaly scan will be offered an examination for viability, growth, placental site and liquor at 20 weeks.

Patients attending as late bookers over 20 weeks and 6 days gestation will be offered a Fetal Anomaly examination, within the limitations of gestation, if they have documented consent on TRAK provided by their midwife.

The sonographer should evaluate the following:

- Fetal viability
- Number of fetuses
- Placental site – including evidence of a succinturiate lobe
- Liquor volume
- Fetal biometry
    - Head Circumference (HC)
    - Abdominal Circumference (AC))
    - Femur Length (FL)

4.2.4.4 NHS fetal anomaly screening programme (FASP) 20-week screening scan base menu

Area	Structure detail	Measurement	Images to be archived
Head and neck • skull • brain • neck	Head shape	Head circumference (HC)	Yes (to include HC measurement, CSP and measurement of the atrium of the posterior lateral ventricle) *(See Image 1)*
	Cavum septum pellucidum (CSP)	Not required	
	Ventricular atrium (VA)	Atrium of the posterior lateral ventricle at the level of the glomus of the choroid plexus	
	Cerebellum	Transcerebellar diameter (TCD) in the suboccipitobregmatic view	Yes *(See Image 2)*
	Nuchal fold (NF) Measure if appears large	Distance between the outer border of the occipital bone and the outer skin edge	Yes (only if measurement ≥ 6.0mm) *(See Image 2)*
Face	Coronal view of lips and nasal tip	Not required	Yes *(See Image 3)*
Chest • lungs	Situs/laterality of heart	Not required	No
	4 chamber view (4CV)		

• heart	Aorta arising from left ventricle (LVOT)		
	Pulmonary artery arising from right ventricle (RVOT) or the 3-vessel view (3VV)		
	3 vessel and trachea view (3VT)		
Abdomen	Stomach and position	Abdominal circumference (AC)	Yes (to include AC measurement, stomach and short section of umbilical vein) *(See Image 4)*
	Kidneys Measure antero-posterior (AP) renal pelvis diameter if it appears large	Measurement not required unless AP renal pelvis diameter >7.0mm	Yes (only if AP renal pelvis diameter measures > 7.0mm)
	Abdominal wall and cord insertion	Not required	
	Diaphragm		
	Bladder		
Spine • cervical • thoracic • lumbar • sacral	Vertebrae Skin covering To be assessed in sagittal, transverse and coronal planes	Not required	Yes (image sagittal plane. If it is not possible to archive the sagittal plane, then it is acceptable to archive the coronal plane) *(See Images 6a, 6b & 6c)*
Limbs • lower • upper	Femur, tibia and fibula (both legs)	Femur length (FL)	Yes (image and measure a single femur only) *(See Image 5)*
	Metatarsals (both feet)	Digit count not required	No
	Radius, ulna and humerus (both arms)	Not required	
	Metacarpals (both hands)	Digit count not required	

Uterine cavity • uterine content	Placenta	According to local guidelines	Yes, as per local guidelines

(Reference: Adapted from: NHS fetal anomaly screening programme (FASP) 20-week screening scan base menu. Available: https://www.gov.uk/government/publications/fetal-anomaly-screening-programme-handbook/20-week-screening-scan

4.2.4.5 Base menu ultrasound images with schematics to be archived

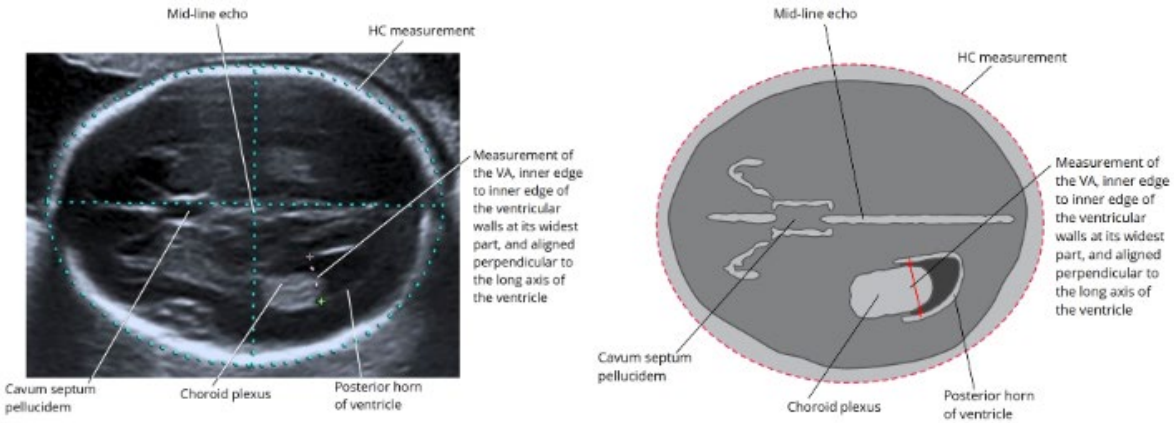


Image 1: head circumference (HC) and atrium of the lateral ventricle

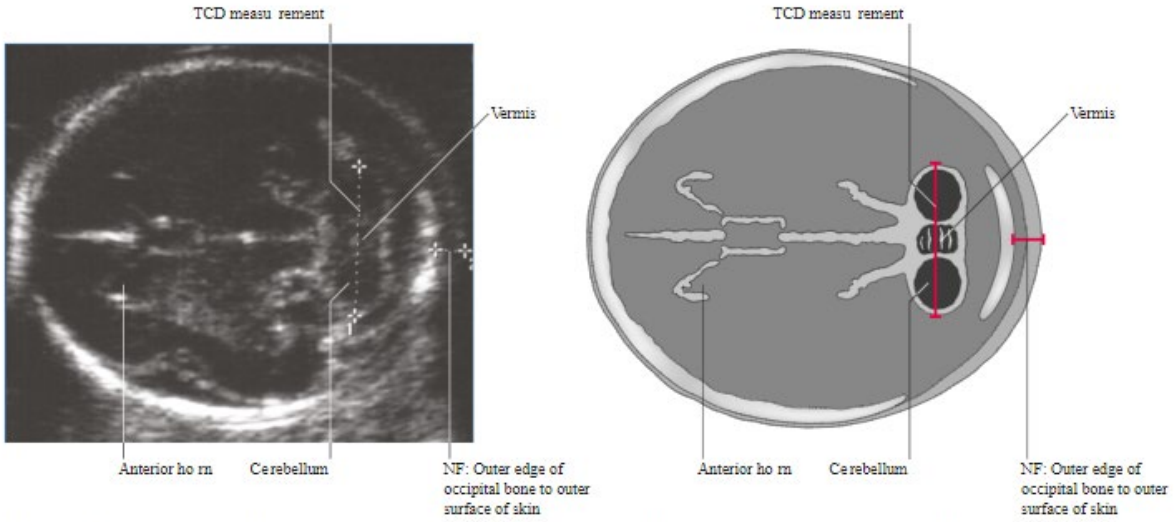


Image 2: suboccipitobregmatic view demonstrating measurement of the transcerebellar diameter

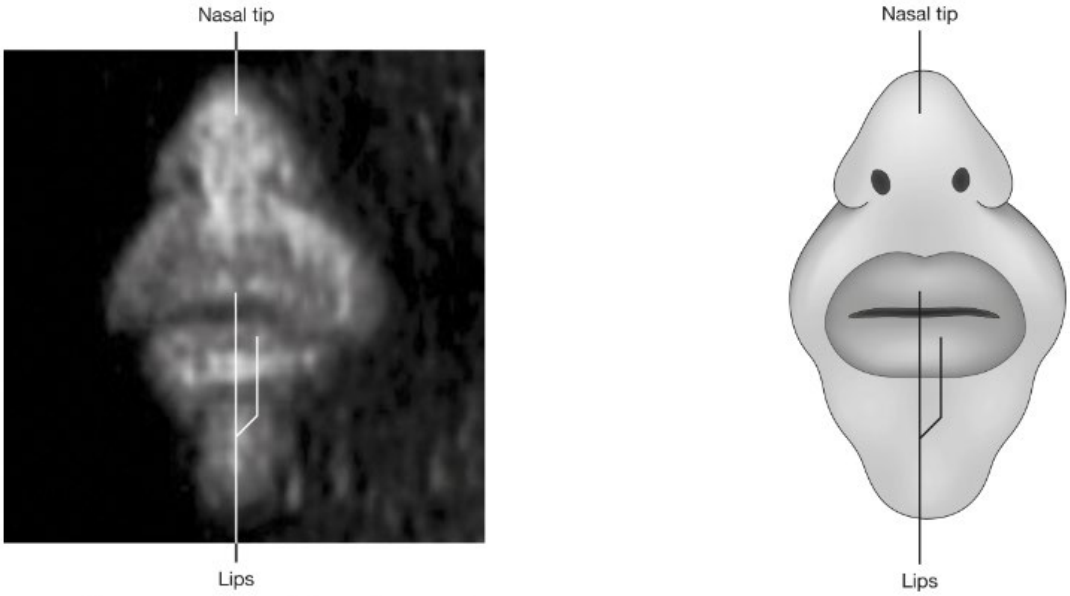


Image 3: coronal view of lips with nasal tip

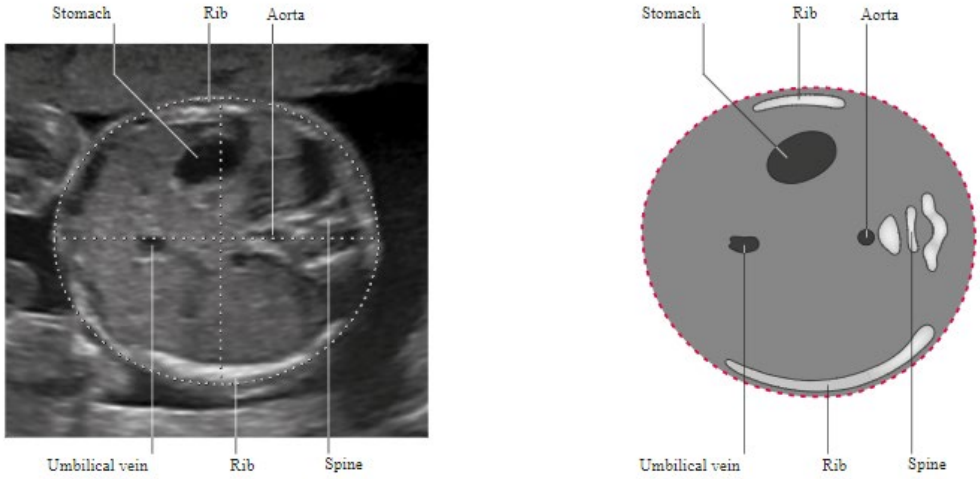


Image 4: abdominal circumference (AC) measurement

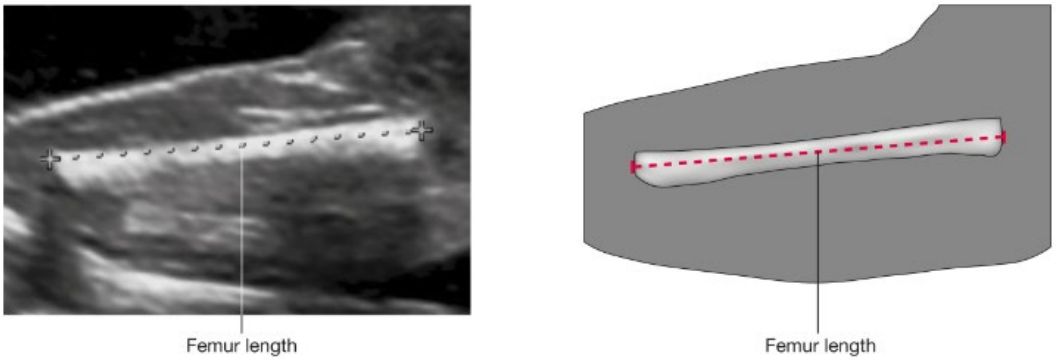


Image 5: femur length (FL) measurement

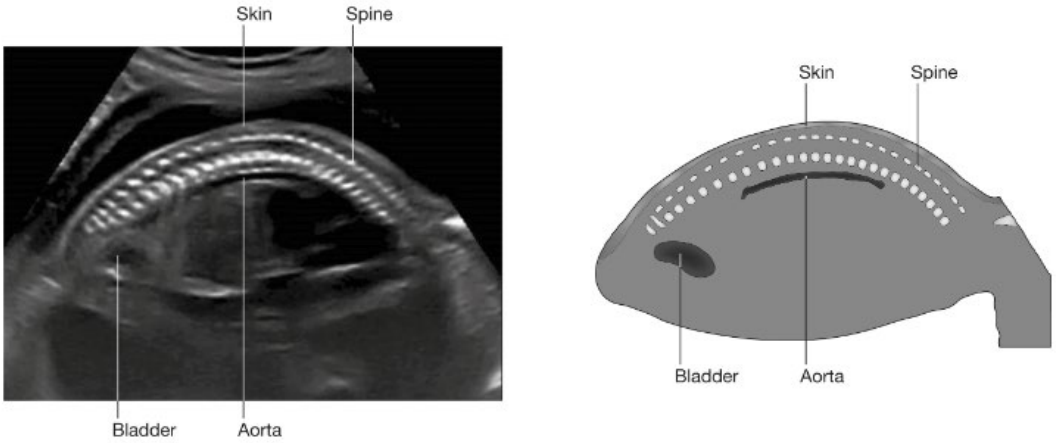


Image 6a: sagittal view of spine including sacrum

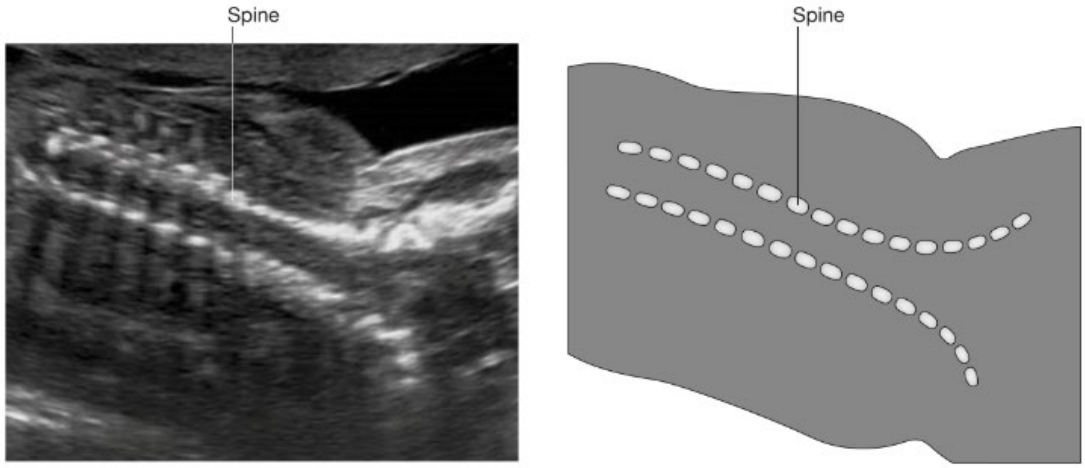


Image 6b: coronal view of upper spine

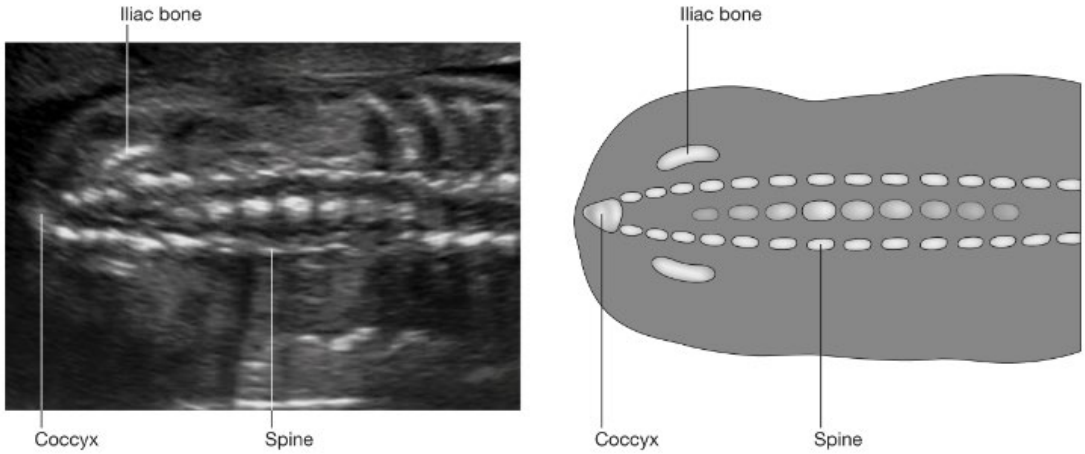
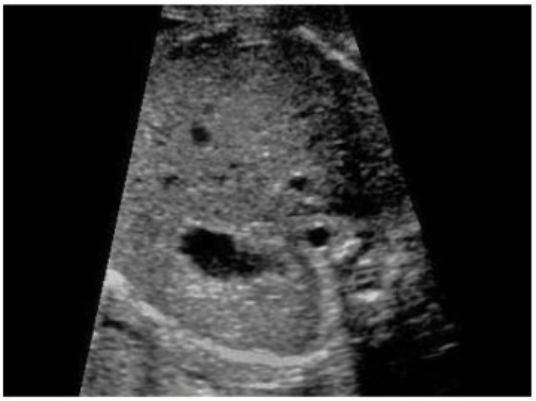


Image 6c: coronal view of lower spine including sacrum

4.2.4.6 Fetal cardiac views to be assessed

There is no requirement to archive images of the fetal cardiac protocol views.

- Situs/laterality *(see Image 7)*
- 4 chamber view (4CV): transverse section of the thorax including one complete rib and the crux of the heart *(see Image 8)*
- aorta/left ventricular outflow tract (LVOT) – shows the outflow tract of the left ventricle *(see Image 9)*
- pulmonary/right ventricular outflow tract (RVOT) – shows the outflow tract of the right ventricle only, or 3 vessel view (3VV): shows the outflow tract of the right ventricle including the pulmonary artery *(see Image 10)*
- 3 vessel and trachea view (3VT): shows the main pulmonary artery in direct communication with the ductus arteriosus, the transverse aortic arch and the superior vena cava *(see Image 11)*



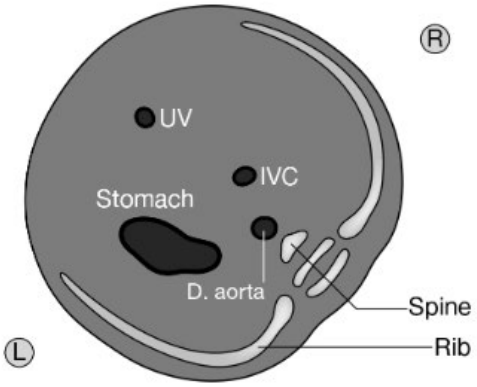
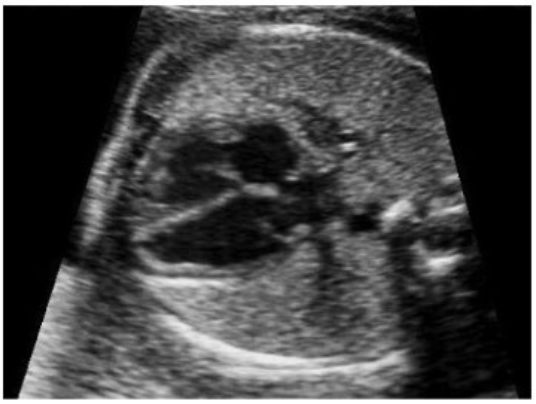


Image 7: situs/laterality



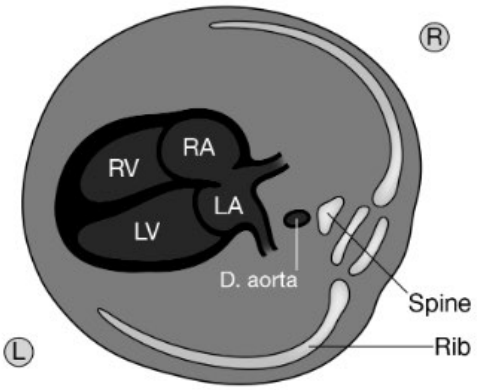


Image 8: 4 chamber view (4CV)

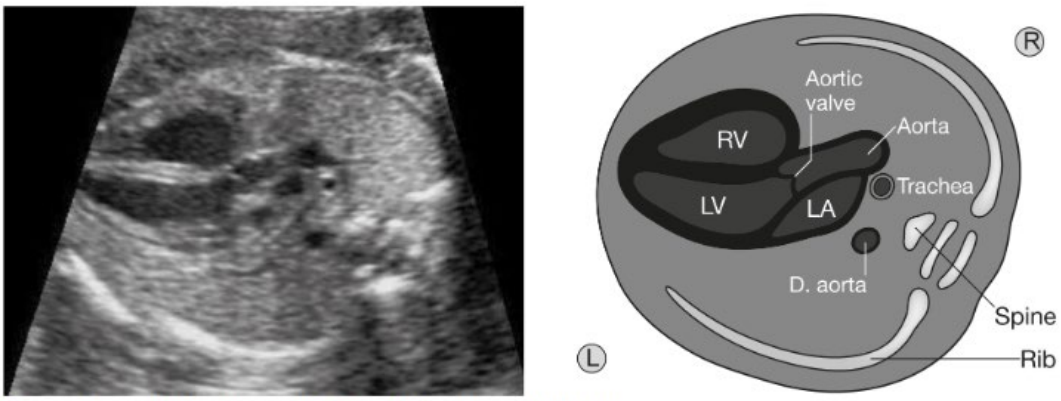


Image 9: aorta/left ventricular outflow tract (LVOT)

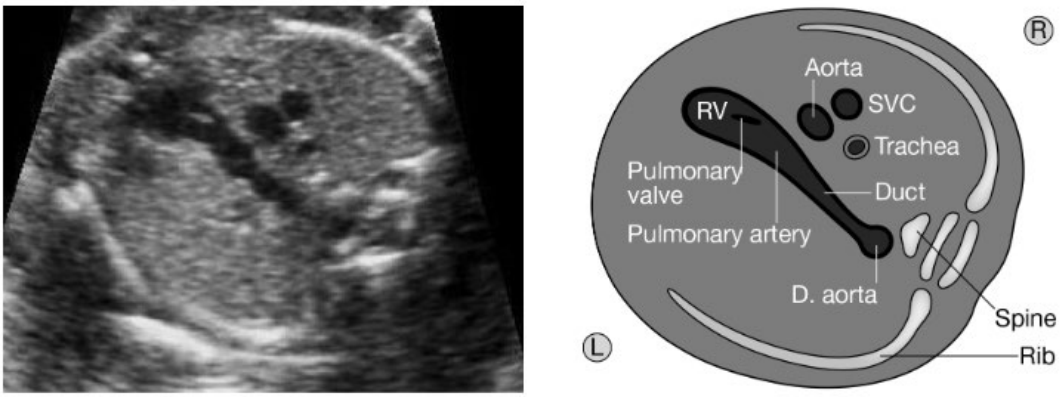


Image 10: pulmonary artery/right ventricular outflow tract (RVOT) or 3 vessel view (3VV)

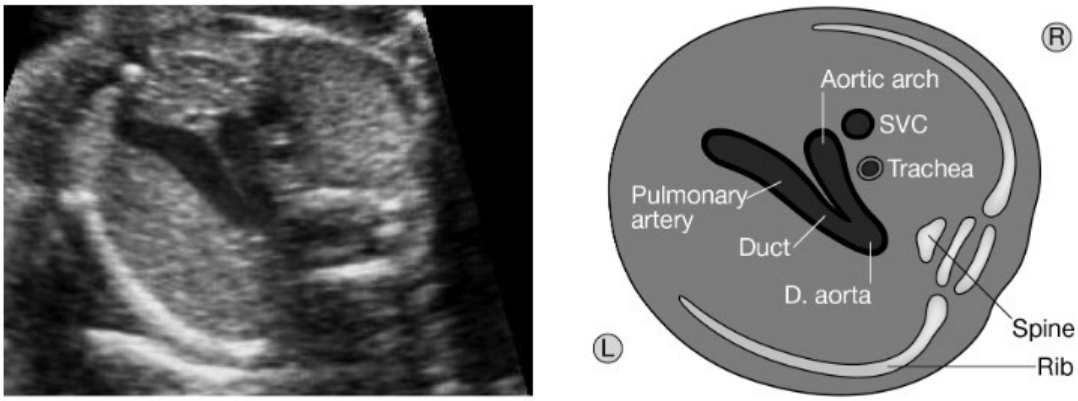


Image 11: 3 vessel and trachea view (3VT)

4.2.4.7 Imaging

Images should include the following:

- All fetal biometry
- Placental site demonstrating the relationship of the lower edge of the placenta to the internal cervical os
- Fetal anatomy to include all aspects indicated for imaging in the standard checklist

4.2.4.8 Normal Variants

If one or more of the normal variants listed below are seen, these do not require to be reported, and the woman does not need referral for further assessment as part of the NHS FASP:

- choroid plexus cysts
- dilated cisterna magna
- echogenic foci in the heart
- 2 vessel cord

However, the scan findings listed below need to be reported and the woman referred to fetal medicine:

- Suspected fetal anomaly
- nuchal fold (greater than or equal to 6.0mm)
- ventriculomegaly (atrium greater than or equal to 10.0mm)
- echogenic bowel (with density equivalent to bone)
- renal pelvic dilatation antero-posterior (AP) measurement > 7mm
- Fetal biometry:
  - HC < 3rd percentile
  - AC < 10th percentile
  - AC ≥ 180mm (in screening window of 18 – 20 weeks 6 days) may be indicative of underlying abnormality, refer to Fetal Medicine
  - FL < 3rd percentile chart for femur length

Intergrowth 21 charts are used to assess fetal biometry. All ultrasound machines should be set up for HC/AC/FL intergrowth centiles. Estimated fetal weight is calculated using Hadlock 3 charts.

Fetal Biometry Growth Charts:

https://intergrowth21.tghn.org/articles/international-fetal-growth-standards-latest-charts-available/ **- See Appendix D.**

4.2.4.9 Reporting

To include:

- Clinical indication
- EDD
- Gestation

- Single or multiple pregnancy
- Confirmation of heart pulsations
- Fetal biometry
- Placental site
- Liquor volume
- Description of any abnormality

If no problem is detected, the women should be reassured that, within the limitations of ultrasound, all appears well.

The ultrasound report should be written as soon as possible after the examination has been completed, a printed report issued and filed in the patient's obstetric folder. If a fetal anomaly is suspected, the sonographer should tell the woman of her concerns and arrange referral to the Fetal Medicine Team as soon as possible. The TRAK fetal anomaly icon should be activated.

In addition, the national register CARDRISS is now active, happening in the background however no action regarding this database is required by sonography staff.

Fetal Medicine contact details:
Email: fetal.medicine@nhslothian.scot.nhs.uk
Telephone: 0131 242 2659
Mobile: 07972 248463

4.2.5 Specific Ultrasound Findings

4.2.5.1 Low Lying Placenta

Placental site to be checked at anomaly ultrasound (US) - 18^{+0}-20^{+6} weeks.

- If the placenta is **low lying (≤20 mm from internal cervical os)** or **placenta praevia (covering the cervical os),** the sonographer should place a request on TRAK for a repeat US at **30 weeks. Please add this request even if growth measurements at 30/40 are planned.** Document in the ultrasound report if the placenta crosses, touches or the distance from internal OS (if ≤ 20mm) to aid patient clinical management. Advise the patient of the findings and ask them to report this to their midwife ASAP.

  Please do not only report the placenta as 'low lying'.

  If the placenta still appears to be low lying at 30/40 on transabdominal approach, or it is difficult to site, a transvaginal scan should be performed with patient consent to confirm placental position. If it remains low lying or praevia

on transvaginal approach, a further placental site US should be organised by the sonographer for **36 weeks** to inform mode of delivery planning.

If the placenta remains low lying at **36 weeks:**-

1. Confirm findings on transvaginal US
2. Refer patient to Obstetric Triage for review

- When a posterior placenta is no longer considered low lying, e.g., after it has been described as low at FAS, a transvaginal scan **MUST** be performed if the lower placental edge is less than 4cm from the internal os on transabdominal imaging.

Placenta Accreta Syndrome (PAS):

- If the placenta is **anterior and low lying or praevia**, the sonographer is encouraged to enquire if the woman has had a previous caesarean section. However ultimately it is for the midwife or obstetrician to know the woman's past obstetric history and manage her accordingly.
- In cases in which the placenta is **anterior and low lying or praevia and the woman has had a previous caesarean section**, she should be referred to Fetal Medicine for a placental US at 28 weeks.

4.2.5.2 Vasa Praevia

This is a condition in which fetal blood vessels run freely and unsupported in the membranes across the internal cervical os beneath the presenting part. These fetal vessels may rupture at amniotomy, spontaneous rupture of membranes or during cervical dilation leading to fatal fetal haemorrhage.

If an antenatal diagnosis of vasa praevia is made, an elective caesarean section will be performed. An excellent perinatal outcome is then expected, unlike if the diagnosis is not made.

<u>Risk factors for vasa praevia</u>

- Placenta praevia
- Bilobed or succenturiate lobed placentas
- Velamentous insertion of the umbilical cord
- IVF
- Multiple pregnancy

It commonly coexists with velamentous cord insertion where the cord inserts into the chorioamniotic membranes rather than the placental mass. The vessels are unprotected by Wharton's jelly as they traverse the membranes before they come together in the cord.

Diagnosis

As per national recommendations - NHS Fetal Anomaly and Down's Syndrome Screening Protocols, NHS Scotland (2015), we do not screen for vasa praevia during routine examinations. However, we may diagnose vasa praevia if seen incidentally during a routine scan or if specifically requested to examine for as follows

- On 2D grey scale ultrasound, TA and/or TV, vessels are seen as echogenic linear structures crossing the internal cervical os
- Colour flow Doppler will confirm if the structures are fetal vessels
- Umbilical cord insertion: check if it inserts centrally into the placenta, or not, to help exclude vasa praevia.

Differential diagnosis

- Membrane separation – *there will be no colour flow*
- Loop of umbilical cord – *umbilical cord will move with time*

Management

- Record findings of suspected vasa praevia in report on Soliton
- Refer patient immediately to Fetal Medicine

4.2.5.3 Cervical length screening in singleton pregnancies, in women at risk of preterm labour

Introduction

Ultrasound surveillance of cervical length is advocated in women at very high, high and moderate risk of preterm labour. The timing of which is dependent on the women's history. Transvaginal cervical length scans have been found to be a reasonable predictor of preterm delivery in women at high risk of spontaneous preterm birth.

This guideline does not address the role of cervical length measurements for women in threatened preterm labour.

Referral Guideline:

Cervical length can be measured between 16 and 24 weeks. For practical purposes, most women who merit cervical length screening (moderate risk group), screening will be carried out at the 20-week fetal anomaly scan.

There may be women (very high risk and high-risk group) who require earlier or serial cervical length screening, however in such cases this decision should be made by a Consultant Obstetrician and the woman referred to the Pre-term Birth Clinic.

Very High Risk:

All care including ultrasound assessment is via **Preterm Birth Clinic NOT Ultrasound Department.** Midwife booking patient to make necessary referral.

APPOINTMENT NO LATER THAN 12 WEEKS GESTATION AT PRETERM BIRTH CLINIC

- 3 or more previous preterm births OR
- 2 or more mid-trimester losses OR
- Previous vaginal cerclage - successful or failed OR
- Trachelectomy or Transabdominal cerclage (TAC) These patients have a VERY HIGH RISK of a preterm birth and may benefit from an early elective cerclage (6) and progesterone. A woman with a previous failed transvaginal cerclage will generally be advised to have an interpregnancy sited transabdominal cerclage.

Midwife/Obstetrician to urgently refer to Lothian Preterm Birth Clinic (Rie.PretermClinic@nhslothian.scot.nhs.uk) and/or discuss with a member of the Lothian Preterm Birth Service

High Risk:

All care including ultrasound assessment is via **Preterm Birth Clinic NOT Ultrasound Department.** Midwife booking patient to make necessary referral.

- One or more preterm birth or preterm pre-labour rupture of membranes <34 weeks
- TWO or more LETZ OR
- ONE or more cone biopsy

Moderate Risk:

Women identified at moderate risk should be offered a single TRANSVAGINAL ultrasound assessment of cervical length at the time of the fetal anomaly screening scan in **the ultrasound department**.

- one previous LLETZ or “loop excision” cervix
- Full dilatation caesarean section in their last birth

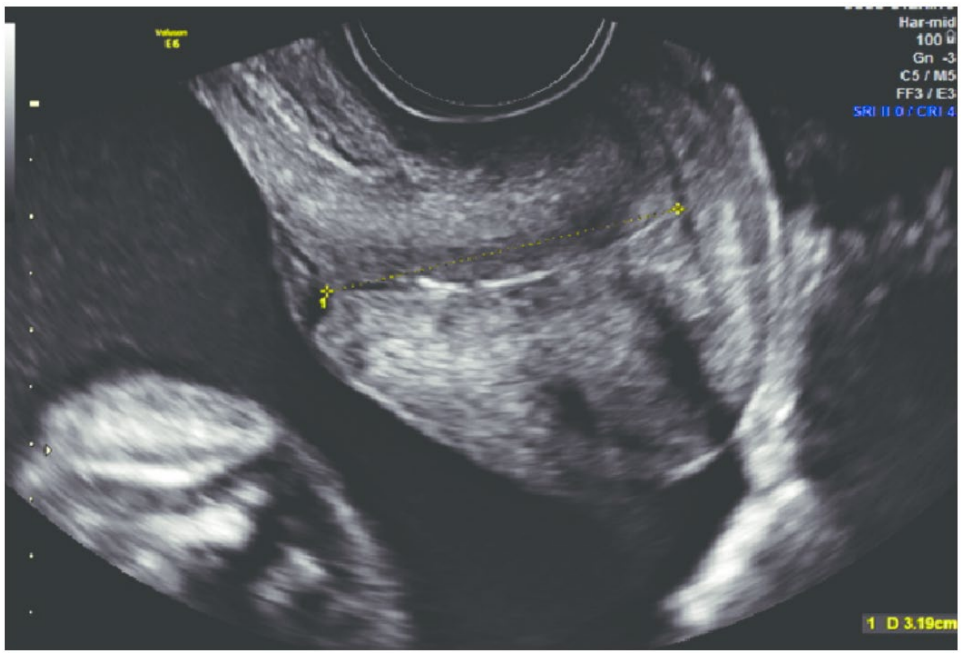
The following women should NOT be offered cervical length screening routinely:

- Women who have had a TERM DELIVERY after the risk factor event
- Multiple pregnancy
  At present there is no adequate clinical benefit to justify routine cervical length screening in this group of women (Shennan 2022). However, in women being seen by Fetal Medicine for management of TTTS a cervical length measurement may be performed.
- Following cervical stitch placement
  No proven clinical benefit of **routine** post-stitch cervical length measurement or surveillance
- Abnormal smear +/- colposcopy and biopsy only

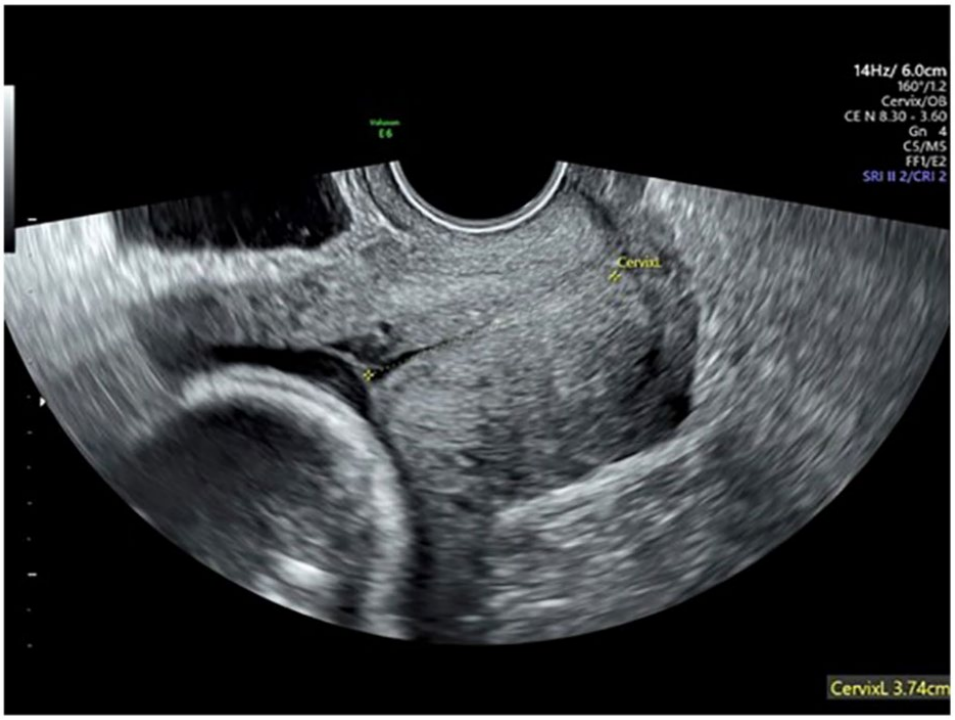
Ultrasound measurement of the cervix criteria

- Cervical length measurement should only be obtained by transvaginal scan with an empty bladder
- A sagittal view of the cervix should be obtained
- The cervix should fill approximately 75% of the screen
- The anterior and posterior lips of the cervix should be of equal width in the image
- The amount of pressure exerted with the transducer should be kept to a minimum to avoid artificially lengthening the cervix
- The sonolucent endocervical mucosa should be identified as a guide to the true position of the internal os
- Cervical length should be recorded as the length between the V-shaped notch of the internal os and the triangular area of echodensity representing the external os. The funnel length should NOT be included in the cervical length measurement.
- The examination should be performed over 3 – 5 minutes with suprapubic and fundal pressure applied. The patient should be asked to cough. Three measurements are taken and should be within 10% of each other. The 'shortest best' measurement should be reported. Please record funnelling if present.

(Updated 12/5/25 to include cough instructions)



Reference: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4958676/pdf/ogs-59-303.pdf



Reference: https://journals.sagepub.com/doi/10.1177/87564793211012612

Reference:

https://www.nice.org.uk/guidance/ng25/resources/preterm-labour-and-birth-pdf-1837333576645

Results and management

- Cervical length ≥ 30mm then return to routine care
- Cervical length of 25-30 mm, sonographer refer to Preterm Birth Clinic and they will be seen within 2 weeks
- If transvaginal scan shows cervical length <25mm the woman should be referred **immediately** to a Consultant Obstetrician (please contact beep 1621 WR/OTA or 1617 LW Consultant at RIE) who will coordinate discussion with Preterm birth clinic team. This will include commencing treatment with vaginal progesterone

Short Cervix – coincidental finding

Women with a coincidental finding of a cervical length of <25mm at fetal anomaly scan but with no history of preterm birth or mid trimester loss should be referred to the **Preterm birth email inbox:** RIE.pretermclinic@nhslothian.scot.nhs.uk

References:

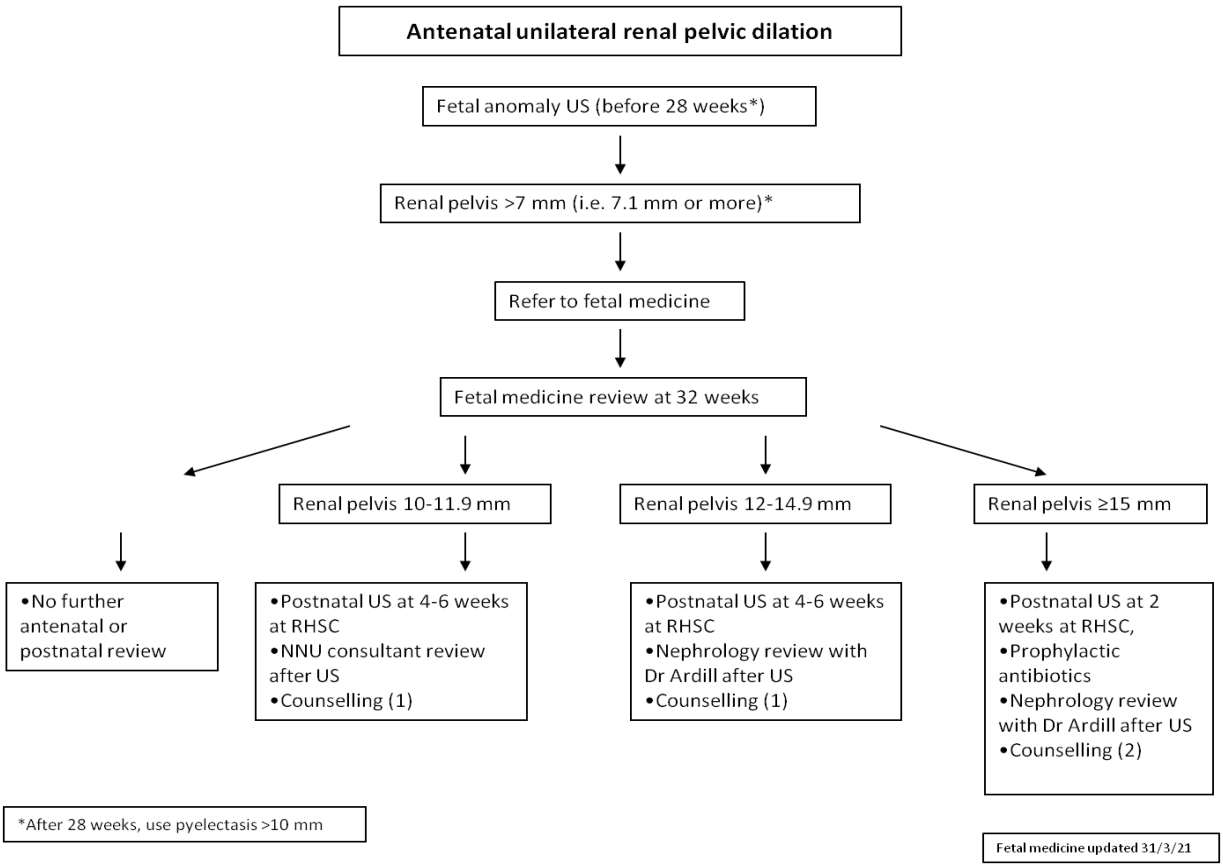
http://intranet.lothian.scot.nhs.uk/Directory/ReproductiveMedicine/PoliciesAndGuidelines/Documents/Maternity%20Pan%20Lothian/Antenatal/Preterm%20Birth%20Service%20(cervical%20scanning%20and%20cerclage).pdf

Cervical Cerclage - Shennan - 2022 - BJOG: An International Journal of Obstetrics & Gynaecology - Wiley Online Library

4.2.5.4 Absent Fetal Stomach

If the fetal stomach cannot be identified and an abnormal site excluded, the sonographer should re-scan in approximately ½ hr. If the stomach is still not seen a repeat scan should be performed in 1 week. If it is still absent on this scan, the woman should be referred to Fetal Medicine.

4.2.5.5 Renal Pelvis Dilatation (RPD)



Bilateral renal pelvic dilation, megacystis and absent kidneys should be referred to Fetal Medicine.

4.3 Third Trimester Examinations

Requests will be accepted from Obstetricians, Clinic and Community Midwives.

4.3.1 Assessment of Fetal Growth

4.3.1.1 Introduction

Babies that have not achieved specific growth parameters by their gestation are small for gestational age (SGA). These babies have increased incidence of stillbirth, complications in labour, intrapartum hypoxia, neonatal problems and poorer adult health.

The definition in Lothian for SGA is abdominal circumference or birthweight less than 10th centile. SGA included babies that are constitutively small and those with fetal growth restriction (FGR). FGR is the term used for fetuses that have not achieved their growth potential and is caused by placental dysfunction. FGR fetuses are at highest risk of complications.

Not all fetuses that have FGR are SGA, but they are all at risk of poor outcomes.

In the antenatal period, screening for SGA and FGR is based on clinical assessment through symphysis fundal height (SFH) measurement. Diagnosis of SGA and FGR is by ultrasound.

Detection of SGA and FGR is difficult – but the aim is to detect and monitor these babies and deliver them at a time that minimised risk. Decisions to deliver may be complex (particularly in early gestations) and should be made by a consultant obstetrician, in conjunction with fetal medicine and neonatology as appropriate.

References:

Small for Gestational Age.pdf (scot.nhs.uk)

https://www.nice.org.uk/guidance/ng201/resources/antenatal-care-pdf-66143709695941

Royal College of Obstetricians and Gynaecologists. The investigation and management of the small-for-gestational age fetus. RCOG Green Top Guideline No 31, 2013. RCOG, London https://www.rcog.org.uk/media/t3lmjhnl/gtg_31.pdf

4.3.1.2 Indications and Schedules for Growth Assessment

Growth Ultrasound at 30 and 36 weeks

1. Large fibroid/s, one or more >6cm
2. Maternal age > 40 years at booking
3. Smoker with CO level 5ppm or more
4. Late booker (at or after 21 weeks' gestation)
5. PAPP-A < 0.4 on 1st trimester screen (of HCG >4 of AFP > 2.5 MoM on 2nd trimester screen
6. Recurrent miscarriage clinic patient immediately prior to this pregnancy (no live children after 3 miscarriages)
7. Recurrent bleeding (like menses, not spotting)
8. Previous SGA (<10th centile at delivery)
9. Asthma requiring current use of oral steroids or recent hospital admission
10. Chronic hypertension
11. Chronic kidney disease
12. Uterine anomaly
13. Substance use including alcohol
14. BMI >40 or previous bariatric surgery
15. Women on antiepileptic drugs

Growth Ultrasound at 28, 32 and 36 weeks

1. Newly diagnosed or poorly controlled hyperthyroidism
2. Previous stillbirth not associated with fetal growth restriction (FGR); see also below
3. SLE/connective tissue disease
4. Eating disorder
5. Maternal cardiac disease
6. Cystic fibrosis
7. Pre-existing diabetes – type 1 & 2

Fetal Medicine Personalised Growth Assessment Schedule

1. Positive Uterine Artery Dopplers (bilateral notching or mean PI > 95th centile)
2. SGA (< 10th centile) and/or echogenic bowel and/or femur length < 5th centile on fetal anomaly scan (sonographer to refer)
3. Sickle cell disease (not sickle cell trait)
4. Severe early onset FGR in a previous pregnancy (delivery before 34 weeks for SGA and/or < 3rd centile at delivery)
5. Previous stillbirth (birthweight < 10th centile for gestation or pathology suggests placental insufficiency)
6. Antiphospholipid syndrome

Additional Indications for Growth Assessment

1. Symphysio-fundal height (SFH) < 10th centile, static or falling SFH
2. Recent antepartum haemorrhage (2 bleeds > 20 weeks gestation)
3. Pre-eclampsia/pregnancy induced hypertension (PIH)
4. Reduced fetal movements – **see guideline 4.3.2**
5. Prior to Elective Cephalic Version (ECV) - protected slots are available

Assessment of fetal growth when the patient is large for dates should only be performed on the request of the Locality Consultant.

No routine growth assessment required for coeliac disease.

4.3.1.3 Purpose

To establish:

- Fetal growth velocity
- Estimated fetal weight
- Presentation
- Placental site
- Liquor volume

4.3.1.4 Procedure

The examination is performed trans-abdominally. The Sonographer should confirm the following:

- Fetal viability
- Presentation
- Placental site and presence of haematoma if patient presents with pain or bleeding
- Liquor volume – Subjective global assessment and measurement of deepest vertical pool (DVP). If DVP < 20mm or > 80mm include Amniotic Fluid Index (AFI) - considered within normal limits if AFI < 25cm. Please report DVP in mm and AFI in cm.
- Fetal biometry should include HC, AC, and FL
- **If the AC percentile has reduced by >20%, or if oligo/polyhydramnios, perform umbilical artery Doppler**

  Methodological guidelines for Doppler assessment of the umbilical artery blood flow

  - Locate a free loop of uncompressed cord.
  - Identify umbilical artery, using colour Doppler as necessary.
  - Magnify until the loop of cord fills most of the image.
  - Pulsed Doppler gate 1-2mm.

- Adjust calliper gate over single umbilical artery.
- Adjust Power Doppler scale to fit velocity.
- Obtain at least 3 uniform waveforms for measurement of indices.
- Ensure absence of fetal breathing and movement during measurement.
- Observe As Low as Reasonably Achievable (ALARA) principle during evaluation.
- Record the Umbilical Artery Pulsatility Index (UAPI on the appropriate chart.

References:

Use of Doppler velocimetry in obstetrics (isuog.org)

Microsoft Word - BMUS Safety Guidelines _2009 revision_ Feb 2010.doc

4.3.1.5 Preparation

- No preparation required

4.3.1.6 Imaging

To include

- All fetal biometry and umbilical artery Doppler waveform when performed
- Placental site demonstrating the relationship of the lower edge of the placenta to the internal cervical os or the presenting part
- Assessment of liquor volume: DVP
- Fetal abnormality if detected
- Any incidental fetal of maternal pelvic pathology

4.3.1.7 Reporting

To include

- Clinical indication
- EDD
- Gestation
- Confirmation of fetal heart pulsations
- Number of fetuses
- Presentation
- Fetal biometry – include percentile of AC on all examinations. Record any abnormal percentiles for example HC < 3rd centile, FL < 3rd centile. All fetal biometry measurements by Intergrowth chart 21 – **See Appendix 21**
- Placental site
- Liquor volume – DVP. Please report AFI if DVP outside normal range
- Estimated fetal weight (EFW) by Hadlock 3
- **UAPI** and assessment of end diastolic flow of umbilical Doppler when performed. Plot **UAPI** on Doppler chart and file in patient notes

- Any incidental fetal abnormality or maternal pelvic pathology
- Record HC and AC on growth chart, including biometry from Fetal Anomaly scan if not already plotted

Reference:

https://doi.org/10.1002/uog.22000

4.3.1.8 Management:

- **AC reduced by > 20 percentiles refer to Day Assessment Unit**
- **HC < 3rd centile, refer to fetal medicine**
- **AC < 10th centile, refer to fetal medicine**
- **FL < 3rd centile, refer to fetal medicine**
- **When mal-presentation is detected from 36/40 onwards i.e. Breech/Transverse lie, please refer the patient to DAU on the same day.**
- **Polyhydramnios/Oligohydramnios - see guideline 4.3.3**
- **Fetal abnormality, refer to fetal medicine**
- **Maternal pathology, refer to Obstetric Triage**

Biometry charts available:

https://intergrowth21.tghn.org/articles/international-fetal-growth-standards-latest-charts-available/

4.3.2 Ultrasound Assessment of Patients Attending with Reduced Fetal Movement

4.3.2.1 Definitions:

- Single episode of reduced fetal movement (RFM) is a first episode of reduced movements
- Recurrent reduced fetal movement is defined as more than one episode
- Persistent reduced fetal movement is defined as lasting for more than 24 hours

4.3.2.2 Management of RFM (depends on gestation)

ALL PATIENTS ATTENDING FOR ULTRASOUND GROWTH MEASUREMENTS FOR RFM SHOULD BE REFERRED BACK TO OBSTETRIC TRIAGE FOR REVIEW POST EXAMINATION

For examination procedure, imaging and reporting - **see ultrasound growth examination guideline 4.3.1.4**

4.3.2.3 Referral Criteria (Ultrasound)

Management of RFM (depends on gestation)

22+0 – 25+6 weeks

If risk factors for fetal growth restriction (FGR) present, the midwife will arrange serial growth USS as per Lothian SGA guideline. If patient NEVER felt movements by 24 weeks, OTA to discuss with Fetal Medicine team.

There is no evidence to recommend the routine use of CTG surveillance OR ULTRASOUND in this group and this should be discouraged.

26+0 – 38+6 weeks: Single Episode

1. If CTG normal and no FGR risk factor identified, patient discharged back to routine care.
2. If any FGR risk factor identified, perform growth ultrasound (+/- umbilical artery Doppler) next working day.

26+0 – 38+6 weeks: Recurrent Reduced Fetal Movement

1. If CTG normal – organise growth ultrasound scan next working day (if not performed within last 21 days). If had normal growth ultrasound scan within 21 days, book next growth scan for 21 days from previous USS.

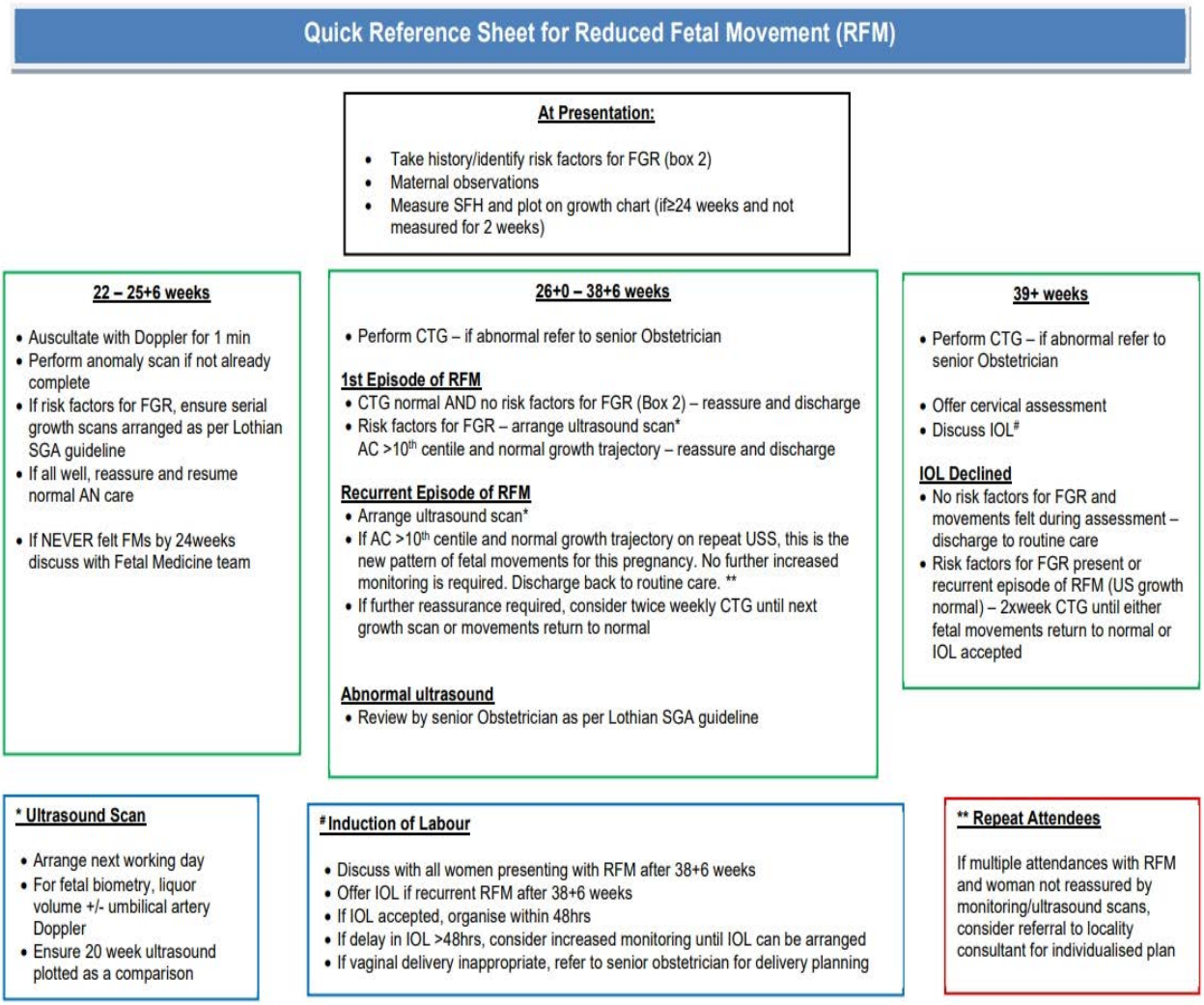
28+0 – 38+6: Recurrent Reduced Fetal Movement

1. If CTG normal – organise growth ultrasound scan next working day (if not performed within last 21 days)
2. If had normal growth ultrasound scan within 21 days, book next growth scan for ~21 days from previous USS

≥39+0 weeks: Single episode or recurrent

1. If CTG normal, discuss and offer IOL within 48 hours with all women presenting with first or recurrent episodes of RFM after 38+6 weeks.
2. If declines IOL, risk factors for FGR reviewed. If risk factors identified, ultrasound only indicated if previous growth assessment is >21 days.

4.3.2.4 Quick Reference Sheet for Reduced Fetal Movement (RFM):



Reference:

Microsoft Word - Reduced Fetal Movements

4.3.3 Amniotic Fluid – Ultrasound Assessment

Amniotic fluid volume is an important parameter in the assessment of fetal wellbeing. Oligohydramnios and polyhydramnios are rare. When extremes of amniotic fluid volume are reported this is likely to lead to further investigations and a cascade of interventions.

When assessment of liquor volume is requested the following method of evaluation should be employed

- Global subjective assessment of amniotic fluid volume as a guide.
- Formal objective assessment of amniotic fluid by the measurement of a single vertical pool. This must be at least 1cm wide and contain no cord loops.
- Determine whether normal, oligohydramnios or polyhydramnios as described below. DVP appears to perform better in the assessment of amniotic fluid volume during fetal surveillance since the use of amniotic fluid index increases the rate of diagnosis of olighydramnios and induction of labour without any improvement in perinatal outcome.

4.3.3.1 Normal

Definition: Deepest pool between 20 to 80 mm.

4.3.3.2 Oligohydramnios (confirmed)

Definition: Deepest pool <20mm.

If present the likely underlying diagnosis will be IUGR, PROM/PPROM or renal pathology.

Assess:

- AFI
- fetal viability
- fetal kidneys and bladder
- fetal biometry (HC, AC and FL)
- umbilical artery Doppler if AC < 10th centile

4.3.3.3 Anhydramnios (confirmed)

Definition: No liquor

Likely causes as for oligohydramnios. Assess as above within the limitations of anhydramnios.

4.3.3.4 Polyhydramnios (confirmed)

Definition: Global increase in AFV (> 25cm). Deepest pool > 80mm.

Assess:

- Fetal biometry (HC, AC, FL)
  Skeletal Dysplasias often associated with polyhydramnios
- Fetal anatomy (allowing for position and gestation) - to include
  - Intracranial contents
  - Nose and lips
  - Stomach: presence of >1 bubble suggests upper gastrointestinal atresia. Double bubble suggests duodenal atresia while >2 bubbles, jejunal atresia more likely. Absent stomach raises possibility of oesophageal atresia.
  - Diaphragm
  - Cardiac axis/chest contents

- Presence of fetal hydrops

4.3.3.5 Reporting

Document on Scan Report:

- Fetal biometry
- AFI and Deepest Vertical Pool in cases of oligo/polyhydramnios
- Stomach, Kidneys, Bladder, Nose & Lips and diaphragm appear normal OR any abnormality identified.

  If fetal abnormality found please refer to Fetal Medicine, or when considered idiopathic, refer to Day Assessment Unit.

Reference:

Sonography Evaluation of Amniotic Fluid - StatPearls - NCBI Bookshelf (nih.gov)

4.3.4 Placental Site Referrals

The placental site is checked at the time of the routine fetal anomaly examination. If the placenta has been described as **not low** (≥21mm away from the internal os), and there is a satisfactory confirmatory image, no further ultrasound is required.

If a low-lying placenta has not been excluded - **see low lying placenta guideline 4.2.5.1**.

4.3.5 Presentation Referrals

Referrals for confirmation of fetal presentation only should be directed to Day Assessment unit.

When mal-presentation is detected from 36/40 onwards on a routine USS i.e. Breech/Transverse lie, please refer the patient to DAU on the same day.

4.3.6 Large for Dates (LFD) Referrals

Community midwives may request LV scan for patients considered to be ‘Large for Dates’ i.e. plotting on or above the 90th percentile on fundal height chart.

Locality consultant may request growth scan in selected cases.

4.3.7 Zika Virus

Indications of referral for growth measurements

- Pregnant women who have been to Zika risk areas within their pregnancy, or within 2 months prior to conception.

AND/OR

- Pregnant women whose male partner has been to a Zika risk area within 6 months of conception.

Procedure

- Women should be offered normal booking scan and detailed scan.
- Community Midwife should organise one growth scan at 28 – 30 weeks.
- No routine referral to Fetal Medicine required by ultrasound department unless findings are abnormal.

4.3.8 Intrahepatic Cholestasis of Pregnancy

Previous RCOG guidelines have recommended routine laboratory and imaging investigations to exclude other causes for the clinical picture of ICP, including viral and autoimmune tests and **liver ultrasound.** A recent retrospective review of over 500 pregnant women with raised bile acid concentrations suggests that the likelihood of identifying a viral, autoimmune, or structural cause for the itching and liver derangement that was not suspected on other clinical grounds is extremely low as no new diagnoses were made following investigations. Therefore, routine use of other investigations is no longer recommended.

Stillbirth remains the major concern for women and pregnant people with ICP and for their healthcare practitioners. A large systematic review and individual patient data meta-analysis of women with ICP reported that, for singleton pregnancies, the risk of stillbirth only increased above population rate once serum bile acid concentrations were 100micromol/L or more.

ICP is not associated with fetal growth restriction, with no difference in birthweight centiles compared with babies born to women without ICP,7 and therefore strategies for antenatal monitoring for placental insufficiency are unlikely to be beneficial in women with isolated ICP. [Evidence level 3

Intrahepatic cholestasis of pregnancy - Girling - 2022 - BJOG: An International Journal of Obstetrics & Gynaecology - Wiley Online Library

ICP affects approximately 1% of pregnancies in the UK. Women from Indian– Asian and Pakistani Asian backgrounds are more frequently affected than other ethnic groups. ICP should be considered in pregnant women who have itchy skin, that is normal in appearance, and a random serum bile acid concentration of ≥19μmol/l.

Investigations such as upper abdominal ultrasound and laboratory tests e.g. liver infection or autoimmune screen, are not indicated unless there are atypical symptoms, other co-morbidities or severe early onset ICP.

ICP has previously been linked with potential fetal risks such as spontaneous or iatrogenic prematurity and intrauterine death, whilst also causing significant maternal morbidity in association with intense pruritus. Recent meta-analysis is more reassuring about actual still birth risk. In a singleton, otherwise uncomplicated, pregnancy the stillbirth risk is not significantly increased above the background population rate unless the serum bile acid measurement is >100μmol/l. Stillbirth rates are increased in women with ICP who have multiple pregnancies and likely raised in those who have ICP and Gestational Diabetes (GDM) or pre-eclampsia (PET). In these situations, timing of birth should be considered on an individualised basis. There are no treatments (including Ursodeoxycholic acid) that improve pregnancy outcome or raised bile acid concentration.

ICP is not associated with growth restriction

CTG and USS monitoring do not improve fetal outcome and should not be routinely recommended.

5. Twin and Multiple Pregnancies

5.1 Antenatal Management

5.1.1 Introduction

Multiple pregnancy is a high-risk pregnancy for both mother and babies. Adverse maternal outcomes associated with twin pregnancy include increased rates of pre-eclampsia, pregnancy induced hypertension and miscarriage. Perinatal complications include increased rates of congenital abnormalities, preterm birth, fetal growth restriction (FGR), twin-twin transfusion syndrome (TTTS) in monochorionic twins, and stillbirth.

The incidence of multiple births is rising and currently accounts for 3% of all livebirths.

5.1.2 Diagnosis of twin/multiple pregnancy

Chorionicity should be determined at the time the twin or multiple pregnancy is detected (normally at the booking ultrasound scan between 11 weeks 2 days and 13

weeks 6 days). Chorionicity is based upon the number of placental masses, the appearance of the membrane attachment to the placenta (Lambda sign for dichorionic or T sign for monochorionic), and the membrane thickness. This is decision is best made before 14 weeks gestation. If there is any uncertainty about the diagnosis of chorionicity a second opinion should be sought, and if doubt persists the patient should be referred to Fetal Medicine.

On completion of the booking scan, patients diagnosed with:

- monochorionic twins - refer directly to fetal medicine to arrange antenatal care
- dichorionic twins – sonographer to prompt patient to inform their community midwife which will generate a referral to the multiple pregnancy clinic. Patients will be seen regularly in the Obstetric Multiple Pregnancy Clinic.

5.2 Ultrasound Schedule

Dichorionic/Diamniotic Twin Pregnancy - performed by Sonographers in ultrasound department

- 20 weeks: fetal anomaly scan and review in clinic.
- 24 weeks: growth scan and review in clinic.
- 28 weeks: growth scan and clinic review
- 32 weeks: growth scan and clinic review.
- 36 weeks: final growth scan and clinic review.

Additional scanning time will be provided, allowing 50 mins to complete the Fetal Anomaly scan and 30 minutes for subsequent growth measurements.

5.2.1 Procedure

Follow guidelines for singleton pregnancies as appropriate.

Fetal Anomaly – **see guideline 4.2.4**

Growth Measurements – **see guideline 4.3.1.4**

5.2.2 Reporting

Ultrasound reports should include consistent labelling of twins, accurate plotting of growth measurements and calculation of estimated fetal weight.

Twins should be labelled Twin A/Twin B with sac position in uterus i.e. left/right. Please note the twin that is presenting.

5.3 Monochorionic twin pregnancies - all monochorionic twins in Lothian will be managed by RIE fetal medicine unit and RIE multiple pregnancy clinic.

- 16 weeks: US mainly to look for TTTS and review in clinic.
- 18 weeks: Fetal anomaly scan and review in clinic

- 20 weeks: TTTS screening +/- cardiac scan and review in clinic.
- 22 weeks: TTTS screening, ensure cardiac views completed.
- 24 weeks: Growth scan + UAD (umbilical artery Doppler) and FM antenatal check.
- 26 weeks: Growth scan + UAD and FM antenatal check.
- 28 weeks: Growth scan + UAD, antenatal check in clinic.
- 30 weeks: Growth scan + UAD, community midwife antenatal check
- 32 weeks: Growth scan + UAD and antenatal check in clinic.
- 34 weeks: Growth scan + UAD, community midwife antenatal check
- 36 weeks: Growth scan + UAD if undelivered, antenatal check and FBC in clinic.

5.4 Triplet pregnancy

Triplet pregnancies are managed in the same way as monochorionic twins as laid out above.

Useful links:

RCOG Management of Monochorionic Twin Pregnancy, Greentop Guideline No. 51 (2016). https://obgyn.onlinelibrary.wiley.com/doi/epdf/10.1111/1471-0528.14188

Microsoft Word - Antenatal Management of Multiple Pregnancies

5.5 Complications of Twin/Multiple Pregnancy

5.5.1 Twin to Twin Transfusion Syndrome (TTTS)

Introduction

Because there is no barrier separating the two fetuses from each other, there are almost always blood vessel connections in the placenta shared by two fetuses in monochorionic twin (MC) pregnancies. As a result of these connections, in about 10-15% of monochorionic twins (sharing one placenta) an imbalance in the circulations of the fetuses can develop. In these instances, there may be significant transfer of blood from one twin (the so-called “donor”) to the other twin (the so-called “recipient”), resulting in twin-to-twin transfusion syndrome (TTTS).

Twin-to-Twin Transfusion Syndrome (TTTS) is a serious, progressive disorder. The twins do not have malformations, but one transfuses the other through abnormal or imbalanced blood vessel connections in the shared placenta. More specifically, an artery branches off from the donor twin’s umbilical cord, entering the placenta to obtain oxygen and nutrients for the blood from the mother’s circulation. Unfortunately, the corresponding vein that would normally bring the now nutrient-rich blood back to that same fetus instead, is directed toward the other twin via this abnormal “arterio-venous” connection. As a result, if there are no connections flowing in the opposite direction, one twin receives too much blood and the other too little.

Diagnosis

Ultrasound diagnostic criteria for TTTS usually included: -

- Discordant fetal size – especially abdominal circumference (AC) of 20mm
- Discordant amniotic fluid volume – membrane folding and stuck twin (see below)

Net Donor

- Oligohydramnios/anhydramnios (stuck twin). Deepest vertical pool ≤ 20mm
- Oligouria (small or non-visible bladder)
- Growth restriction
- Abnormal umbilical artery Dopplers

Net Recipient

- Polyhydramnios. Deepest vertical pool ≥ 80mm
- Polyuria
- Visceromegaly (increased AC)
- Abnormal umbilical and venous Dopplers
- Cardiac enlargement/failure
- hydrops

Membrane folding – the membrane may be seen ‘folded’ around the limbs of the donor twin. Or in severe oligohydramnios the membrane may fold to itself and can be seen as a thicker membrane.

Stuck Twin – as the donor twin amniotic fluid becomes reduced, the twin becomes ‘stuck’ to the wall of the uterus and cannot move away. If any twin is seen next to the uterine wall and does not move away, them assume it is a stuck twin and refer immediately to Fetal Medicine even if it is impossible to see the dividing membrane that may be adherent to the fetus.

Referral

ALL suspected cases of TTTS should be referred to Fetal Medicine.

5.5.3 Acardiac Twinning: Twin Reversed Arterial Perfusion (TRAP) Introduction

This is a very rare condition affecting 1% of monochorionic twins and occurring in around 1:35 000 births.

The condition results in a physically normal fetus circulating blood to both itself and a severely malformed fetus whose heart regresses or is overtaken by the pump twin's heart.

Diagnosis

Ultrasound diagnostic criteria for the acardiac twin usually include: -

- Absence of fetal activity
- No heartbeat
- Continued growth
- Increasing soft tissue mass
- Undergrowth of the upper torso
- Normal growth of lower trunk in some cases
- In summary: soft tissue mass, often with legs and a lower body, but no upper body or heart
- Doppler: - reversed flow in the umbilical artery of the acardiac twin (towards the acardiac twin

Ultrasound of the normal (pump) twin: -

- Usually structurally normal
- May develop signs of cardiac failure, namely hydrops
- Demise in 50 – 70% of cases without treatment
-

Treatment

Treatment aims to save the pump twin as there is none available for the acardiac twin. Interruption of the vascular connection between the twins can be attempted.

Referral

If there is any suspicion of TRAP, refer patient immediately to Fetal Medicine.

5.5.4 Vasa Praevia

Twin pregnancies are at higher risks of velamentous cord insertion and vasa previa. In vitro fertilisation is an additional risk factor of abnormal cord insertion and thus the incidence of vasa previa is likely to increase over the next decades - **see guideline 4.2.5.2**

6. Post Partum

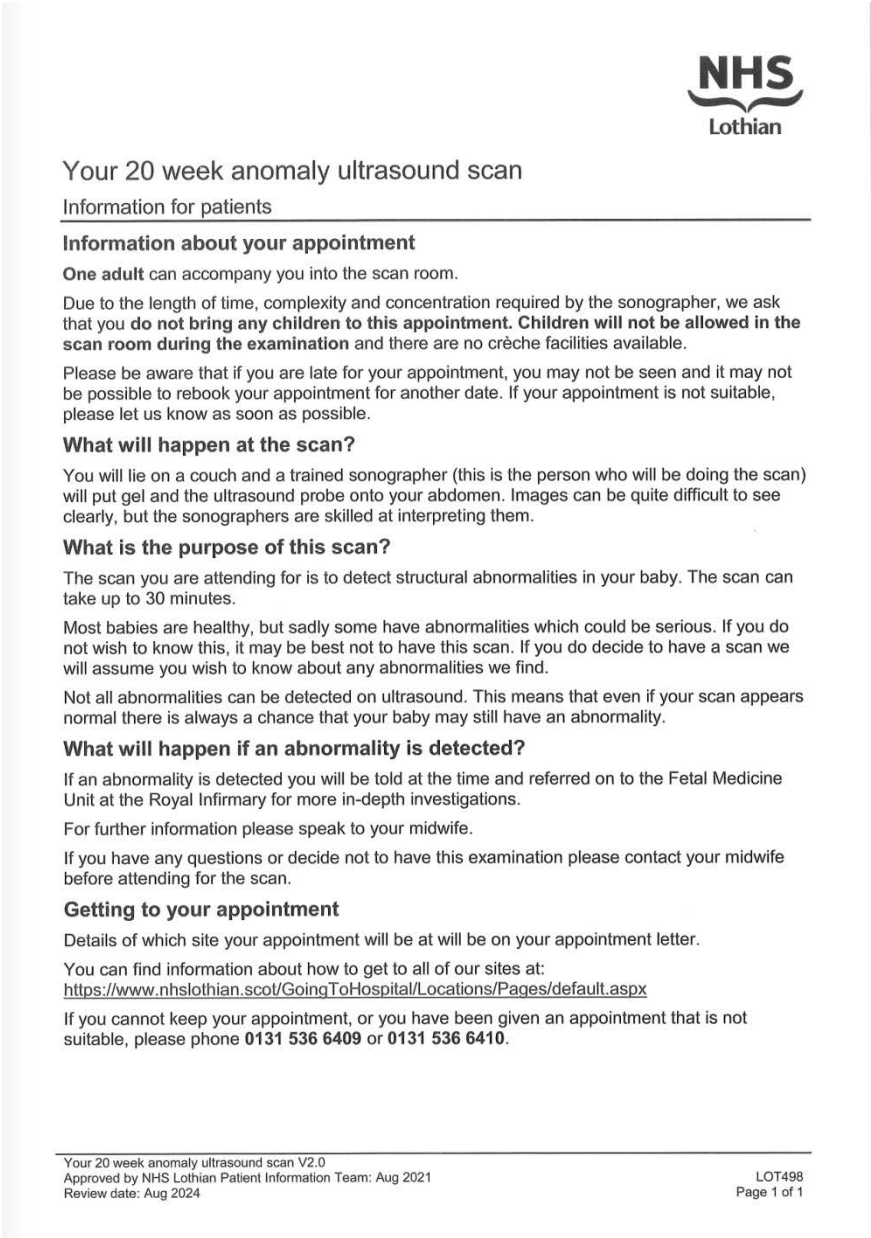
Secondary Post Partum Haemorrhage (PPH) – assessment for retained products of conception (RPOC)

Indications:

- Ultrasound assessment is indicated where the patient is > 2 weeks post vaginal delivery
- PPH persists when a course of antibiotics has been completed
- Referral post caesarean section is not recommended and should be discussed with a consultant.
- Where RPOC identified ≤ 15mm AP measurement, no further/follow up ultrasound examination is routinely indicated

7. APPENDIX

7.1 Appendix A Obstetric ultrasound scan letters



NHS Lothian

Your 20 week anomaly ultrasound scan

Information for patients

Information about your appointment

One adult can accompany you into the scan room.

Due to the length of time, complexity and concentration required by the sonographer, we ask that you **do not bring any children to this appointment. Children will not be allowed in the scan room during the examination** and there are no crèche facilities available.

Please be aware that if you are late for your appointment, you may not be seen and it may not be possible to rebook your appointment for another date. If your appointment is not suitable, please let us know as soon as possible.

What will happen at the scan?

You will lie on a couch and a trained sonographer (this is the person who will be doing the scan) will put gel and the ultrasound probe onto your abdomen. Images can be quite difficult to see clearly, but the sonographers are skilled at interpreting them.

What is the purpose of this scan?

The scan you are attending for is to detect structural abnormalities in your baby. The scan can take up to 30 minutes.

Most babies are healthy, but sadly some have abnormalities which could be serious. If you do not wish to know this, it may be best not to have this scan. If you do decide to have a scan we will assume you wish to know about any abnormalities we find.

Not all abnormalities can be detected on ultrasound. This means that even if your scan appears normal there is always a chance that your baby may still have an abnormality.

What will happen if an abnormality is detected?

If an abnormality is detected you will be told at the time and referred on to the Fetal Medicine Unit at the Royal Infirmary for more in-depth investigations.

For further information please speak to your midwife.

If you have any questions or decide not to have this examination please contact your midwife before attending for the scan.

Getting to your appointment

Details of which site your appointment will be at will be on your appointment letter.

You can find information about how to get to all of our sites at:
https://www.nhslothian.scot/GoingToHospital/Locations/Pages/default.aspx

If you cannot keep your appointment, or you have been given an appointment that is not suitable, please phone **0131 536 6409** or **0131 536 6410**.

Your 20 week anomaly ultrasound scan V2.0
Approved by NHS Lothian Patient Information Team: Aug 2021
Review date: Aug 2024

LOT498
Page 1 of 1

NHS Lothian

Obstetric ultrasound scan

Information for patients

Your doctor/midwife has asked you to attend for an ultrasound scan to check the position of the placenta/length of your cervix.

One adult can accompany you into the scan room.

We ask that you **do not bring any children to this appointment. Children will not be allowed in the scan room during the examination** and there are no crèche facilities available.

What do I need to do before my ultrasound scan appointment?

You **must** have a full bladder for this scan. Please **drink 1 pint of water one hour before your appointment**.

Do not go to the toilet until after your scan.

Please also remember to bring your pregnancy notes with you to the appointment.

Sometimes, even with a full bladder, it is not possible to see the placenta/cervix clearly. You may be offered a trans-vaginal examination (internal examination) in this case.

When you come to your appointment, wear simple clothing with as few fastenings as possible. Please also bring your appointment letter. Do not bring any valuables with you.

Keep taking any medications you are on.

What is a trans-vaginal examination?

This examination is performed when your bladder is empty. A special scan probe is inserted into the vagina. It is similar to an internal examination carried out in the clinic or GP surgery. Your baby is not at risk with this examination.

What should I do when I get to the X-Ray Department?

When you arrive, go to the reception desk and give your name or show your appointment letter. Someone will call your name when they are ready to see you.

How long will my appointment take?

You should allow 30 minutes for your appointment.

Be aware, if you are late for your appointment, or you do not have a full bladder, you may not be seen and it may not be possible to rebook your appointment for another date. If the appointment does not suit, please let us know as soon as possible.

Please bring your pregnancy notes and be aware that these scans are performed in many locations and your appointment may not be in the same place as previous scans.

When will I get the results of my scan?

The report will be placed in your pregnancy notes after the scan.

Obstetric ultrasound scan V2.0
Approved by NHS Lothian Patient Information Team: Aug 2021
Review date: Aug 2024
LOT499

Getting to your appointment

Details of which site your appointment will be at will be on your appointment letter.

You can find information about how to get to all of our sites at:
https://www.nhslothian.scot/GoingToHospital/Locations/Pages/default.aspx

Further information

For further information, please read *Ultrasound scans in pregnancy.*

Keeping your appointment

If you cannot keep your appointment, or have been given one that is unsuitable, please change it by phoning **0131 536 6409** or **0131 536 6410**. Your call will give someone else the chance to be seen and will help us keep waiting times to a minimum.

Public transport and travel information

Bus details are available from:

Lothian Buses on 0131 555 6363 or www.lothianbuses.co.uk

Traveline Scotland on 08712 002 233 or www.travelinescotland.com

Train details are available from:

National Rail Enquiries on 03457 484 950 or www.nationalrail.co.uk

Patient transport

Patient Transport will only be made available if you have a medical or clinical need. Telephone **0300 123 1236** (calls charged at local rate) up to 28 days in advance to book, making sure you have your CHI Number available.

A text relay service is available if you are hard of hearing or speech impaired. They can be contacted on: **18001-0300 123 1236** (calls charged at local rate).

To cancel patient transport, you should telephone 0800 389 1333 (Freephone 24 hour answer service).

Interpretation and translation

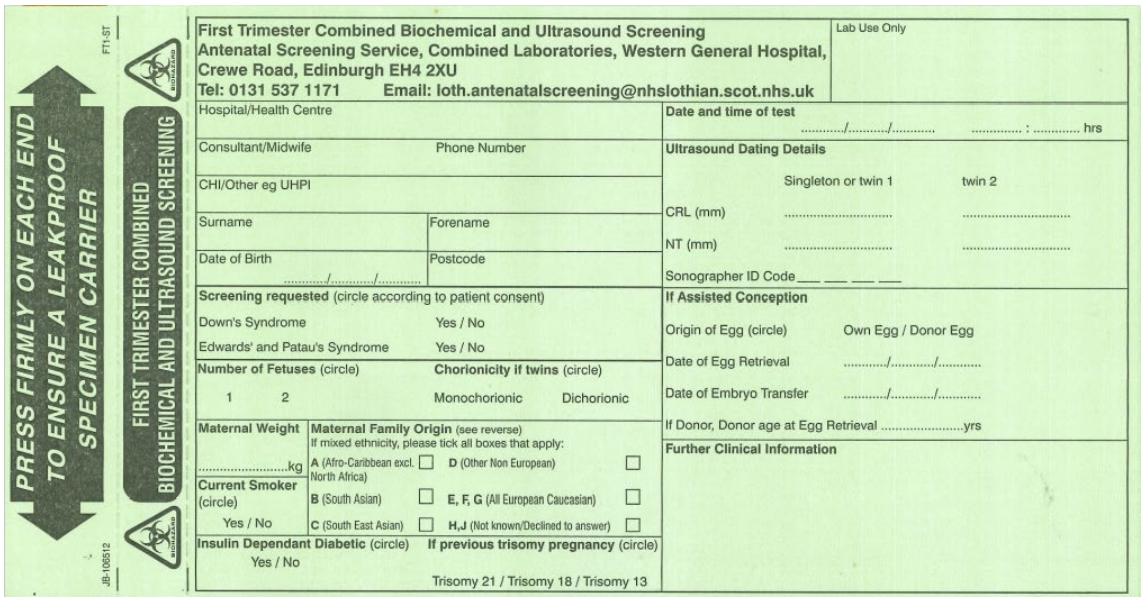
Your GP will inform us of any interpreting requirements you have before you come to hospital and we will provide an appropriate interpreter. If you are having this procedure as an existing inpatient, staff will arrange interpreting support for you before your procedure.

This leaflet may be made available in a larger print, Braille or your community language.

7.2 Appendix B

First Trimester Combined Biochemical and Ultrasound Screening blood form; and

Second Trimester Down's syndrome Screening for NHS Scotland (Bolton) blood forms



PRESS FIRMLY ON EACH END TO ENSURE A LEAKPROOF SPECIMEN CARRIER

FIRST TRIMESTER COMBINED BIOCHEMICAL AND ULTRASOUND SCREENING

FT1-ST

JB-106512

First Trimester Combined Biochemical and Ultrasound Screening
Antenatal Screening Service, Combined Laboratories, Western General Hospital, Crewe Road, Edinburgh EH4 2XU
Tel: 0131 537 1171 Email: loth.antenatalscreening@nhslothian.scot.nhs.uk

Lab Use Only

Hospital/Health Centre

Consultant/Midwife Phone Number

CHI/Other eg UHPI

Surname Forename

Date of Birth Postcode

Screening requested (circle according to patient consent)
Down's Syndrome Yes / No
Edwards' and Patau's Syndrome Yes / No

Number of Fetuses (circle) 1 2

Chorionicity if twins (circle) Monochorionic Dichorionic

Maternal Weight ..... kg

Current Smoker (circle) Yes / No

Maternal Family Origin (see reverse)
If mixed ethnicity, please tick all boxes that apply:
A (Afro-Caribbean excl. North Africa) ☐ D (Other Non European) ☐
B (South Asian) ☐ E, F, G (All European Caucasian) ☐
C (South East Asian) ☐ H,J (Not known/Declined to answer) ☐

Insulin Dependant Diabetic (circle) Yes / No

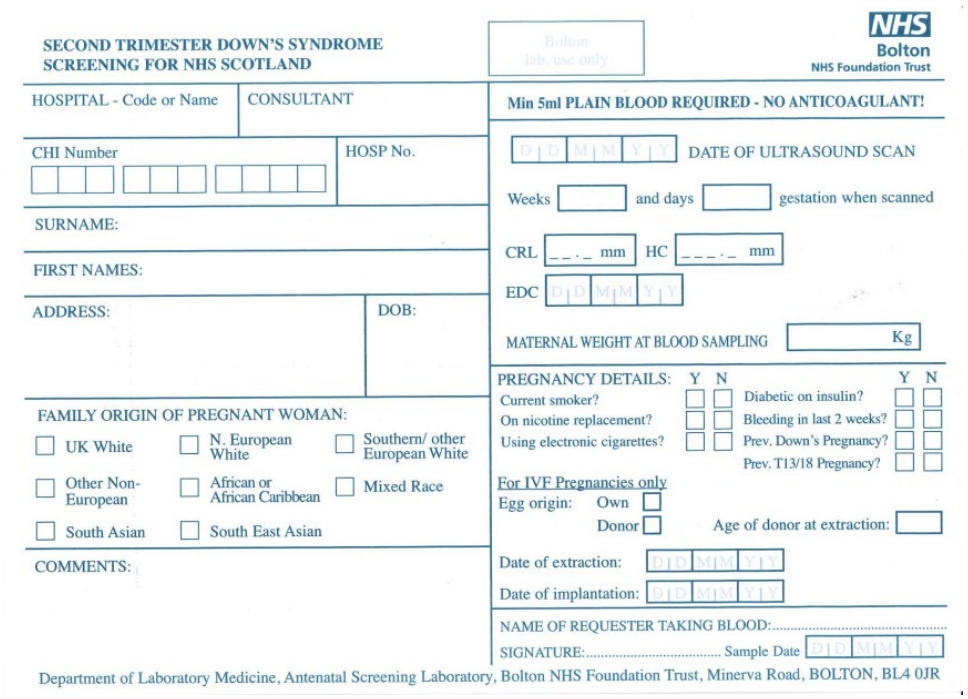
If previous trisomy pregnancy (circle) Trisomy 21 / Trisomy 18 / Trisomy 13

Date and time of test ...../...../..... ..... : ..... hrs

Ultrasound Dating Details
Singleton or twin 1 twin 2
CRL (mm) ....
NT (mm) ....
Sonographer ID Code ___ ___ ___ ___

If Assisted Conception
Origin of Egg (circle) Own Egg / Donor Egg
Date of Egg Retrieval ...../...../.....
Date of Embryo Transfer ...../...../.....
If Donor, Donor age at Egg Retrieval .....yrs

Further Clinical Information



SECOND TRIMESTER DOWN'S SYNDROME SCREENING FOR NHS SCOTLAND

Bolton lab. use only

NHS Bolton NHS Foundation Trust

HOSPITAL - Code or Name CONSULTANT

CHI Number HOSP No.

SURNAME:

FIRST NAMES:

ADDRESS: DOB:

FAMILY ORIGIN OF PREGNANT WOMAN:
☐ UK White ☐ N. European White ☐ Southern/ other European White
☐ Other Non-European ☐ African or African Caribbean ☐ Mixed Race
☐ South Asian ☐ South East Asian

COMMENTS:

Min 5ml PLAIN BLOOD REQUIRED - NO ANTICOAGULANT!

D D M M Y Y DATE OF ULTRASOUND SCAN

Weeks ____ and days ____ gestation when scanned

CRL __ __ . _ mm HC ___ . _ mm

EDC D D M M Y Y

MATERNAL WEIGHT AT BLOOD SAMPLING ____ Kg

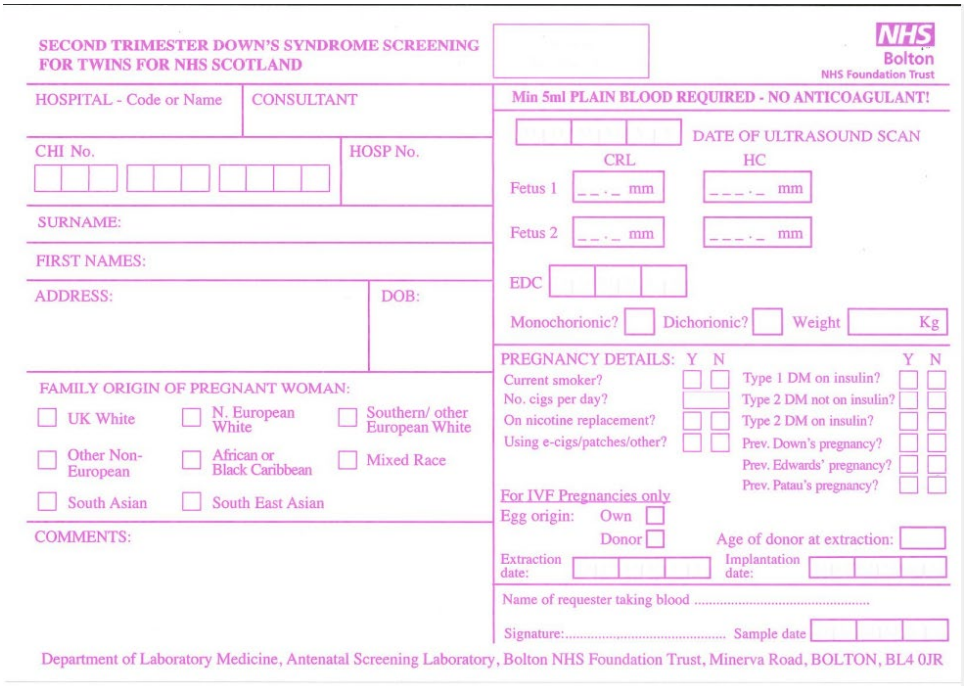
PREGNANCY DETAILS: Y N
Current smoker? ☐ ☐
On nicotine replacement? ☐ ☐
Using electronic cigarettes? ☐ ☐
Diabetic on insulin? ☐ ☐
Bleeding in last 2 weeks? ☐ ☐
Prev. Down's Pregnancy? ☐ ☐
Prev. T13/18 Pregnancy? ☐ ☐

For IVF Pregnancies only
Egg origin: Own ☐ Donor ☐ Age of donor at extraction: ____

Date of extraction: D D M M Y Y
Date of implantation: D D M M Y Y

NAME OF REQUESTER TAKING BLOOD:.....
SIGNATURE:..... Sample Date D D M M Y Y

Department of Laboratory Medicine, Antenatal Screening Laboratory, Bolton NHS Foundation Trust, Minerva Road, BOLTON, BL4 0JR



SECOND TRIMESTER DOWN'S SYNDROME SCREENING FOR TWINS FOR NHS SCOTLAND

NHS Bolton NHS Foundation Trust

HOSPITAL - Code or Name | CONSULTANT

CHI No. | HOSP No.

SURNAME:

FIRST NAMES:

ADDRESS: | DOB:

FAMILY ORIGIN OF PREGNANT WOMAN:

- ☐ UK White
- ☐ N. European White
- ☐ Southern/ other European White
- ☐ Other Non-European
- ☐ African or Black Caribbean
- ☐ Mixed Race
- ☐ South Asian
- ☐ South East Asian

COMMENTS:

Min 5ml PLAIN BLOOD REQUIRED - NO ANTICOAGULANT!

DATE OF ULTRASOUND SCAN

	CRL	HC
Fetus 1	__.__ mm	___.__ mm
Fetus 2	__.__ mm	___.__ mm

EDC

Monochorionic? ☐ Dichorionic? ☐ Weight ____ Kg

PREGNANCY DETAILS:

	Y	N		Y	N
Current smoker?	☐	☐	Type 1 DM on insulin?	☐	☐
No. cigs per day?			Type 2 DM not on insulin?	☐	☐
On nicotine replacement?	☐	☐	Type 2 DM on insulin?	☐	☐
Using e-cigs/patches/other?	☐	☐	Prev. Down's pregnancy?	☐	☐
			Prev. Edwards' pregnancy?	☐	☐
			Prev. Patau's pregnancy?	☐	☐

For IVF Pregnancies only

Egg origin: Own ☐ Donor ☐ Age of donor at extraction: ____

Extraction date: ____ Implantation date: ____

Name of requester taking blood .....

Signature:..... Sample date ____

Department of Laboratory Medicine, Antenatal Screening Laboratory, Bolton NHS Foundation Trust, Minerva Road, BOLTON, BL4 0JR

7.3 Appendix C
Informing your midwife (yellow form)

Informing your midwife

□ First trimester bloods

Unfortunately we were not able to take blood from you today to complete the first trimester screening test. Please arrange to see your midwife **as soon as possible** so she can take blood and we will complete the test.

□ Second trimester bloods

Unfortunately we were not able to perform the screening test to calculate the chance of your baby having Down's syndrome today because:

□ *Your pregnancy is further on than we thought.*

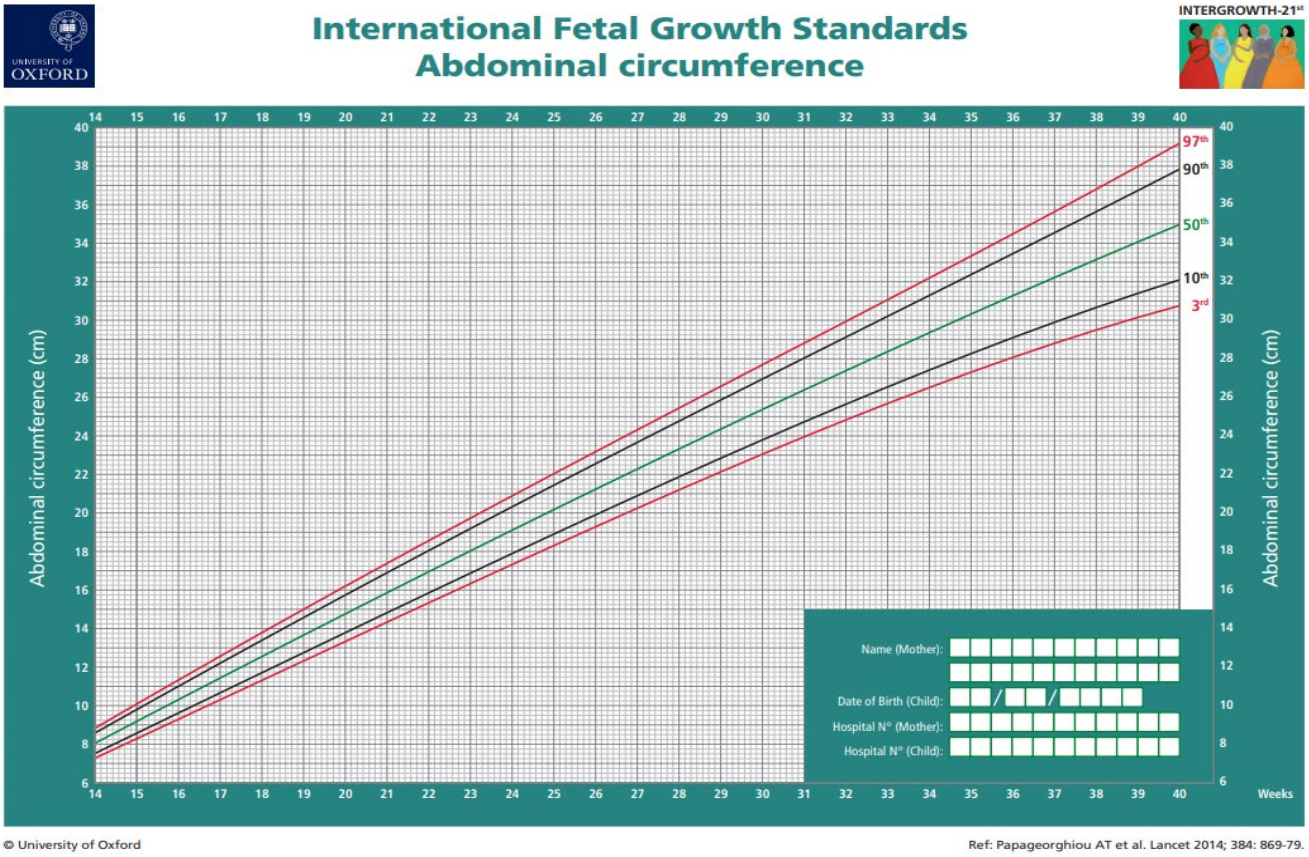
□ *We have not been able to measure the neck region (nuchal translucency) of your baby.*

□ *There is no evidence of your consent to perform the test on TRAK or in your maternity notes (or you did not bring your notes with you)*

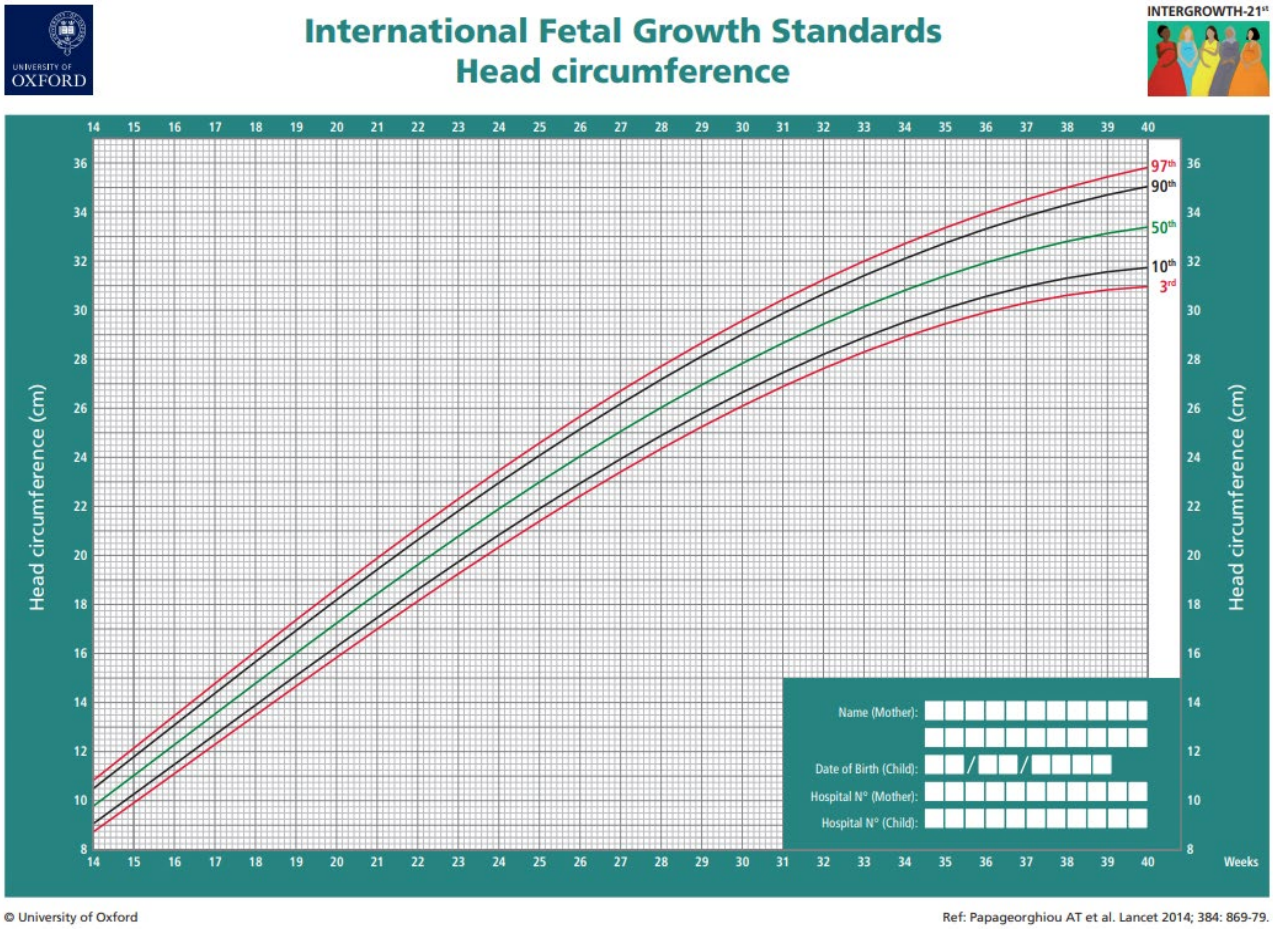
However you are still able to find out the chance of your baby having Down's syndrome by seeing your midwife for a blood test between 14 weeks 2 days and 20 weeks.
Please contact your midwife promptly to arrange an appointment for this screening test.

Thank you!

7.4 Appendix D: Intergrowth 21 Charts



GROW_Fetal_ac-hz-green-1 (tghn.org)



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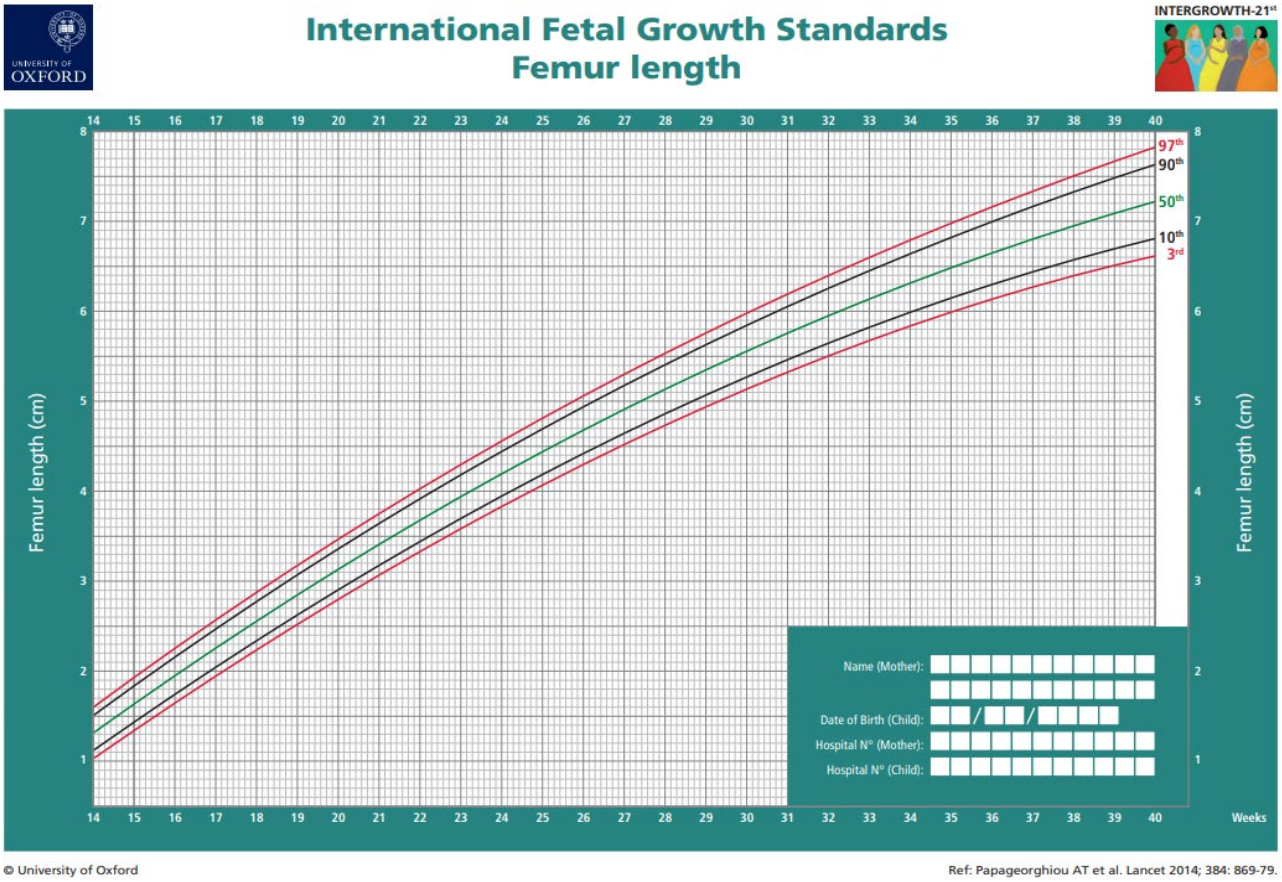
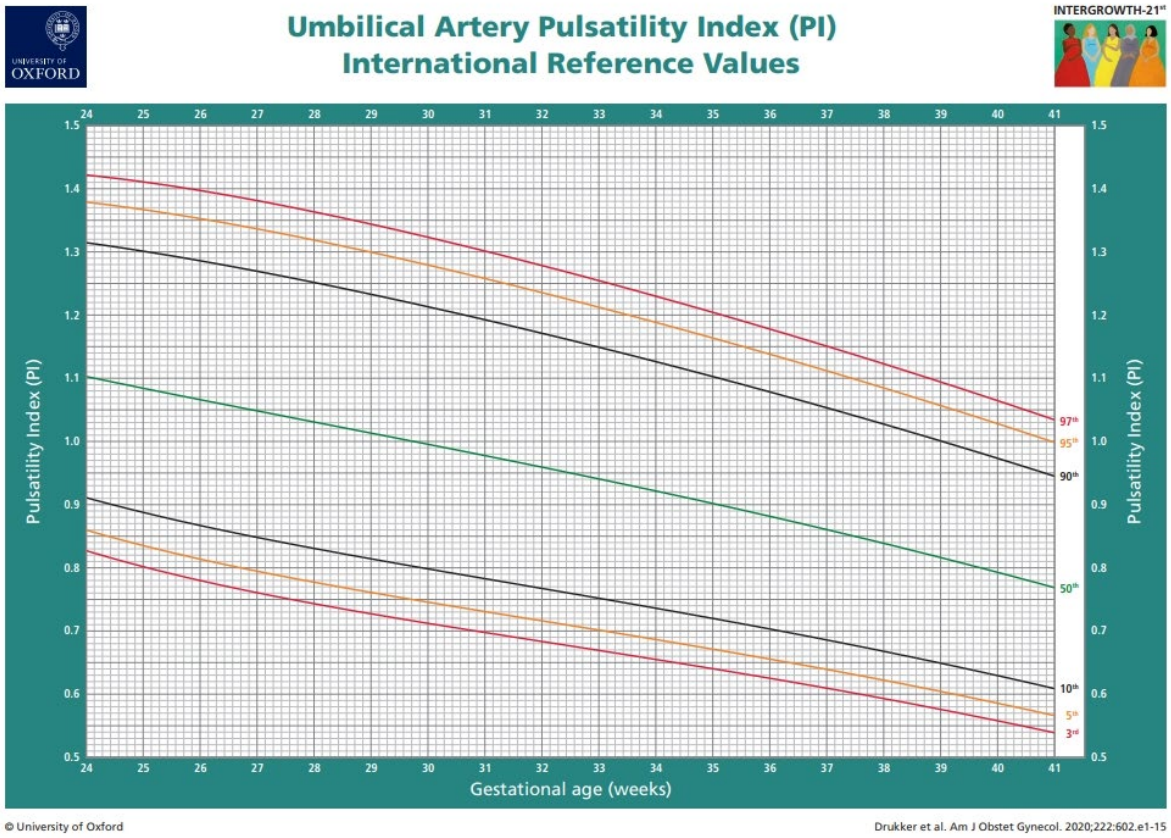


[GROW_Fetal_fl-hz-green-1 (tghn.org)]

7.5 Appendix E: Umbilical Artery PI Chart



GROW_SFH_zs_3

Maternity Services Lothian Guidelines

1. INTRODUCTION:

Babies that have not achieved specific growth parameters by their gestation are small-for-gestational-age (SGA). These babies have increased incidence of stillbirth [1], complications in labour (eg intrapartum hypoxia) [2], neonatal problems [3], and poorer adult health [4].

The definition in Lothian for SGA is abdominal circumference or birthweight less than 10th centile.

SGA includes babies that are constitutively small and those with fetal growth restriction (FGR). FGR is the term used for fetuses that have not achieved their growth potential and is caused by placental dysfunction. FGR fetuses are at highest risk of complications. Not all fetuses that have FGR are SGA, but they are all at risk of poor outcomes[1].

In the antenatal period, screening for SGA and FGR is based on clinical assessment through symphysis fundal height [SFH] measurement. Diagnosis of SGA and FGR is by ultrasound.

Detection of SGA and FGR is difficult – but the aim is to detect and monitor these babies, and deliver them at a time that minimises risk. Decisions to deliver may be complex (particularly at early gestations) and should be made by a consultant obstetrician, in conjunction with fetal medicine and neonatology as appropriate.

2. AIM:

To provide guidance on
1. identifying women at risk of SGA,
2. clinical detection of SGA through SFH measurement
3. when to request growth ultrasound scans
4. management of babies with SGA

3. GUIDELINES:

Summary

1. **Gestation should be checked using the date estimated at booking scan performed at 11.0-13.6 weeks and recorded in TRAK**

2. **Risk factors for SGA should be assessed at booking and the screening pathway for SGA filled out and recorded in woman's record. Ultrasounds should be requested at the fetal anomaly scan review visit.**

3. **Symphysio-fundal height measurement (SFH) should be measured at each antenatal attendance after 20 weeks and recorded on SFH charts in hand held records. If SFH static or falling then referral for growth scan should be made.**

4. **In certain women SFH measurement is inaccurate (eg BMI>40; large fibroids) – and these should be referred for growth scans.**

5. **Women referred for growth scans should have measurement of abdominal circumference (AC) and head circumference (HC) plotted on growth charts. AC and HC from fetal anomaly (20 week) scan must also be plotted and comparison should be made to these.**

6. **Women at very high risk of FGR; and those with FGR suspected by ultrasound scan should be referred to/discussed with fetal medicine to arrange additional surveillance.**

7. **Growth scans are less accurate after 38 weeks gestation. If there is clinical concern about SGA beyond 38 weeks gestation then refer to day assessment unit for CTG, Doppler and liquor volume (deepest vertical pool) and/or discuss with senior trainee/consultant about timing of delivery.**

i). Referral for growth scans

Formal risk assessment should be made BY MIDWIFE BY 16-20 weeks and women referred as appropriate. If there is a concern or maternal condition which is not included below or in the risk assessment table, please contact the patient's named consultant for an individual management plan.

A. WOMEN UNSUITABLE FOR MONITORING BY FUNDAL HEIGHT

Large fibroids, 1 or more >6cm
BMI>40

-> Two growth scans should be requested at 30 and 36 weeks gestation

NB Women with multiple pregnancies should follow the multiple pregnancy care pathway

B. WOMEN WITH RISK Factors for SGA

Maternal age>40yrs
Smoker with CO level 5ppm or more
Substance misuse including alcohol
Previous SGA (<10th centile for gestation at delivery)
Previous stillbirth not associated with FGR (- see also section C below)
Chronic hypertension
Diabetes – Pre-existing- Type 1&2 (uncomplicated)
Chronic kidney disease
Antiphospholipid syndrome
Recurrent bleeding (similar to menses, not spotting)
PAPP-A<0.4MOM on first trimester screen (or hCG >4 or AFP>2.5 MoM on second trimester screen)
Recurrent miscarriage clinic patient immediately prior to this pregnancy (ie no live children after miscarriages)
Late bookers (at or after 21 weeks gestation)
Asthma requiring current use of oral steroids or recent hospital admission
Uterine anomaly
Previous bariatric surgery

-> Two growth scans should be requested, one at 30 weeks gestation and one at 36 weeks gestation

Newly diagnosed or uncontrolled hyperthyroidism
Previous stillbirth (not associated with Fetal Growth Restriction [FGR] see also below)
SLE/Connective Tissue Disease
Eating disorder
Maternal Cardiac Disease

This section to be completed by document control.

Cystic fibrosis
Pre-existing Diabetes – Type 1&2 (complicated by vascular or renal disease or a St John's Hospital Patient)

-> Three growth scans should be requested, at 28, 32 and 36 weeks gestation

C. WOMEN AT VERY HIGH RISK FGR
SGA (<10th centile) and/or Echogenic bowel and/or femur length <5th centile on FA scan (sonographer to refer)
Positive Uterine Artery Dopplers (bilateral notching or mean PI >95th centile)
Sickle cell disease (NOT sickle cell trait)
Severe early onset FGR in a previous pregnancy (delivery before 34 weeks for growth restriction and/or SGA <3rd centile at delivery)
Previous stillbirth with FGR (<10th centile for gestation or pathology suggests placental insufficiency)

-> should be referred to fetal medicine for personalised growth scan schedule

D. WOMEN WHO DEVELOP PREGNANCY COMPLICATIONS
Symphysio-fundal height (SFH) <10th centile or static or falling SFH
Recurrent Antepartum Haemorrhage (2 bleeds >20 wk)
Pre-eclampsia/PIH
Reduced fetal movements

- ➔ **A growth scan should be requested.**
- ➔ **The Scan should be performed within 3 working days and results reviewed the same day**
- ➔ **A further growth scan should be arranged 3 weeks later for comparison of growth trajectory**

NB: Growth scans are less accurate after 38 weeks gestation.
-> If there is clinical concern about IUGR/SGA beyond 38 weeks gestation then refer to Day Assessment Unit for CTG, Doppler and liquor volume (deepest vertical pool) and/or discuss with senior trainee/consultant about timing of delivery.

ii) Management of growth scan results

Women referred for growth ultrasound should have measurement of abdominal circumference (AC) and head circumference (HC) plotted on growth charts and placed in the notes.

- AC and HC should be plotted from fetal anomaly (20 week USS) and comparison should be made to these.
- Liquor volume (LV) should also be documented (normal/abnormal) Deepest Vertical Pool (DVP) should be recorded for abnormal results.
- Management should be directed as below

Normal USS results
AC is >10t^{h} centile, growth velocity maintained compared to previous scan(s), and LV normal (DVP ≥ 2cm)

- **Women should be referred back to routine antenatal care.**
- **SFH measurements should continue. If there is ongoing clinical concern a second growth ultrasound should be requested 3-4 weeks later.**

Abnormal USS results:
- ***SGA or suspected FGR:*** **All women in who AC <10th centile or AC is crossing centiles from previous scan/ fetal anomaly scan**

This section to be completed by document control.

- ***Should have umbilical artery Doppler performed and Resistance Index (RI) plotted on chart at time of scan***
- ***Should be reviewed by consultant or senior trainee within 24 hours • DAU, DBU or ANC)***

- **If umbilical artery flow is < 95th centile (ie normal) but growth velocity reduction significant, or <10th centile**
  - **Refer to fetal medicine for surveillance**
  - **Fetal medicine growth surveillance and wellbeing scans will be arranged**
  - **These will include relevant fetal Dopplers (eg Ductus venosus Dopplers for severe early onset FGR; and/or Middle Cerebral Artery Doppler in cases >32 weeks)**
  - **Delivery is recommended at 37 weeks or sooner if monitoring deteriorates**

- **If umbilical artery RI is > 95th centile (abnormal) but there is positive flow**
  - **If ≥37 weeks gestation discuss with consultant regarding timing of delivery (delivery should be offered)**
  - **If <37 weeks gestation refer to fetal medicine for plans for ongoing fetal surveillance and delivery planning. This will include twice weekly Umbilical artery +/- CTG.**
  - **If there is absent or reversed end diastolic flow (EDF)**
    - **If gestational age is >32 weeks offer antenatal corticosteroids and magnesium sulphate as per protocol and arrange delivery**
    - **If <32 weeks refer to fetal medicine for ongoing fetal surveillance with ultrasound and Dopplers (umbilical, MCA, DV) and delivery planning.**

➔ ***Isolated reduced LV*** **(DVP < 2cm)*:* The prognostic value of reduced LV is limited.**
- **Growth measurement and Umbilical artery Dopplers should be reviewed and if abnormal manage as above.**
- **Rupture of membranes should be excluded.**
- **If isolated reduced DVP in the absence of membrane rupture referral should be made to consultant obstetrician. Repeat LV and Doppler should be performed weekly, and growth USS fortnightly**
- **Delivery plan should be made by consultant**

3. ASSOCIATED DOCUMENTS:

Small for Gestational Age Guideline
Management of Intrauterine Death Protocol

4. REFERENCES:

1 RCOG Greentop Guideline No 31- The Investigation and Management of the Small for Gestational Age Fetus. January 2014

2 Clausson B., Axelsson O., Cnattingius S.. Adverse outcomes in post-term births: the role of fetal growth restriction and malformations. *Obstet Gynecol* 1999;94: 758–762

3 McIntire D.D., Bloom S.L., Casey B.M., Leveno K.J.. Birth weight in relation to morbidity and mortality among newborn infants. *N Engl J Med* 1999;340: 1234–1238

4 P. E. Clayton S. Cianfarani P. Czernichow G. Johannsson R. RapaportA. Rogol
Management of the Child Born Small for Gestational Age through to Adulthood: A Consensus Statement of the International Societies of Pediatric Endocrinology and the Growth Hormone Research Society
The Journal of Clinical Endocrinology & Metabolism, Volume 2007:92; 3; 804–810

Risk assessment and screening pathway for SGA				
1. Complete and file in handheld record at booking assessment **2. Update pathway and request any required ultrasound scans at time of fetal anomaly (FA) scan review** **3. State the scan indication on the scan request as listed below (NB scans for any indication not listed; or deviating from suggested scanning schedule will need to be discussed directly between the consultant and ultrasound scan department)** **4. Assess the fetal growth trajectory of plotted measurements from fetal anomaly scan and growth scans on charts overleaf**				
Risk Factor	**TICK**	**SGA Screening PATHWAY**	**REQUEST (initial)**	**Review of results**
Large fibroids, 1 or more >6cm		**2 growth ultrasounds (30 and 36 weeks gestation)**		Midwife led
Maternal age>40yrs				Midwife led
Smoker with CO level 5ppm or more				Midwife led
Late bookers (at or after 21 weeks gestation)				Midwife led
PAPP-A <0.4MoM on 1st trimester screen (or hCG >4 or AFP>2.5 MoM on 2nd trimester screen)				Midwife led
Recurrent miscarriage clinic patient immediately prior to this pregnancy (ie no live children after 3 miscarriages)				Midwife led
Recurrent bleeding (similar to menses, not spotting)				Midwife led
Previous SGA (<10th centile at delivery)				Midwife led
Asthma requiring current use of oral steroids or recent hospital admission				Midwife led (with AN care input from named consultant)
Chronic hypertension				Midwife led (with AN care input from named consultant)
Chronic kidney disease (CKD)				Midwife led (with AN care input from named consultant)
Uterine anomaly				Midwife led (with AN care input from named consultant)
Substance misuse including alcohol				Midwife led (with AN care input from named consultant/PREPARE team)
BMI>40 or previous bariatric surgery				Metabolic Antenatal Clinic Team
Newly diagnosed or uncontrolled hyperthyroidism		**3 growth ultrasounds at 28/32/36 weeks gestation**		Midwife led (with AN care input from named consultant)
Previous stillbirth (not associated with Fetal Growth Restriction [FGR] *see also below*)				Midwife led (with AN care input from named consultant)
SLE/Connective Tissue Disease				Midwife led (with AN care input from named consultant)
Eating disorder				Midwife led (with AN care input from named consultant)
Maternal Cardiac Disease				Cardiac Antenatal Clinic Team
Cystic fibrosis				Cystic fibrosis Team
Pre-existing Diabetes – Type 1&2				Diabetic Clinic Team
Positive Uterine Artery Dopplers (bilateral notching or mean PI >95th centile)		**Refer to fetal medicine for personalised growth assessment schedule**		Fetal Medicine Team
SGA (AC<10th centile) and/or Echogenic bowel and/or femur length <5th centile on FA scan (*sonographer to refer*)				Fetal Medicine Team
Sickle cell disease (not sickle cell trait)				Fetal Medicine Team
Severe early onset FGR in a previous pregnancy (delivery before 34 weeks for SGA and/or <3rd centile at delivery)				Fetal Medicine Team
Previous stillbirth (Birthweight <10th centile for gestation or pathology suggests placental insufficiency)				Fetal Medicine Team
Antiphospholipid syndrome				Fetal Medicine Team
None of the above?		**Measure SFH and plot at each ANC attendance. Refer for growth scan if** - Symphisio-fundal height <10th centile or static or falling SFH -Recurrent Antepartum Haemorrhage (2 bleeds >20 wk) -Pre-eclampsia/PIH -Reduced fetal movements		Midwife/named consultant or DAU team as appropriate Scan should be performed within 3 working days and results reviewed the same day

This section to be completed by document control.

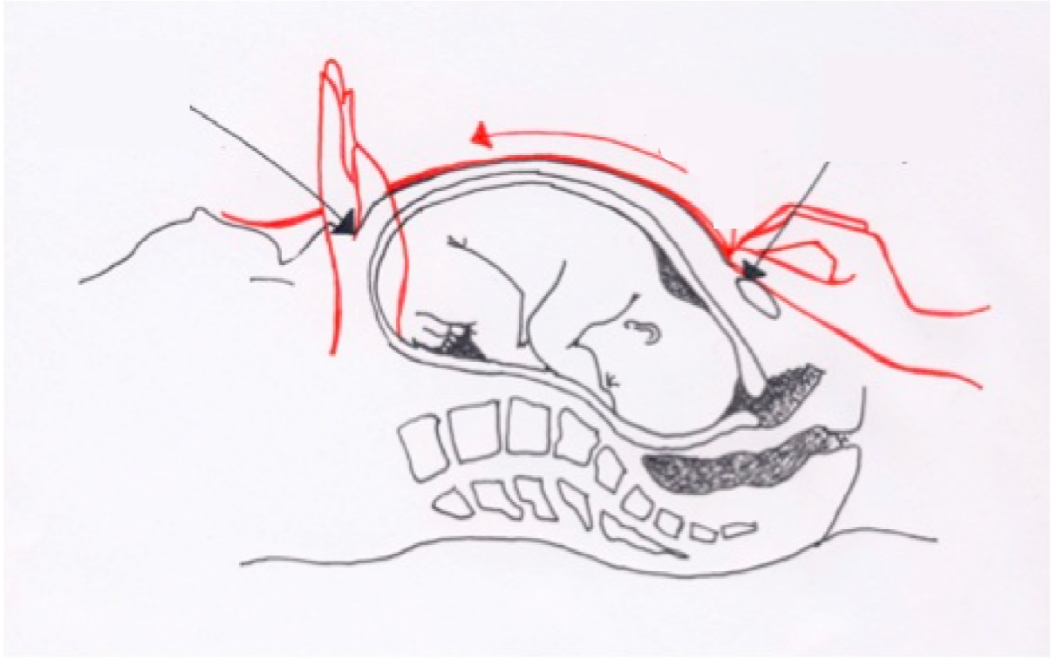
Appendix 1 above

If there is a concern or a maternal condition which is not included in the risk assessment table, please contact the patient's consultant for an individual management plan.

Appendix 2
Measuring and Plotting Symphysio-Fundal Height (SFH)

1. Explain the procedure to the mother, gain verbal consent, wash hands
2. The expectant mother should be in a semi-recumbent position (45 degree angle) on a firm surface, with an empty bladder and expose enough of the abdomen to allow thorough two handed palpation.
3. Use a non-elastic tape measure. Turn the tape measure over so no numbers are visible during the measurement.
4. With the palm of the other hand on the abdomen, pass the tape from the fundus of the uterus along the longitudinal axis of the uterus (not correcting to the midline) to the top of the symphysis pubis – the fixed point and more easily identified landmark.
5. Measure once only, and plot immediately on the chart for the right gestation (weeks and days) to the nearest half centimetre.
6. SFH measurements should not occur more frequently than every two weeks.

Ref. Belizan J, Villar J et al. Diagnosis of intrauterine growth retardation by a simple clinical method: Measurement of uterine height. Am J Obstet Gynecol 1978 131:6: 643-64



How to interpret results

You **do not** need to allow for decent of the head. The curves do not flatten towards term; uncompromised babies should continue growing until delivery.

Symphysio-fundal height **at or above** 10th centile	Routine antenatal care with continued SFH monitoring
SFH i**ncreased** since last measurement*	
Symphysio-fundal height **<10th** centile	**Directly refer for ultrasound scan (should be performed within three working days)**
Static or falling SFH (2 weeks or more after previous measurement)	

*Accelerated growth trajectory is **not** an indication for ultrasound referral. If clinical concerns about excessive growth discuss with named consultant.

Appendix 3

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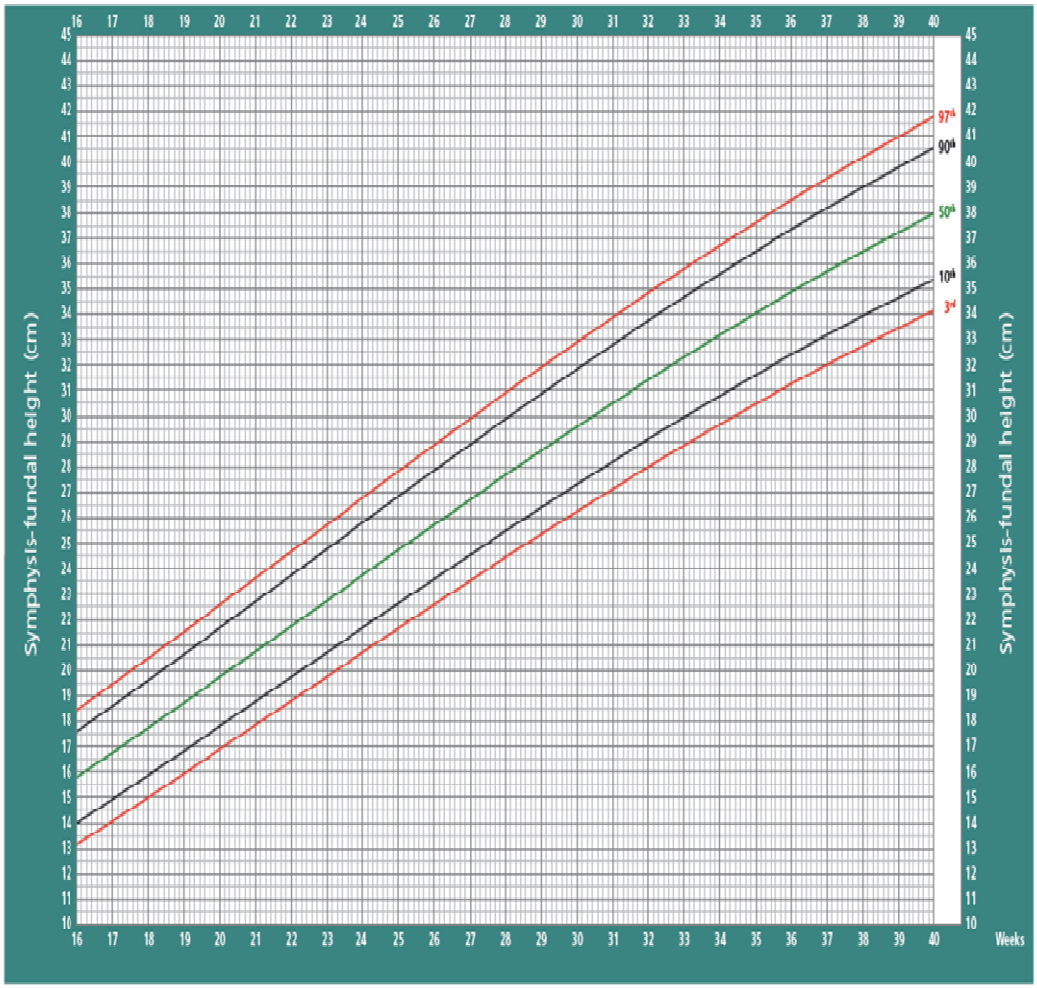
Symphysio-fundal height chart



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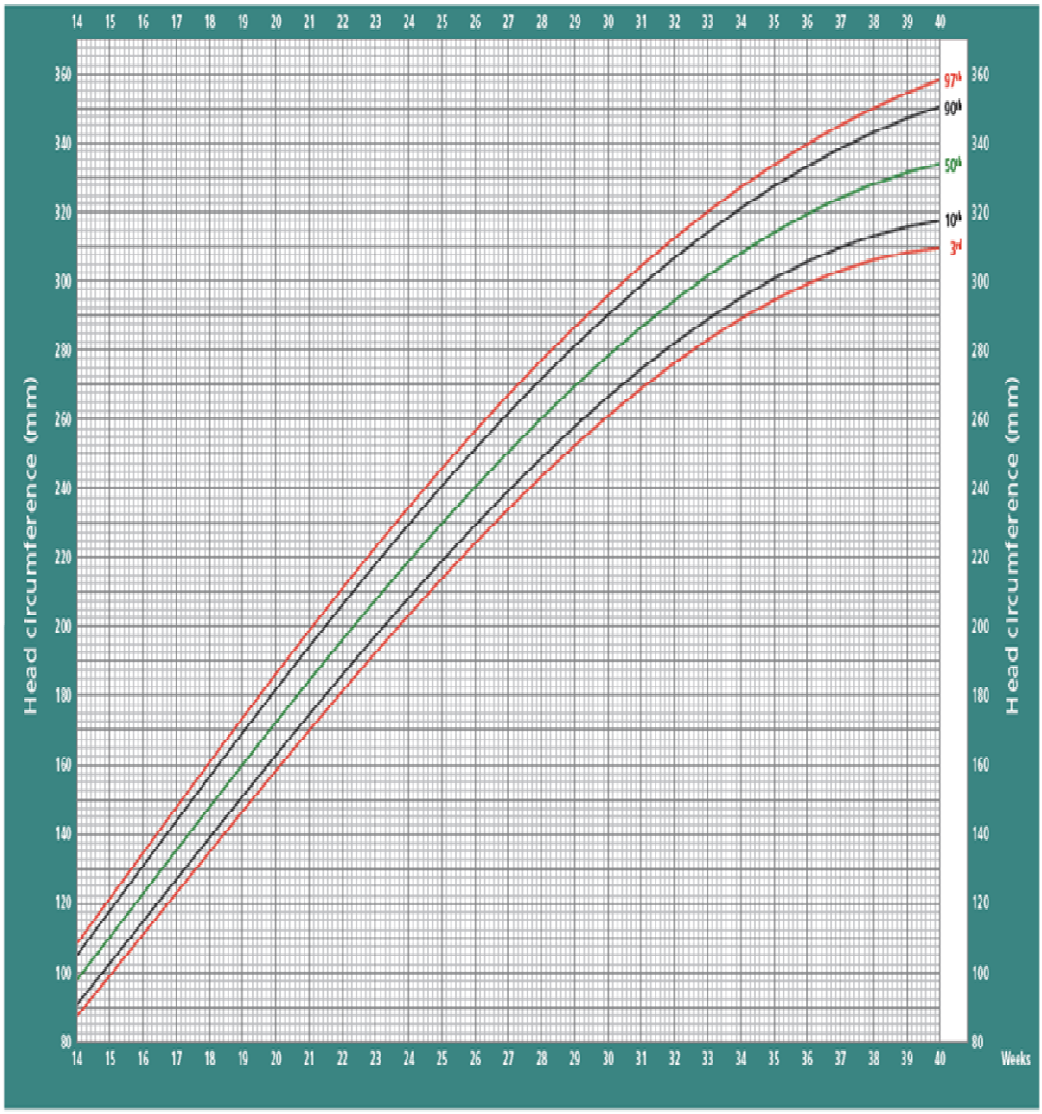
Appendix 4
Plotting Ultrasound Results

1. Plot HC and AC for appropriate **weeks** and **days** gestation
2. **Ensure measurements from **fetal anomaly** ultrasound are plotted for comparison**

How to interpret results

- If AC is less than 10th centile or the trajectory is reduced (crossing centiles) then refer to DAU consultant
- If HC is less than 3rd centile then refer to fetal medicine
- If ultrasound measurements are reassuring, continue routine antenatal care with SFH monitoring. If ongoing concern about SFH measurements **3 or more weeks** after ultrasound, refer for further scan and consultant review.

Appendix 5
Growth charts



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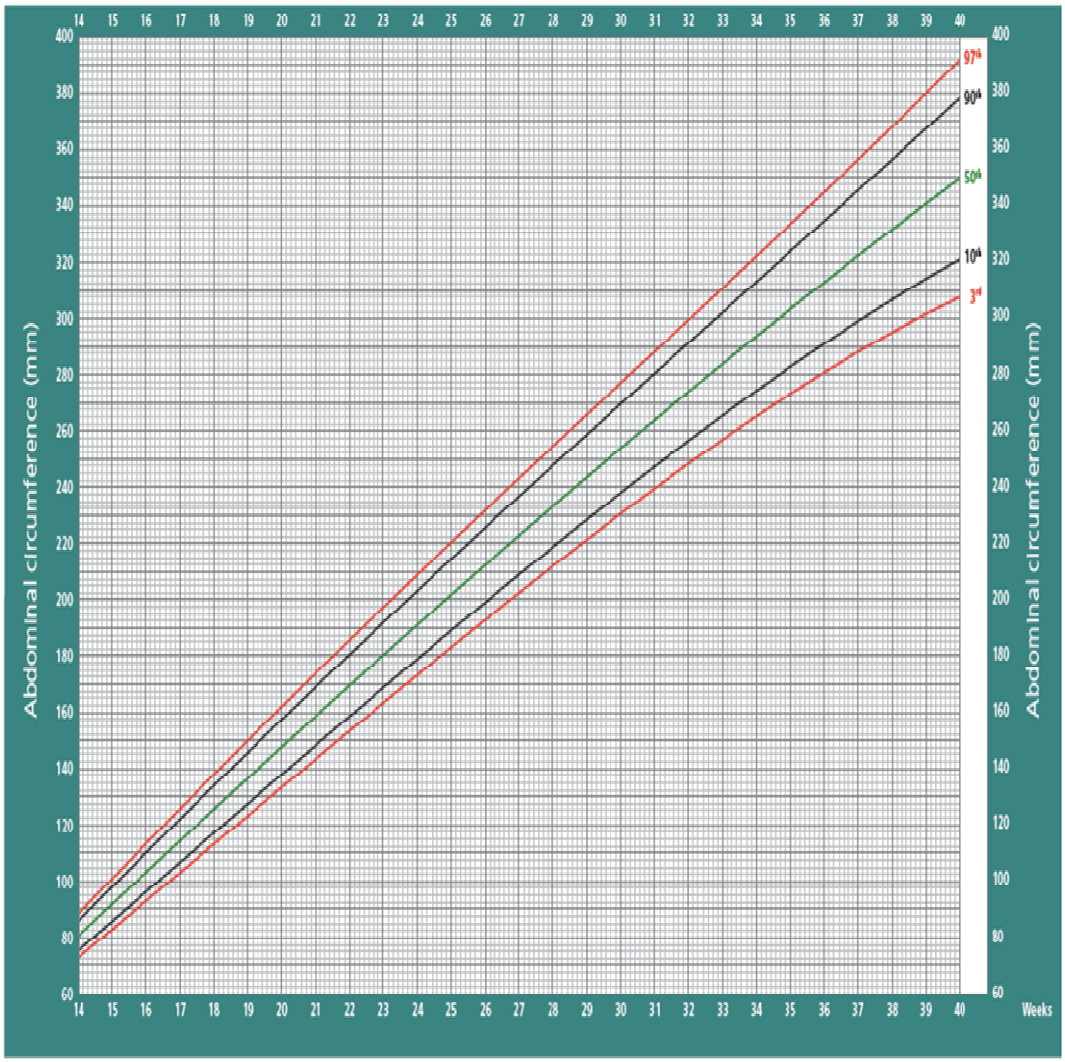

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Appendix 6
<10th centile table

This table below contains the weight in grams of a baby born on the 10th centile according to gestation and gender. Please use this table to assist completion of the risk assessment in appendix 1.

Gestation	Girls (10th Centile)	Boys (10th Centile)
24 – 24^{+6}	500g	550g
25 – 25^{+6}	575g	625g
26 – 26^{+6}	650g	700g
27 – 27^{+6}	725g	775g
28 – 28^{+6}	800g	875g
29 – 29^{+6}	900g	975g
30 – 30^{+6}	1000g	1075g
31 – 31^{+6}	1150g	1200g
32 – 32^{+6}	1300g	1350g
33 – 33^{+6}	1450g	1550g
34 – 34^{+6}	1650g	1750g
35 – 35^{+6}	1850g	1950g
36 – 36^{+6}	2050g	2150g
37 – 37^{+6}	2275g	2375g
38 – 38^{+6}	2475g	2575g
39 – 39^{+6}	2675g	2775g
40 – 40^{+6}	2850g	2950g
41 – 41^{+6}	3000g	3100g
42 – 42^{+6}	3150g	3250g

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Maternity Services Lothian Guidelines

1. INTRODUCTION:

Babies that have not achieved specific growth parameters by their gestation are small-for-gestational-age (SGA). These babies have increased incidence of stillbirth [1], complications in labour (eg intrapartum hypoxia) [2], neonatal problems [3], and poorer adult health [4].

The definition in Lothian for SGA is abdominal circumference or birthweight less than 10th centile.

SGA includes babies that are constitutively small and those with fetal growth restriction (FGR). FGR is the term used for fetuses that have not achieved their growth potential and is caused by placental dysfunction. FGR fetuses are at highest risk of complications. Not all fetuses that have FGR are SGA, but they are all at risk of poor outcomes[1].

In the antenatal period, screening for SGA and FGR is based on clinical assessment through symphysis fundal height [SFH] measurement. Diagnosis of SGA and FGR is by ultrasound.

Detection of SGA and FGR is difficult – but the aim is to detect and monitor these babies, and deliver them at a time that minimises risk. Decisions to deliver may be complex (particularly at early gestations) and should be made by a consultant obstetrician, in conjunction with fetal medicine and neonatology as appropriate.

2. AIM:

To provide guidance on
1. identifying women at risk of SGA,
2. clinical detection of SGA through SFH measurement
3. when to request growth ultrasound scans
4. management of babies with SGA

3. GUIDELINES:

Summary

1. **Gestation should be checked using the date estimated at booking scan performed at 11.0-13.6 weeks and recorded in TRAK**

2. **Risk factors for SGA should be assessed at booking and the screening pathway for SGA filled out and recorded in woman's record (see appendix 1). Ultrasounds should be requested at the fetal anomaly scan review visit.**

3. **Symphysio-fundal height measurement (SFH) should be measured at each antenatal attendance after 24weeks and recorded on SFH charts in hand held records. If SFH static or falling then referral for growth scan should be made.**

4. **In certain women SFH measurement is inaccurate (eg BMI>40; large fibroids) – and these should be referred for growth scans.**

5. **Women referred for growth scans should have measurement of abdominal circumference (AC) and head circumference (HC) plotted on growth charts. AC**

and HC from fetal anomaly (20 week) scan must also be plotted and comparison should be made to these.

6. **Women at very high risk of FGR; and those with FGR suspected by ultrasound scan should be referred to/discussed with fetal medicine to arrange additional surveillance.**

7. **Growth scans are less accurate after 38 weeks gestation. If there is clinical concern about SGA beyond 38 weeks gestation then refer to day assessment unit for CTG, Doppler and liquor volume (deepest vertical pool) and/or discuss with senior trainee/consultant about timing of delivery.**

i). Referral for growth scans

Formal risk assessment should be made BY MIDWIFE BY 16-20 weeks and women referred as appropriate. If there is a concern or maternal condition which is not included below or in the risk assessment table, please contact the patient's named consultant for an individual management plan.

A. WOMEN UNSUITABLE FOR MONITORING BY FUNDAL HEIGHT

Large fibroids, 1 or more >6cm
BMI>40

-> Two growth scans should be requested at 30 and 36 weeks gestation

NB Women with multiple pregnancies should follow the multiple pregnancy care pathway

B. WOMEN WITH RISK Factors for SGA

Maternal age>40yrs
Smoker with CO level 5ppm or more
Substance misuse including alcohol
Previous SGA (<10th centile for birthweight -*see appendix 6 for 10th centile birthweight*)
Chronic hypertension
Chronic kidney disease
Recurrent bleeding (similar to menses, not spotting)
PAPP-A<0.4MOM on first trimester screen (or hCG >4 or AFP>2.5 MoM on second trimester screen)
Recurrent miscarriage clinic patient immediately prior to this pregnancy (ie no live children after miscarriages)
Late bookers (at or after 21 weeks gestation)
Asthma requiring current use of oral steroids or recent hospital admission
Uterine anomaly
Previous bariatric surgery/ BMI 40
Epilepsy on antiepileptic drugs (AED)

-> Two growth scans should be requested, one at 30 weeks gestation and one at 36 weeks gestation

Newly diagnosed or uncontrolled hyperthyroidism
Previous stillbirth (not associated with Fetal Growth Restriction [FGR] see also below)
SLE/Connective Tissue Disease
Eating disorder
Maternal Cardiac Disease
Cystic fibrosis
Diabetes – Pre-existing- Type 1&2

-> Three growth scans should be requested, at 28, 32 and 36 weeks gestation

This section to be completed by document control.

C. WOMEN AT VERY HIGH RISK FGR
SGA (<10th centile) and/or Echogenic bowel and/or femur length <5th centile on FA scan (sonographer to refer)
Previous stillbirth with FGR (<10th centile for gestation or pathology suggests placental insufficiency)
Severe early onset FGR in a previous pregnancy (delivery before 34 weeks for growth restriction and/or SGA <3rd centile at delivery)
Antiphospholipid syndrome
Positive Uterine Artery Dopplers (bilateral notching or mean PI >95th centile)
Sickle cell disease (NOT sickle cell trait)

-> should be referred to fetal medicine for personalised growth scan schedule

D. WOMEN WHO DEVELOP PREGNANCY COMPLICATIONS
Symphysio-fundal height (SFH) <10th centile or static or falling SFH
Recurrent Antepartum Haemorrhage (2 bleeds >20 wk)
Pre-eclampsia/PIH
Reduced fetal movements (RFMs)

- ➔ **A growth scan should be requested.**
- ➔ **The Scan should be performed within 3 working days and results reviewed the same day**
- ➔ **A further growth scan should be arranged 3 weeks later for comparison of growth trajectory**

NB: Growth scans may be performed until a gestation of 40+0 weeks. Clinical concerns beyond 37wks may also necessitate DAU/ OTA review for CTG eg. RFMs

ii) Management of growth scan results

Women referred for growth ultrasound should have measurement of abdominal circumference (AC) and head circumference (HC) plotted on growth charts and placed in the notes.

- AC and HC should be plotted from fetal anomaly (20 week USS) and comparison should be made to these.
- Liquor volume (LV) should also be documented (normal/abnormal) Deepest Vertical Pool (DVP) should be recorded for abnormal results.
- Management should be directed as below

Normal USS results
AC is ≥10th centile, growth velocity maintained compared to previous scan(s), and LV normal (DVP ≥ 2cm)

- **Women should be referred back to routine antenatal care.**
- **SFH measurements should continue. If there is ongoing clinical concern a second growth ultrasound should be requested 3-4 weeks later.**

Abnormal USS results:
- ***SGA or suspected FGR:*** **All women in who AC <10th centile or AC is crossing centiles (20 or more) from previous scan/ fetal anomaly scan**
    - ***Should have umbilical artery Doppler performed and Resistance Index (RI) plotted on chart at time of scan***
    - ***Should be reviewed within 24 hours • DAU, DBU or ANC and discussed with consultant or senior trainee***

This section to be completed by document control.

- **If umbilical artery flow is < 95th centile (ie normal) but growth velocity reduction significant, or <10th centile**
    - **Refer to fetal medicine for surveillance**
    - **Fetal medicine growth surveillance and wellbeing scans will be arranged**
    - **These will include relevant fetal Dopplers (eg Ductus venosus Dopplers for severe early onset FGR; and/or Middle Cerebral Artery Doppler in cases >32 weeks)**
    - **Delivery is recommended at 37 weeks or sooner if monitoring deteriorates**

- **If umbilical artery RI is > 95th centile (abnormal) but there is positive flow**
    - **If ≥37 weeks gestation discuss with consultant regarding timing of delivery (delivery should be offered)**

    - **If <37 weeks gestation refer to fetal medicine for plans for ongoing fetal surveillance and delivery planning. This will include twice weekly Umbilical artery +/- CTG.**

    - **If there is absent or reversed end diastolic flow (EDF)**
        - **If gestational age is >32 weeks offer antenatal corticosteroids and magnesium sulphate as per protocol and arrange delivery**
        - **If <32 weeks refer to fetal medicine for ongoing fetal surveillance with ultrasound and Dopplers (umbilical, MCA, DV) and delivery planning.**

➔ ***Isolated reduced LV*** **(DVP < 2cm)*: The prognostic value of reduced LV is limited.***
- **Growth measurement and Umbilical artery Dopplers should be reviewed and if abnormal manage as above.**
- **Rupture of membranes should be excluded.**
- **If isolated reduced DVP in the absence of membrane rupture referral should be made to consultant obstetrician. Repeat LV and Doppler should be performed weekly, and growth USS fortnightly**
- **Delivery plan should be made by consultant**

3. ASSOCIATED DOCUMENTS:

Small for Gestational Age Guideline
Management of Intrauterine Death Protocol

4. REFERENCES:

1 RCOG Greentop Guideline No 31- The Investigation and Management of the Small for Gestational Age Fetus. January 2014

2 Clausson B., Axelsson O., Cnattingius S.. Adverse outcomes in post-term births: the role of fetal growth restriction and malformations. *Obstet Gynecol* 1999;94: 758–762

3 McIntire D.D., Bloom S.L., Casey B.M., Leveno K.J.. Birth weight in relation to morbidity and mortality among newborn infants. *N Engl J Med* 1999;340: 1234–1238

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The Journal of Clinical Endocrinology & Metabolism, Volume 2007:92; 3; 804–810

1. Complete and file in handheld record at booking assessment
2. Update pathway and request any required ultrasound scans at time of fetal anomaly (FA) scan review
3. State the scan indication on the scan request as listed below (NB scans for any indication not listed; or deviating from suggested scanning schedule will need to be discussed directly between the consultant and ultrasound scan department)
4. Assess the fetal growth trajectory of plotted measurements from fetal anomaly scan and growth scans on charts overleaf

Risk Factor	TICK ¶	SGA Screening PATHWAY	REQUEST (initial)	Review of results
Large fibroids, 1 or more >6cm		**2 growth ultrasounds (30 and 36 weeks gestation)**		Midwife led
Maternal age>40yrs				Midwife led
Smoker with CO level 5ppm or more				Midwife led
Late bookers (at or after 21 weeks gestation)				Midwife led
PAPP-A <0.4MoM on 1st trimester screen (or hCG >4 or AFP>2.5 MoM on 2nd trimester screen)				Midwife led
Recurrent miscarriage clinic patient immediately prior to this pregnancy (ie no live children after 3 miscarriages)				Midwife led
Recurrent bleeding (similar to menses, not spotting)				Midwife led
Previous SGA (<10th centile at delivery)				Midwife led
Asthma requiring current use of oral steroids or recent hospital admission				Midwife led (with AN care input from named consultant)
Chronic hypertension				Midwife led (with AN care input from named consultant)
Chronic kidney disease (CKD)				Midwife led (with AN care input from named consultant)
Uterine anomaly				Midwife led (with AN care input from named consultant)
Substance misuse including alcohol				Midwife led (with AN care input from named consultant/PREPARE team)
BMI>40 or previous bariatric surgery				Metabolic Antenatal Clinic Team
Epilepsy on antiepileptic drugs (AEDs)				Midwife led (with AN care input from named consultant)
Newly diagnosed or uncontrolled hyperthyroidism		**3 growth ultrasounds at 28/32/36 weeks gestation**		Midwife led (with AN care input from named consultant)
Previous stillbirth (not associated with Fetal Growth Restriction [FGR] *see also below*)				Midwife led (with AN care input from named consultant)
SLE/Connective Tissue Disease				Midwife led (with AN care input from named consultant)
Eating disorder				Midwife led (with AN care input from named consultant)
Maternal Cardiac Disease				Cardiac Antenatal Clinic Team
Cystic fibrosis				Cystic fibrosis Team
Pre-existing Diabetes – Type 1&2				Diabetic Clinic Team
Positive Uterine Artery Dopplers (bilateral notching or mean PI >95th centile)		**Refer to fetal medicine for personalised growth assessment schedule**		Fetal Medicine Team
SGA (AC<10th centile) and/or Echogenic bowel and/or femur length <5th centile on FA scan (*sonographer to refer*)				Fetal Medicine Team
Sickle cell disease (not sickle cell trait)				Fetal Medicine Team
Severe early onset FGR in a previous pregnancy (delivery before 34 weeks for SGA and/or <3rd centile at delivery)				Fetal Medicine Team
Previous stillbirth (Birthweight <10th centile for gestation or pathology suggests placental insufficiency)				Fetal Medicine Team
Antiphospholipid syndrome				Fetal Medicine Team
None of the above?		**Measure SFH and plot at each ANC attendance >24wks. Refer for growth scan if** - Symphisio-fundal height <10th centile or static or falling SFH -Recurrent Antepartum Haemorrhage (2 bleeds >20 wk) -Pre-eclampsia/PIH -Reduced fetal movements		Midwife/named consultant or DAU team as appropriate Scan should be performed within 3 working days and results reviewed the same day

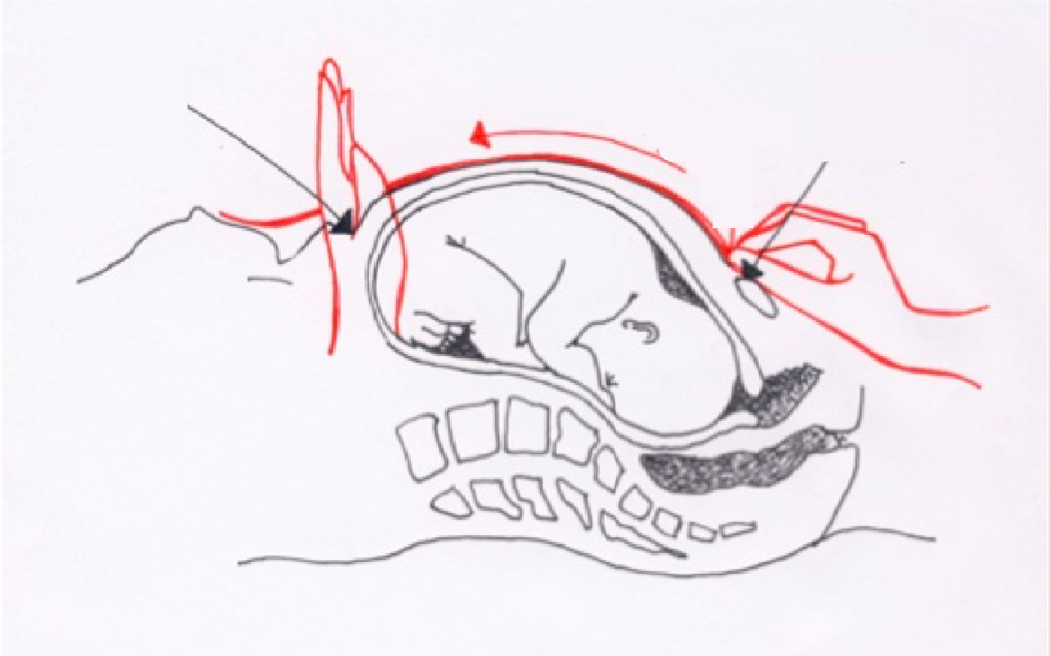
Appendix 1 above

This section to be completed by document control.

Appendix 2
Measuring and Plotting Symphysio-Fundal Height (SFH)

1. Explain the procedure to the mother, gain verbal consent, wash hands
2. The expectant mother should be in a semi-recumbent position (45 degree angle) on a firm surface, with an empty bladder and expose enough of the abdomen to allow thorough two handed palpation.
3. Use a non-elastic tape measure. Turn the tape measure over so no numbers are visible during the measurement.
4. With the palm of the other hand on the abdomen, pass the tape from the fundus of the uterus along the longitudinal axis of the uterus (not correcting to the midline) to the top of the symphysis pubis – the fixed point and more easily identified landmark.
5. Measure once only, and plot immediately on the chart for the right gestation (weeks and days) to the nearest half centimetre.
6. SFH measurements should not occur more frequently than every two weeks.

Ref. Belizan J, Villar J et al. Diagnosis of intrauterine growth retardation by a simple clinical method: Measurement of uterine height. Am J Obstet Gynecol 1978 131:6: 643-64



How to interpret results

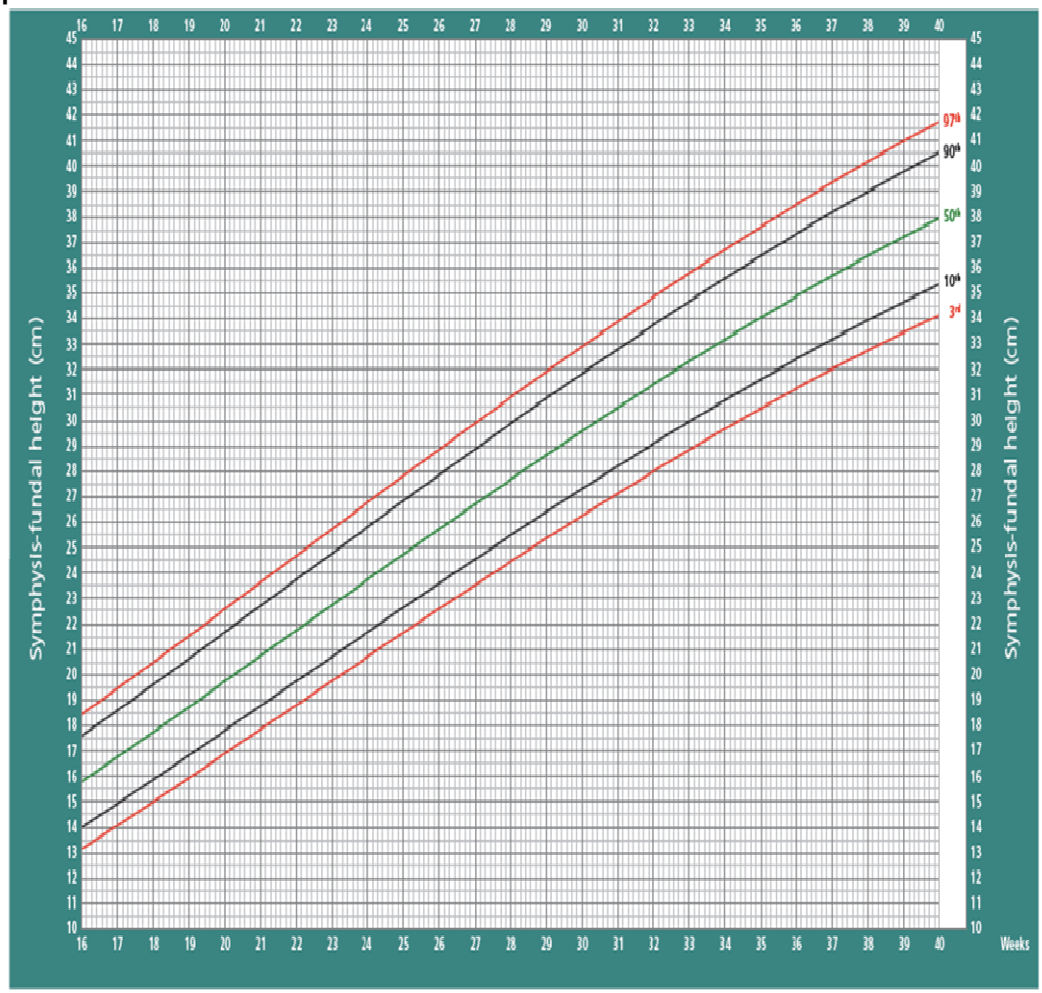
You **do not** need to allow for decent of the head. The curves do not flatten towards term; uncompromised babies should continue growing until delivery.

Symphysio-fundal height **at or above** 10th centile	Routine antenatal care with continued SFH monitoring
SFH i**ncreased** since last measurement*	
Symphysio-fundal height **<10th** centile	**Directly refer for ultrasound scan (should be performed within three working days)**
Static or falling SFH (2 weeks or more after previous measurement)	

*Accelerated growth trajectory is **not** an indication for growth scan referral. If clinical concerns about excessive growth discuss with named consultant.

This section to be completed by document control.

Appendix 3



SFH <10th centile before 28 weeks

Women are generally assessed at 22 and 28 weeks by community midwife (CMW). Occasionally symphysial fundal height (SFH) is measured in between. SGA guidance suggests ultrasound growth measurements are required if SFH<10th centile at gestations from 24+0 weeks.
It should be remembered that absolute SFH < 24wks is more indicative of maternal BMI than fetal size and should NOT routinely be plotted. It is the trend of SFH growth that is important. If a CMW has clinical concern the below is a guide for review.

If SFH <10th centile suggest:
22-23 weeks: review growth measurements at anomaly US. If AC >10th centile consider repeat SFH at 25wks
≥24 weeks: if <10th centile refer for growth US

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This section to be completed by document control.

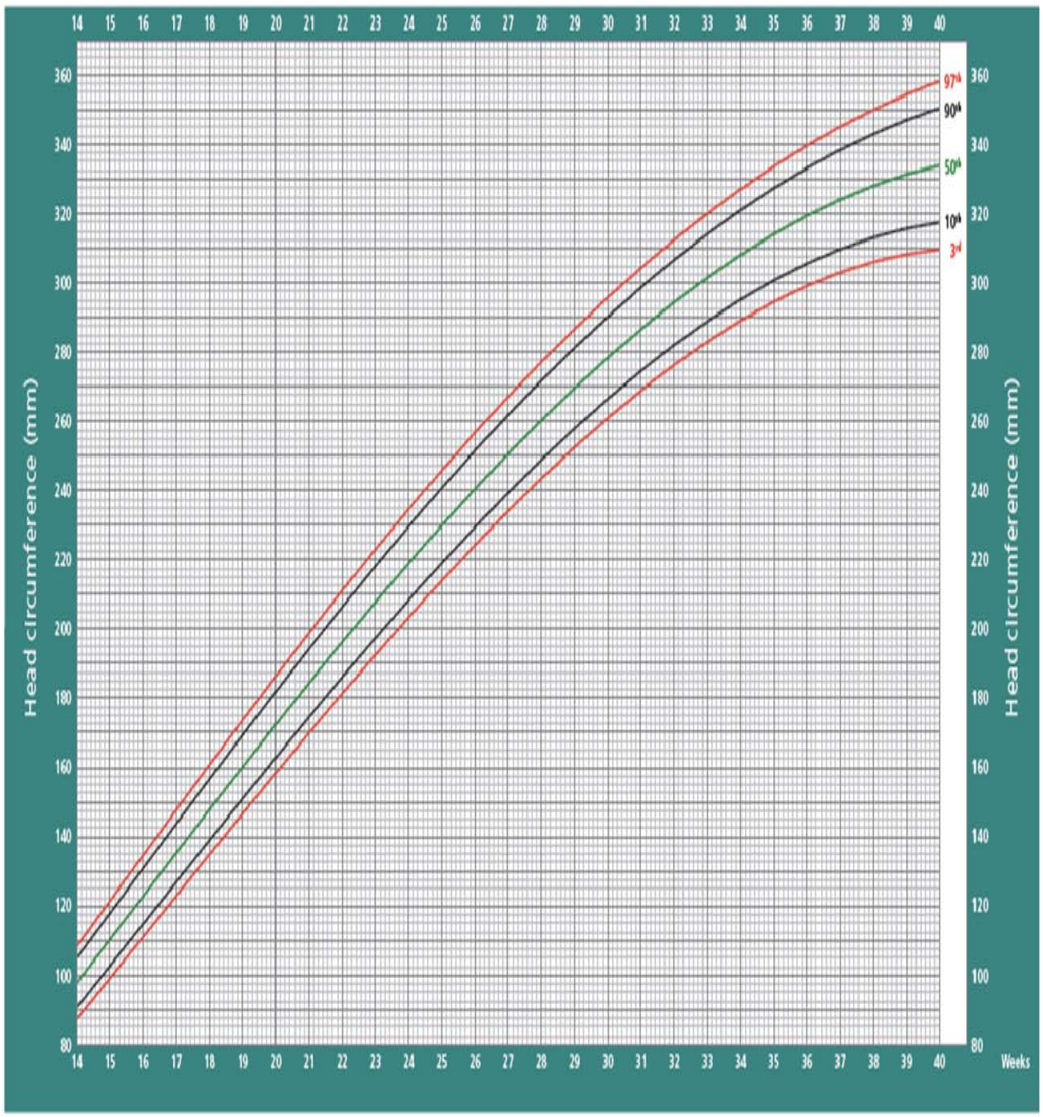
Appendix 4
Plotting Ultrasound Results

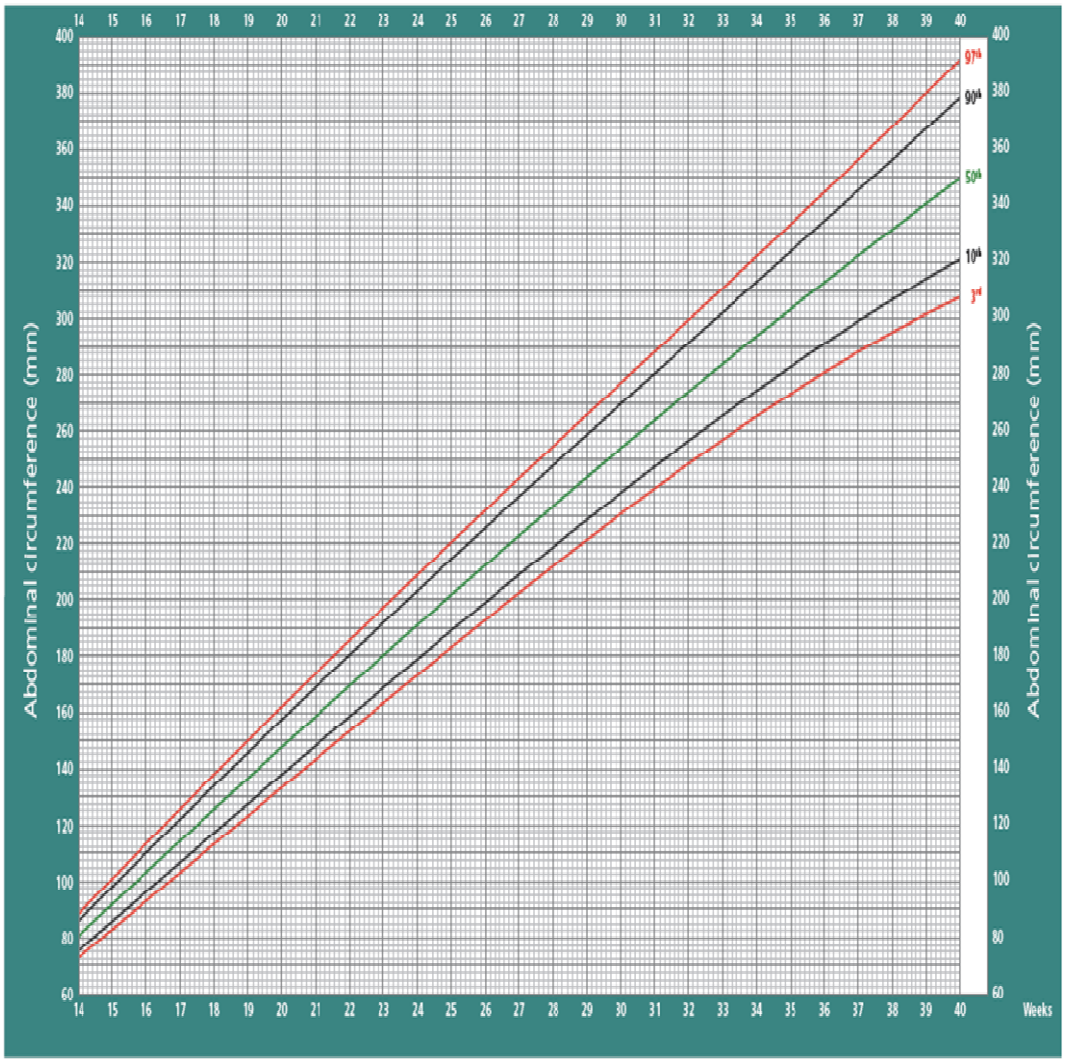
1. Plot HC and AC for appropriate **weeks** and **days** gestation
2. **Ensure measurements from **fetal anomaly** ultrasound are plotted for comparison**

How to interpret results

- If AC is less than 10th centile or the trajectory is reduced (crossing >20 centiles) then refer to DAU / DBA/ consultant ANC
- If HC is less than 3rd centile then refer to fetal medicine
- If ultrasound measurements are reassuring, continue routine antenatal care with SFH monitoring. If ongoing concern about SFH measurements **3 or more weeks** after ultrasound, refer for further scan and consultant review.

Appendix 5
Growth charts





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Appendix 6
3rd/ 10th centile table

This table below contains the weight in grams of a baby born on the 10th centile according to gestation and gender. Please use this table to assist completion of the risk assessment in appendix 1.

Gestation	Girls (10th centile)	Girls (3rd centile)	Boys (10th centile)	Boys (3rd centile)
23-23+6	425g	350g	475g	400g
24 – 24+6	500g	400g	550g	475g
25 – 25+6	575g	475g	625g	550g
26 – 26+6	650g	525g	700g	600g
27 – 27+6	725g	600g	775g	675g
28 – 28+6	800g	675g	875g	750g
29 – 29+6	900g	750g	975g	825g
30 – 30+6	1000g	850g	1075g	925g
31 – 31+6	1150g	950g	1200g	1025g
32 – 32+6	1300g	1075g	1350g	1150g
33 – 33+6	1450g	1250g	1550g	1300g
34 – 34+6	1650g	1400g	1750g	1475g
35 – 35+6	1850g	1600g	1950g	1675g
36 – 36+6	2050g	1800g	2150g	1875g
37 – 37+6	2275g	2000g	2375g	2075g
38 – 38+6	2475g	2200g	2575g	2275g
39 – 39+6	2675g	2400g	2775g	2475g
40 – 40+6	2850g	2600g	2950g	2675g
41 – 41+6	3000g	2750g	3100g	2800g
42 – 42+6	3150g	2900g	3250g	2950g

This section to be completed by document control.

Small-for-Gestational-Age detection and management: including indications for growth scans (singleton pregnancies)

Maternity Services Lothian Guidelines

1. INTRODUCTION:

Babies that have not achieved specific growth parameters by their gestation are small-for-gestational-age (SGA). These babies have increased incidence of stillbirth [1], complications in labour (eg intrapartum hypoxia) [2], neonatal problems [3], and poorer adult health [4].

The definition in Lothian for SGA is abdominal circumference or birthweight lessthan 10th centile.

SGA includes babies that are constitutively small and those with fetal growth restriction (FGR). FGR is the term used for fetuses that have not achieved their growth potential and is caused by placental dysfunction. FGR fetuses are at highest risk of complications.Not all fetuses that have FGR are SGA, but they are all at risk of poor outcomes[1].

In the antenatal period, screening for SGA and FGR is based on clinical assessment through symphysis fundal height [SFH] measurement. Diagnosis of SGA and FGR is byultrasound.

Detection of SGA and FGR is difficult – but the aim is to detect and monitor these babies and deliver them at a time that minimises risk. Decisions to deliver may be complex (particularly at early gestations) and should be made by a consultant obstetrician, in conjunction with fetal medicine and neonatology as appropriate.

2. AIM:

To provide guidance on
1. identifying women at risk of SGA,
2. clinical detection of SGA through SFH measurement
3. when to request growth ultrasound scans
4. management of babies with SGA

3. GUIDELINES:

Summary

1. **Gestation should be checked using the date estimated at booking scan performed at 11.0-13.6 weeks and recorded in TRAK**

2. **Risk factors for SGA should be assessed at booking and the screening pathway for SGA filled out and recorded in woman's record (see appendix 1).Ultrasounds should be requested at the fetal anomaly scan review visit.**

3. **Symphysio-fundal height measurement (SFH) should be measured at each antenatal attendance (including triage and day assessment) after 24 weeks, but not more often than every 2 weeks, and recorded on SFH charts in handheld records. If SFH static or falling then referral for growth scan should be made.**

4. **In certain women SFH measurement is inaccurate (eg BMI>40; large fibroids) –and these should be referred for growth scans.**

5. **Women referred for growth scans should have measurement of abdominal circumference (AC) and head circumference (HC) plotted on growth charts. AC and HC from fetal anomaly (20 week) scan must also be plotted and comparison should be made to these.**

6. **Women at very high risk of FGR; and those with FGR suspected by ultrasoundscan should be referred to/discussed with fetal medicine to arrange additional surveillance.**

7. **Growth scans are less accurate after 38 weeks gestation. If there is clinical concern about SGA beyond 38 weeks gestation then refer to day assessment unit for CTG, Doppler and liquor volume (deepest vertical pool) and/or discusswith senior trainee/consultant about timing of delivery.**

i). Referral for growth scans

Formal risk assessment should be made BY MIDWIFE BY 16-20 weeks and women referred as appropriate. If there is a concern or maternal condition which is not included below or in the risk assessment table, please contact the patient's namedconsultant for an individual management plan.

A. WOMEN UNSUITABLE FOR MONITORING BY FUNDAL HEIGHT

Large fibroids, 1 or more >6cm
BMI>40

-> Two growth scans should be requested at 30 and 36 weeks gestation

NB Women with multiple pregnancies should follow the multiple pregnancy carepathway

B. WOMEN WITH RISK Factors for SGA

Maternal age>40yrs
Smoker with CO level 5ppm or more
Substance misuse including alcohol
Previous SGA (<10th centile for birthweight -*see appendix 6 for 10th centile birthweight*)
Chronic hypertension
Chronic kidney disease
Recurrent bleeding (similar to menses, not spotting)
PAPP-A<0.4MOM on first trimester screen (or hCG >4 or AFP>2.5 MoM on second trimester screen)
Recurrent miscarriage clinic patient immediately prior to this pregnancy (i.e. no live children after miscarriages)
Late bookers (at or after 21 weeks gestation)
Asthma requiring current use of oral steroids or recent hospital admission
Uterine anomaly
Previous bariatric surgery/ BMI 40
Epilepsy on antiepileptic drugs (AED)

-> Two growth scans should be requested, one at 30 weeks gestation and one at 36 weeks gestation

Newly diagnosed or uncontrolled hyperthyroidism
Previous stillbirth (not associated with Fetal Growth Restriction [FGR] see also below)
SLE/Connective Tissue Disease
Eating disorder
Maternal Cardiac Disease
Cystic fibrosis
Diabetes – Pre-existing- Type 1&2

-> Three growth scans should be requested, at 28, 32 and 36 weeks gestation

C. WOMEN AT VERY HIGH RISK FGR

SGA (<10th centile) and/or Echogenic bowel and/or femur length <5th centile on FA scan (sonographer to refer)
Previous stillbirth with FGR (<10th centile for gestation or pathology suggests placental insufficiency)
Severe early onset FGR in a previous pregnancy (delivery before 34 weeks for growthrestriction and/or SGA <3rd centile at delivery)
Antiphospholipid syndrome
Positive Uterine Artery Dopplers (bilateral notching or mean PI >95th centile)
Sickle cell disease (NOT sickle cell trait)

-> should be referred to fetal medicine for personalised growth scan schedule

D. WOMEN WHO DEVELOP PREGNANCY COMPLICATIONS

Symphysio-fundal height (SFH) <10th centile or static or falling SFH
Recurrent Antepartum Haemorrhage (2 bleeds >20 wk)
Pre-eclampsia/PIH
Reduced fetal movements (RFMs)

➔ A growth scan should be requested.
➔ The Scan should be performed within 3 working days and results reviewed thesame day
➔ A further growth scan should be arranged 3 weeks later for comparison of growth trajectory

NB: Growth scans may be performed until a gestation of 40+0 weeks. Clinical concerns beyond 37wks may also necessitate DAU/ OTA review for CTG eg. RFMs

ii) Management of growth scan results

Women referred for growth ultrasound should have measurement of abdominal circumference (AC) and head circumference (HC) plotted on growth charts and placed in the notes.

- AC and HC should be plotted from fetal anomaly (20 week USS) and comparison should be made to these.
- Liquor volume (LV) should also be documented (normal/abnormal) Deepest Vertical Pool (DVP) should be recorded for abnormal results.
- Management should be directed as below

Normal USS results
AC is ≥10th centile, growth velocity maintained compared to previousscan(s), and LV normal (DVP ≥ 2cm)

- **Women should be referred back to routine antenatal care.**
- **SFH measurements should continue. If there is ongoing clinical concern a second growth ultrasound should be requested 3-4 weekslater.**

Abnormal USS results:
- ***SGA or suspected FGR:* All women in who AC <10th centile or AC is crossing centiles (20 or more) from previous scan/ fetal anomaly scan**
  - ***Should have umbilical artery Doppler performed and ResistanceIndex (RI) plotted on chart at time of scan***
  - ***Should be reviewed within 24 hours • DAU, DBU or ANC anddiscussed with consultant or senior trainee***

- **If umbilical artery flow is < 95th centile (ie normal) but growth velocityreduction significant, or <10th centile**
  - **Refer to fetal medicine for surveillance**
  - **Fetal medicine growth surveillance and wellbeing scans will bearranged**
  - **These will include relevant fetal Dopplers (eg Ductus venosusDopplers for severe early onset FGR; and/or Middle Cerebral Artery Doppler in cases >32 weeks)**
  - **Delivery is recommended at 37 weeks or sooner if monitoringdeteriorates**

- **If umbilical artery RI is > 95th centile (abnormal) but there is positiveflow**
  - **If ≥37 weeks gestation discuss with consultant regarding timingof delivery (delivery should be offered)**
  - **If <37 weeks gestation refer to fetal medicine for plans forongoing fetal surveillance and delivery planning. This will include twice weekly Umbilical artery +/- CTG.**
  - **If there is absent or reversed end diastolic flow (EDF)**
- **If gestational age is >32 weeks offer antenatal corticosteroids and magnesium sulphate as per protocoland arrange delivery**
- **If <32 weeks refer to fetal medicine for ongoing fetal surveillance with ultrasound and Dopplers (umbilical,MCA, DV) and delivery planning.**

➔ ***Isolated reduced LV*** **(DVP < 2cm)*: The prognostic value of reduced LV is limited.***
  - **Growth measurement and Umbilical artery Dopplers should bereviewed and if abnormal manage as above.**
  - **Rupture of membranes should be excluded.**
  - **If isolated reduced DVP in the absence of membrane rupture referral should be made to consultant obstetrician. Repeat LVand Doppler should be performed weekly, and growth USS fortnightly**
  - **Delivery plan should be made by consultant**

4. ASSOCIATED DOCUMENTS:

Small for Gestational Age Guideline Management of Intrauterine Death Protocol

5. REFERENCES:

1 RCOG Greentop Guideline No 31- The Investigation and Management of the Small forGestational Age Fetus. January 2014

2 Clausson B., Axelsson O., Cnattingius S.. Adverse outcomes in post-term births: the role of fetalgrowth restriction and malformations. *Obstet Gynecol* 1999;94: 758–762

3 McIntire D.D., Bloom S.L., Casey B.M., Leveno K.J.. Birth weight in relation to morbidity andmortality among newborn infants. *N Engl J Med* 1999;340: 1234–1238

4 P. E. Clayton S. Cianfarani P. Czernichow G. Johannsson R. Rapaport A. Rogol Management of the Child Born Small for Gestational Age through to Adulthood: A ConsensusStatement of the International Societies of Pediatric Endocrinology and the Growth HormoneResearch Society *The Journal of Clinical Endocrinology & Metabolism*, Volume 2007:92; 3; 804–810

Author 1: Lothian Guideline Group

Appendix 1 SGA risk assessment in handheld notes

Risk assessment and screening pathway for SGA

1. Complete and file in handheld record at booking assessment
2. Update pathway and request any required ultrasound scans at time of fetal anomaly (FA) scan review
3. State the scan indication on the scan request as listed below (NB scans for any indication not listed; or deviating from suggested scanning schedule will need to be discussed with ultrasound department at the RIE or SJH
4. Assess the fetal growth trajectory of plotted measurements from fetal anomaly scan and growth scans on charts overleaf

Risk Factor	TICK ▮	SGA Screening PATHWAY	REQUEST (initial)	Review of results
Large fibroids, 1 or more >6cm		2 growth ultrasounds (30 and 36 weeks gestation)		Midwife led
Maternal age>40yrs				Midwife led
Smoker with CO level 5ppm or more				Midwife led
Late bookers (at or after 21 weeks gestation)				Midwife led
PAPP-A <0.4MoM on 1st trimester screen (or hCG >4 or AFP>2.5 MoM on 2nd trimester screen)				Midwife led
Recurrent miscarriage clinic patient immediately prior to this pregnancy (i.e. no live children after 3 miscarriages)				Midwife led
Recurrent bleeding (similar to menses, not spotting)				Midwife led
Previous SGA (<10th centile at delivery)				Midwife led
Asthma requiring current use of oral steroids or recent hospital admission		2 growth ultrasounds (30 and 36 weeks gestation)		Midwife led (with AN care input from named consultant)
Chronic hypertension				Midwife led (with AN care input from named consultant)
Chronic kidney disease (CKD)				Midwife led (with AN care input from named consultant)
Uterine anomaly				Midwife led (with AN care input from named consultant)
Substance misuse including alcohol				Midwife led (with AN care input from named consultant/PREPARE team)
BMI>40 or previous bariatric surgery				Metabolic Antenatal Clinic Team
Newly diagnosed or uncontrolled hyperthyroidism		3 growth ultrasounds at 28/32/36 weeks gestation		Midwife led (with AN care input from named consultant)
Previous stillbirth (not associated with Fetal Growth Restriction [FGR] *see also below*)				Midwife led (with AN care input from named consultant)
SLE/Connective Tissue Disease				Midwife led (with AN care input from named consultant)
Eating disorder				Midwife led (with AN care input from named consultant)
Maternal Cardiac Disease				Cardiac Antenatal Clinic Team
Cystic fibrosis				Cystic fibrosis Team
Pre-existing Diabetes – Type 1&2				Diabetic Clinic Team
Positive Uterine Artery Doppler's (bilateral notching or mean PI >95th centile)		Refer to fetal medicine for personalized growth assessment schedule		Fetal Medicine Team
SGA (AC<10th centile) and/or Echogenic bowel and/or femur length <3rd centile on FA scan (*sonographer to refer*)				Fetal Medicine Team
Sickle cell disease (not sickle cell trait)				Fetal Medicine Team
Severe early onset FGR in a previous pregnancy (delivery before 34 weeks for SGA and/or <3rd centile at delivery)				Fetal Medicine Team
Previous stillbirth (Birthweight <10th centile for gestation or pathology suggests placental insufficiency)				Fetal Medicine Team
Antiphospholipid syndrome				Fetal Medicine Team
None of the above				Routine FAS

For all pregnancies* measure SFH and plot overleaf at each antenatal attendance
*with exception of BMI >40 and large fibroids

If
- SFH is <10th centile or static or falling
- Recurrent APH (2 bleeds >20 wk)
- Pre-eclampsia / PIH
- Reduced fetal movements

→ Arrange growth scan (within 3 working days)
Review results on the same day
If >20 centile drop from FAS, contact DAU who will f/up
If normal growth, arrange f/up scan for 3 weeks time

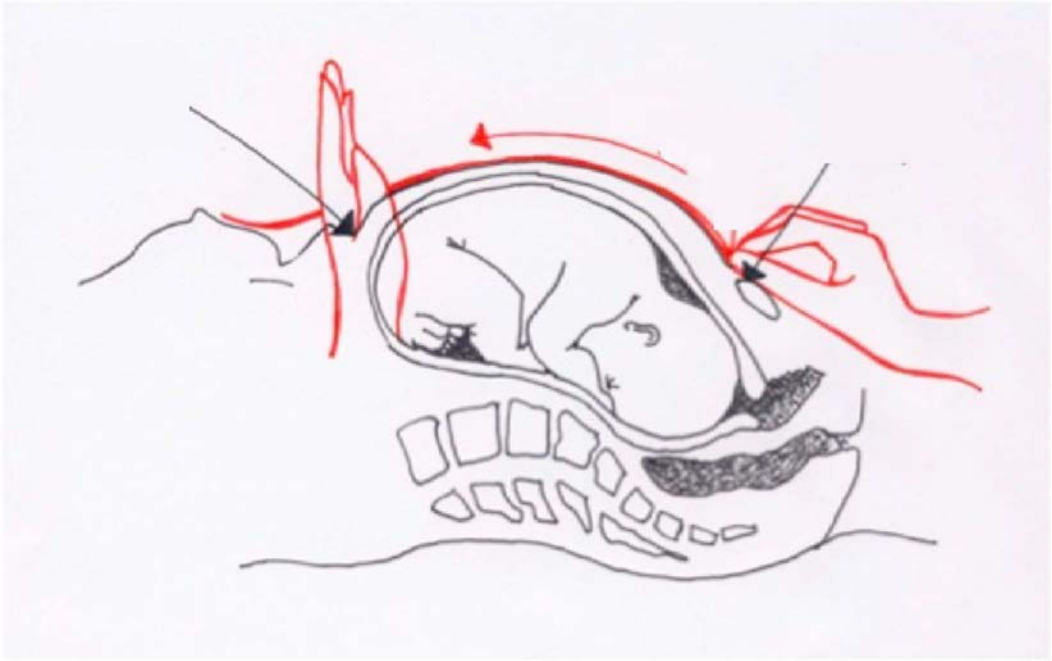
Note of actions taken

Guideline group approved: October 2021 V2

Appendix 2
Measuring and Plotting Symphysio-Fundal Height (SFH)

1. Explain the procedure to the mother, gain verbal consent, wash hands
2. The expectant mother should be in a semi-recumbent position (45 degree angle) on a firm surface, with an empty bladder and expose enough of the abdomen to allow thorough two handed palpation.
3. Use a non-elastic tape measure. Turn the tape measure over so no numbers are visible during the measurement.
4. With the palm of the other hand on the abdomen, pass the tape from the fundus of the uterus alongthe longitudinal axis of the uterus (not correcting to the midline) to the top of the symphysis pubis – the fixed point and more easily identified landmark.
5. Measure once only, and plot immediately on the chart for the right gestation (weeks and days) tothe nearest half centimetre.
6. SFH measurements should not occur more frequently than every two weeks.

Ref. Belizan J, Villar J et al. Diagnosis of intrauterine growth retardation by a simple clinical method: Measurement of uterine height. Am J Obstet Gynecol 1978 131:6: 643-64



How to interpret results

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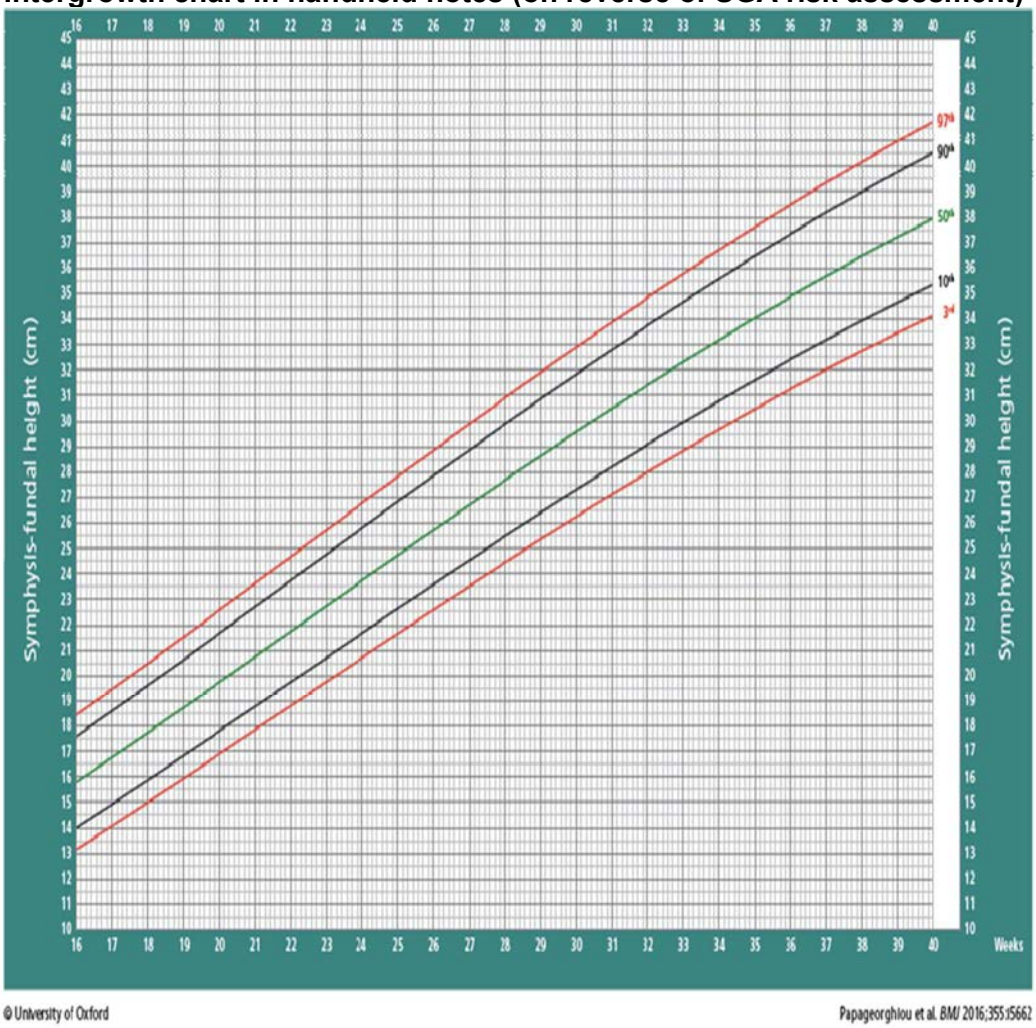
Symphysio-fundal height **at or above** 10thcentile	Routine antenatal care with continuedSFH monitoring
SFH i**ncreased** since last measurement*	
Symphysio-fundal height **<10th** centile	**Directly refer for ultrasound scan (sho ld be performed within threeworking days)**
Static or falling SFH (2 week or more after previous meas rement)	

*Accelerated growth trajectory is **not** an indication for growth scan referral. If clinical concerns about excessive growth discuss with named consultant.

Appendix 3 Intergrowth chart in handheld notes (on reverse of SGA risk assessment)



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1. Plot HC and AC for appropriate **weeks** and **days** gestation
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How to interpret results

- If AC is less than 10th centile or the trajectory is reduced (crossing >20 centiles) thenrefer to DAU / DBA/ consultant ANC
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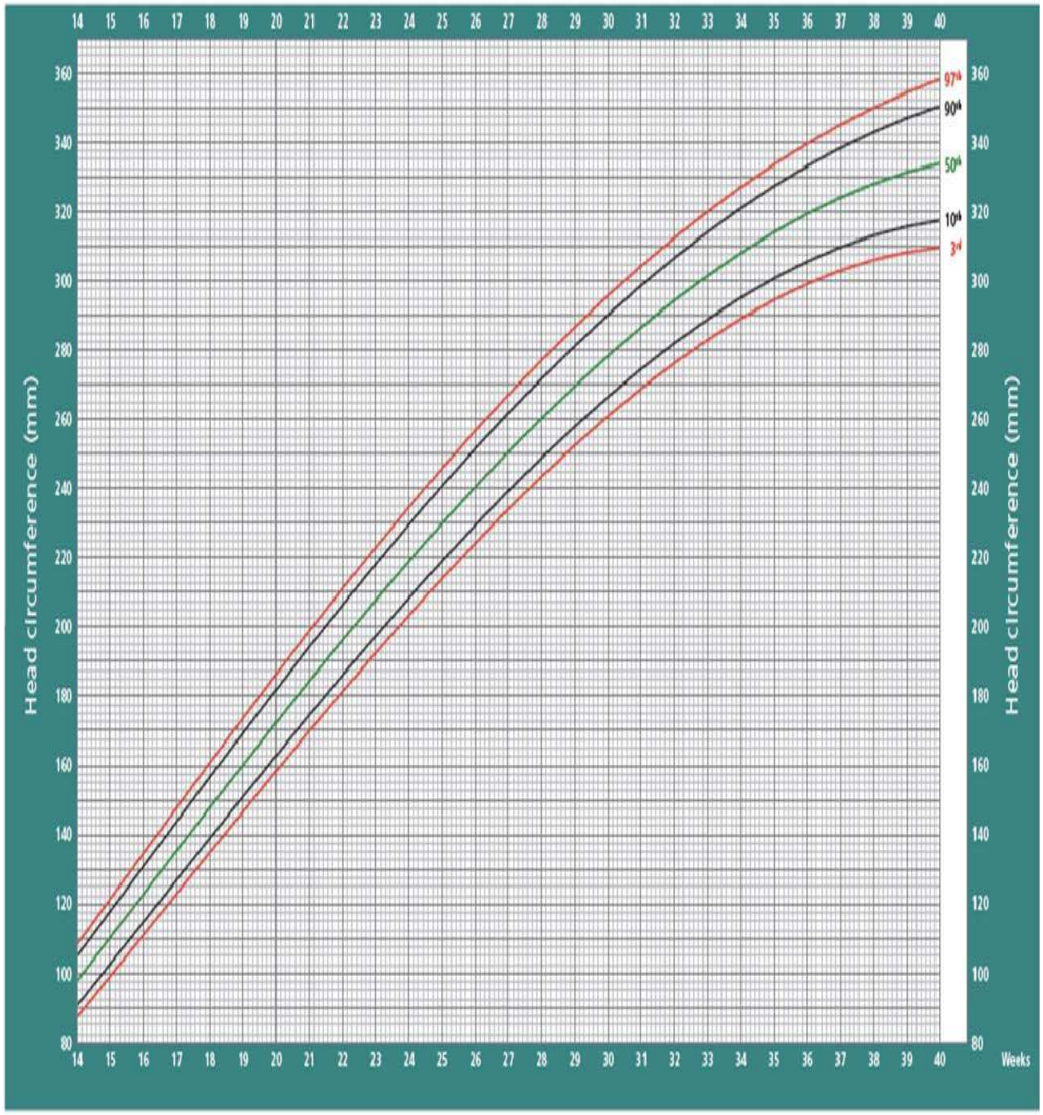
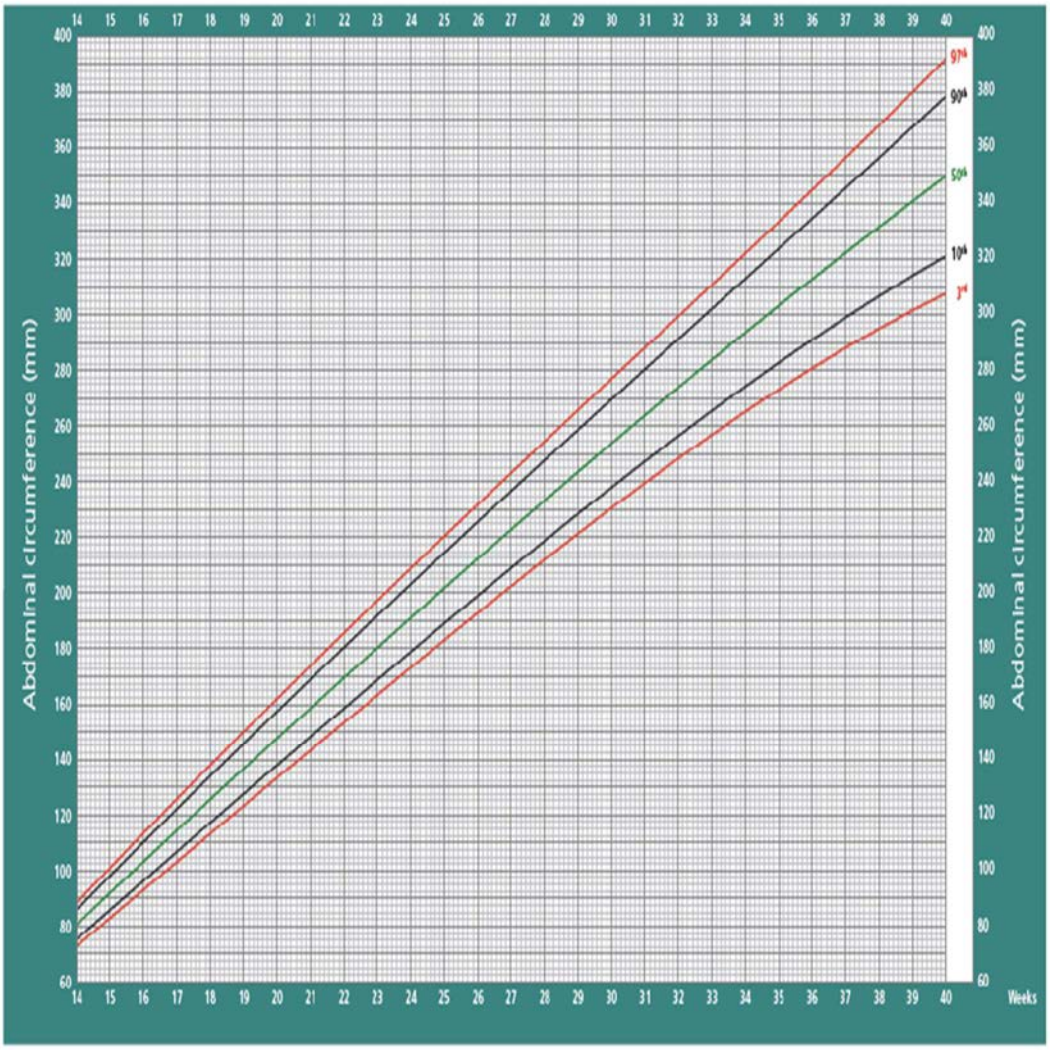
- If ultrasound measurements are reassuring, continue routine antenatal care with SFH monitoring. If ongoing concern about SFH measurements **3 or more weeks** after ultrasound, refer for further scan and consultant review.

Appendix 5 Growth charts





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34 – 34+6	1650g	1400g	1750g	1475g
35 – 35+6	1850g	1600g	1950g	1675g
36 – 36+6	2050g	1800g	2150g	1875g
37 – 37+6	2275g	2000g	2375g	2075g
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Maternity Services Lothian Guidelines

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In the antenatal period, screening for SGA and FGR is based on clinical assessment through symphysis fundal height [SFH] measurement. Diagnosis of SGA and FGR is byultrasound.

Detection of SGA and FGR is difficult – but the aim is to detect and monitor these babies and deliver them at a time that minimises risk. Decisions to deliver may be complex (particularly at early gestations) and should be made by a consultant obstetrician, in conjunction with fetal medicine and neonatology as appropriate.

2. AIM:

To provide guidance on
1. identifying women at risk of SGA,
2. clinical detection of SGA through SFH measurement
3. when to request growth ultrasound scans
4. management of babies with SGA

3. GUIDELINES:

Summary

1. **Gestation should be checked using the date estimated at booking scan performed at 11.0-13.6 weeks and recorded in TRAK**

2. **Risk factors for SGA should be assessed at booking and the screening pathway for SGA filled out and recorded in woman's record (see appendix 1).Ultrasounds should be requested at the fetal anomaly scan review visit.**

3. **Symphysio-fundal height measurement (SFH) should be measured at each antenatal attendance (including triage and day assessment) after 24 weeks, but not more often than every 2 weeks, and recorded on SFH charts in handheld records. If SFH static or falling then referral for growth scan should be made.**

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Maternal age>40yrs
Smoker with CO level 5ppm or more
Substance misuse including alcohol
Previous SGA (<10th centile for birthweight -*see appendix 6 for 10th centile birthweight*)
Chronic hypertension
Chronic kidney disease
Recurrent bleeding (similar to menses, not spotting)
PAPP-A<0.4MOM on first trimester screen (or hCG >4 or AFP>2.5 MoM on second trimester screen)
Recurrent miscarriage clinic patient immediately prior to this pregnancy (i.e. no live children after miscarriages)
Late bookers (at or after 21 weeks gestation)
Asthma requiring current use of oral steroids or recent hospital admission
Uterine anomaly
Previous bariatric surgery/ BMI 40
Epilepsy on antiepileptic drugs (AED)

-> Two growth scans should be requested, one at 30 weeks gestation and one at 36 weeks gestation

Newly diagnosed or uncontrolled hyperthyroidism
Previous stillbirth (not associated with Fetal Growth Restriction [FGR] see also below)
SLE/Connective Tissue Disease
Eating disorder
Maternal Cardiac Disease
Cystic fibrosis
Diabetes – Pre-existing- Type 1&2

-> Three growth scans should be requested, at 28, 32 and 36 weeks gestation

C. WOMEN AT VERY HIGH RISK FGR

SGA (<10th centile) and/or Echogenic bowel and/or femur length <5th centile on FA scan (sonographer to refer)
Previous stillbirth with FGR (<10th centile for gestation or pathology suggests placental insufficiency)
Severe early onset FGR in a previous pregnancy (delivery before 34 weeks for growthrestriction and/or SGA <3rd centile at delivery)
Antiphospholipid syndrome
Positive Uterine Artery Dopplers (bilateral notching or mean PI >95th centile)
Sickle cell disease (NOT sickle cell trait)

-> should be referred to fetal medicine for personalised growth scan schedule

D. WOMEN WHO DEVELOP PREGNANCY COMPLICATIONS

Symphysio-fundal height (SFH) <10th centile or static or falling SFH
Recurrent Antepartum Haemorrhage (2 bleeds >20 wk)
Pre-eclampsia/PIH
Reduced fetal movements (RFMs)

➔ A growth scan should be requested.
➔ The Scan should be performed within 3 working days and results reviewed thesame day
➔ A further growth scan should be arranged 3 weeks later for comparison of growth trajectory

NB: Growth scans may be performed until a gestation of 40+0 weeks. Clinical concerns beyond 37wks may also necessitate DAU/ OTA review for CTG eg. RFMs

ii) Management of growth scan results

Women referred for growth ultrasound should have measurement of abdominal circumference (AC) and head circumference (HC) plotted on growth charts and placed in the notes.

- AC and HC should be plotted from fetal anomaly (20 week USS) and comparison should be made to these.
- Liquor volume (LV) should also be documented (normal/abnormal) Deepest Vertical Pool (DVP) should be recorded for abnormal results.
- Management should be directed as below

Normal USS results
AC is ≥10th centile, growth velocity maintained compared to previousscan(s), and LV normal (DVP ≥ 2cm)

- **Women should be referred back to routine antenatal care.**
- **SFH measurements should continue. If there is ongoing clinical concern a second growth ultrasound should be requested 3-4 weekslater.**

Abnormal USS results:
- ***SGA or suspected FGR:* All women in who AC <10th centile or AC is crossing centiles (20 or more) from previous scan/ fetal anomaly scan**
  - ***Should have umbilical artery Doppler performed and ResistanceIndex (RI) plotted on chart at time of scan***
  - ***Should be reviewed within 24 hours • DAU, DBU or ANC anddiscussed with consultant or senior trainee***
- **If umbilical artery flow is < 95th centile (ie normal) but growth velocityreduction significant, or <10th centile**
  - **Refer to fetal medicine for surveillance**

- **Fetal medicine growth surveillance and wellbeing scans will bearranged**
- **These will include relevant fetal Dopplers (eg Ductus venosusDopplers for severe early onset FGR; and/or Middle Cerebral Artery Doppler in cases >32 weeks)**
- **Delivery is recommended at 37 weeks or sooner if monitoringdeteriorates**

- **If umbilical artery RI is > 95th centile (abnormal) but there is positiveflow**
  - **If ≥37 weeks gestation discuss with consultant regarding timingof delivery (delivery should be offered)**
  - **If <37 weeks gestation refer to fetal medicine for plans forongoing fetal surveillance and delivery planning. This will include twice weekly Umbilical artery +/- CTG.**
  - **If there is absent or reversed end diastolic flow (EDF)**
- **If gestational age is >32 weeks offer antenatal corticosteroids and magnesium sulphate as per protocoland arrange delivery**
- **If <32 weeks refer to fetal medicine for ongoing fetal surveillance with ultrasound and Dopplers (umbilical,MCA, DV) and delivery planning.**

➔ ***Isolated reduced LV*** **(DVP < 2cm)*: The prognostic value of reduced LV is limited.***
- **Growth measurement and Umbilical artery Dopplers should bereviewed and if abnormal manage as above.**
- **Rupture of membranes should be excluded.**
- **If isolated reduced DVP in the absence of membrane rupture referral should be made to consultant obstetrician. Repeat LVand Doppler should be performed weekly, and growth USS fortnightly**
- **Delivery plan should be made by consultant**

4. ASSOCIATED DOCUMENTS:

Small for Gestational Age Guideline Management of Intrauterine Death Protocol

5. REFERENCES:

1 RCOG Greentop Guideline No 31- The Investigation and Management of the Small forGestational Age Fetus. January 2014

2 Clausson B., Axelsson O., Cnattingius S.. Adverse outcomes in post-term births: the role of fetalgrowth restriction and malformations. *Obstet Gynecol* 1999;94: 758–762

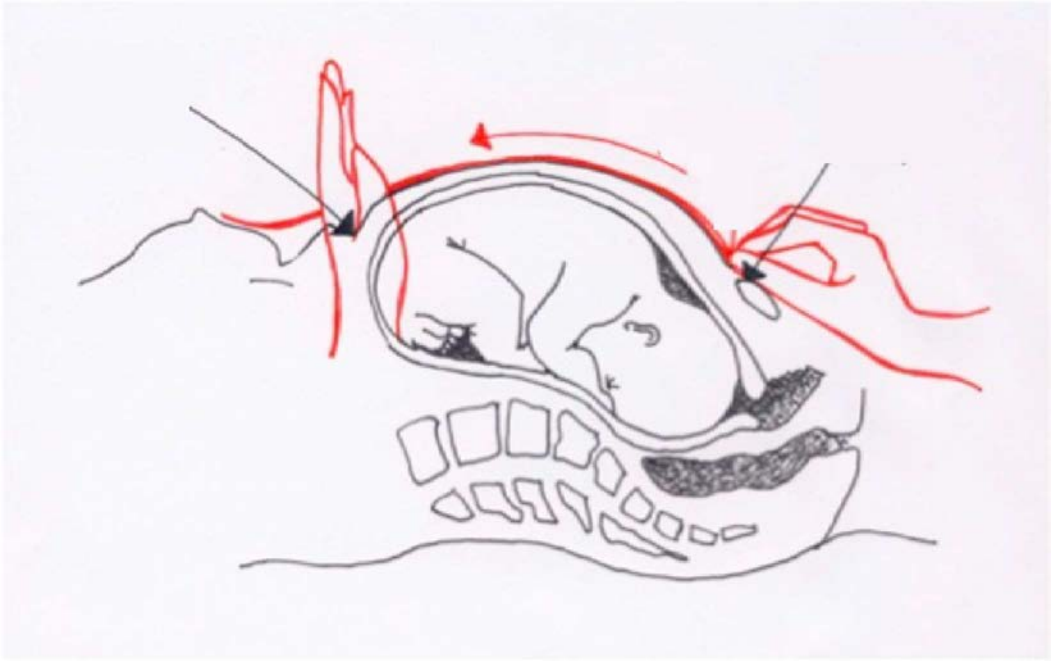
3 McIntire D.D., Bloom S.L., Casey B.M., Leveno K.J.. Birth weight in relation to morbidity andmortality among newborn infants. *N Engl J Med* 1999;340: 1234–1238

4 P. E. Clayton S. Cianfarani P. Czernichow G. Johannsson R. Rapaport A. Rogol Management of the Child Born Small for Gestational Age through to Adulthood: A ConsensusStatement of the International Societies of Pediatric Endocrinology and the Growth HormoneResearch Society *The Journal of Clinical Endocrinology & Metabolism*, Volume 2007:92; 3; 804–810

Appendix 2
Measuring and Plotting Symphysio-Fundal Height (SFH)

1. Explain the procedure to the mother, gain verbal consent, wash hands
2. The expectant mother should be in a semi-recumbent position (45 degree angle) on a firm surface, with an empty bladder and expose enough of the abdomen to allow thorough two handed palpation.
3. Use a non-elastic tape measure. Turn the tape measure over so no numbers are visible during the measurement.
4. With the palm of the other hand on the abdomen, pass the tape from the fundus of the uterus alongthe longitudinal axis of the uterus (not correcting to the midline) to the top of the symphysis pubis – the fixed point and more easily identified landmark.
5. Measure once only, and plot immediately on the chart for the right gestation (weeks and days) tothe nearest half centimetre.
6. SFH measurements should not occur more frequently than every two weeks.

Ref. Belizan J, Villar J et al. Diagnosis of intrauterine growth retardation by a simple clinical method: Measurement of uterine height. Am J Obstet Gynecol 1978 131:6: 643-64



How to interpret results

You **do not** need to allow for decent of the head. The curves do not flatten towards term; uncompromised babies should continue growing until delivery.

Symphysio-fundal height **at or above** 10thcentile	Routine antenatal care with continuedSFH monitoring
SFH i**ncreased** since last measurement*	
Symphysio-fundal height **<10th** centile	**Directly refer for ultrasound scan (sho ld be performed within threeworking days)**
Static or falling SFH (2 week or more after previous meas rement)	

*Accelerated growth trajectory is **not** an indication for growth scan referral. If clinical concerns about excessive growth discuss with named consultant.

Patient Name:	DOB: / /	CHI number:

NHS Lothian

Maternity Service Risk Assessment and Screening Pathway - Small for Gestational Age (SGA)

1. Complete and file in handheld record at booking assessment
2. Update pathway and request any required ultrasound scans at the time of Fetal Anomaly (FA) scan review
3. State the scan indication on the Scan Request Form as listed below (N.B. scans for any indication not listed; or deviating from the suggested scanning schedule will need to be discussed with the Ultrasound department at the RIE or SJH)
4. Assess the fetal growth trajectory of plotted measurements from FA scan and growth scans on the chart overleaf

Risk Factors	Tick	SGA Screening Pathway	Request (initials)	Review of Results
Large fibroids, 1 or more over 6cm	☐	**2 growth ultrasounds at (30 and 36 weeks gestation)**		Midwife led
Maternal age over 40yrs	☐			
Smoker with CO level 5ppm or more	☐			
Late bookers (at or after 21 weeks gestation)	☐			
PAPP-A less than 0.4MoM on 1st trimester screen (or hCG more than 4 or AFP more than 2.5MoM on 2nd trimester screen)	☐			
Recurrent miscarriage clinic patient immediately prior to this pregnancy (i.e. no live children after 3 miscarriages)	☐			
Recurrent bleeding (similar to menses, not spotting)	☐			
Previous SGA (less than 10th centile at delivery)	☐			
Asthma requiring current use of oral steroids or recent hospital admission	☐	**2 growth ultrasounds at (30 and 36 weeks gestation)**		Midwife led (with AN care input from named consultant)
Chronic hypertension	☐			
Chronic kidney disease (CKD)	☐			
Uterine anomaly	☐			
Substance misuse including alcohol	☐			Midwife led (with AN care named consultant/PREPARE team)
BMI more than 40 or previous bariatric surgery	☐			Metabolic Antenatal Clinic Team
Newly diagnosed or uncontrolled hyperthyroidism	☐	**3 growth ultrasounds at 28/32/36 weeks gestation**		Midwife led (with AN care input from named consultant)
Previous stillbirth (not associated with Fetal Growth Restriction [FGR]	☐			
SLE/Connective Tissue Disease	☐			
Eating disorder	☐			
Maternal Cardiac Disease	☐			Cardiac Antenatal Clinic Team
Cystic fibrosis	☐			Cystic fibrosis Team
Pre-existing Diabetes – Type 1 and 2	☐			Diabetic Clinic Team
Positive Uterine Artery Doppler's (bilateral notching or mean Pulsatiity Index (PI) more than 95th centile)	☐	**Refer to Fetal Medicine Team for personalised growth assessment schedule**		Fetal Medicine Team
SGA (AC less than 10th centile) and/or Echogenic bowel and/or femur length less than 5th centile on FA scan *(sonographer to refer)*	☐			
Sickle cell disease (not sickle cell trait)	☐			
Severe early onset FGR in a previous pregnancy (delivery before 34 weeks for SGA and/or less than 3rd centile at delivery)	☐			
Previous stillbirth (Birthweight less than 10th centile for gestation or pathology suggests placental insufficiency)	☐			
Antiphospholipid syndrome	☐			
None of the above	☐			Routine Fetal Anomaly Scan

For all pregnancies (with the exception of a BMI over 40 and large fibroids) measure SFH and plot overleaf at each antenatal attendance.

If any of the following are present:

SFH is less than 10th centile static or falling
Recurrent APH (2x bleeds post 20 weeks)
Pre- Eclampsia/ PIH
Reduced fetal movements

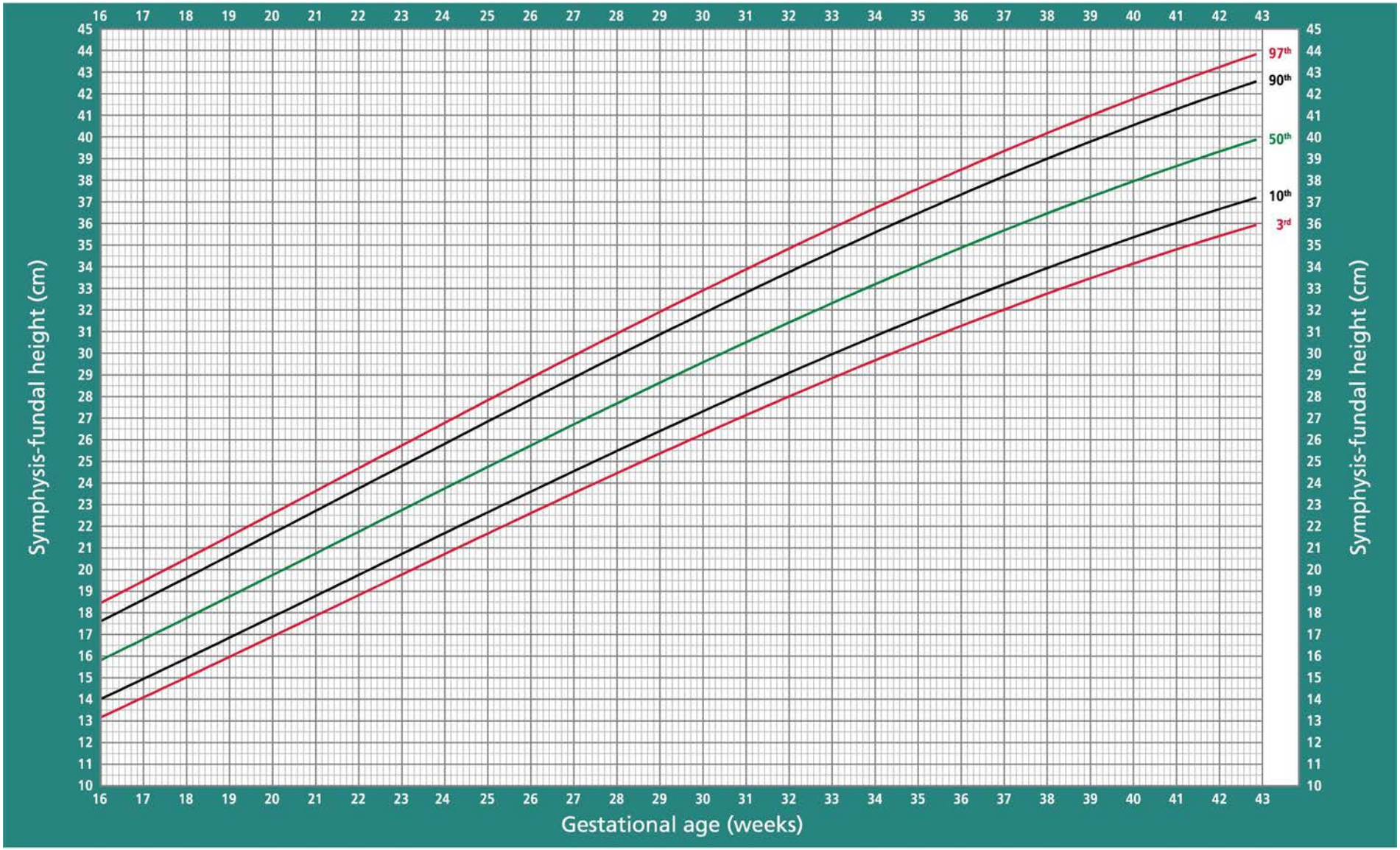
Actions:

Arrange for a growth scan (within 3 working days) and review results on the day of scan
> If more than 20 centile drop from FAS, contact DAU for follow up
> If normal growth, arrange a follow up scan for 3 weeks' time

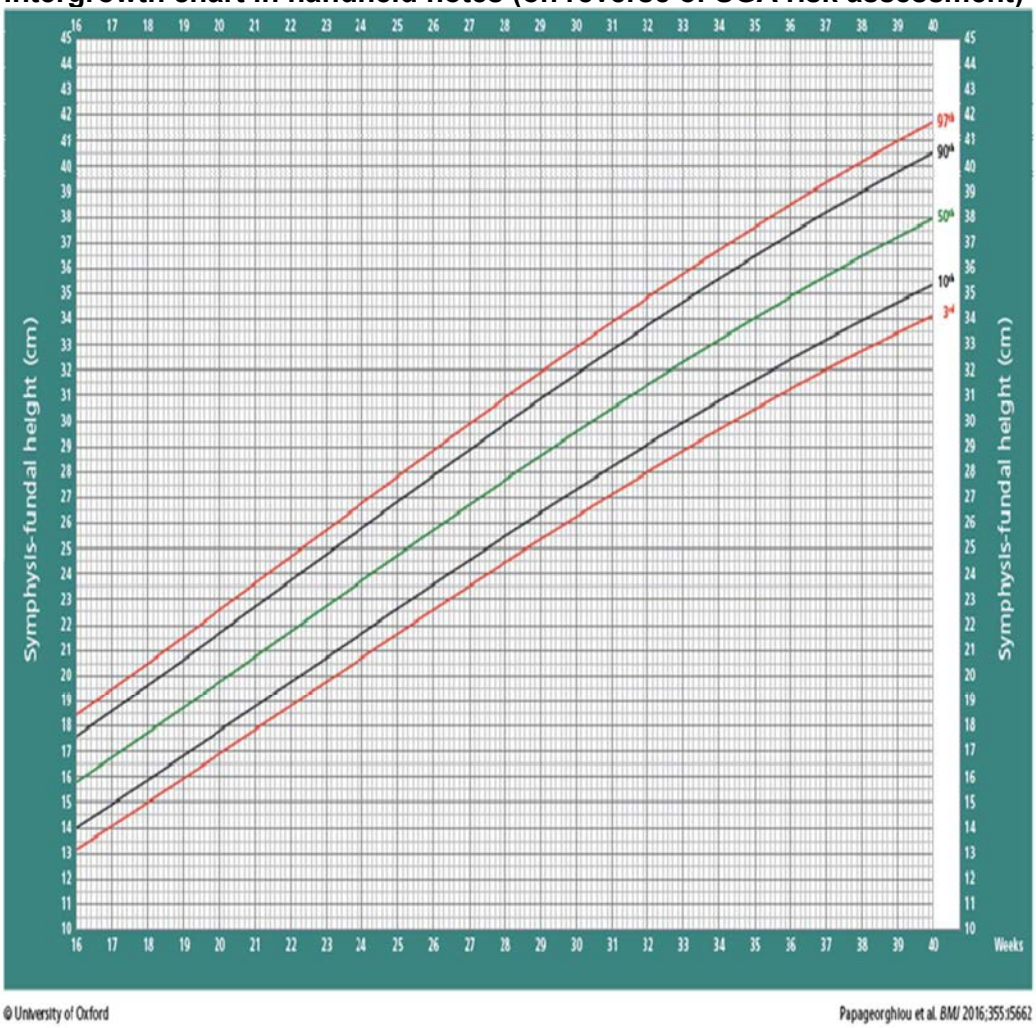
Note of any actions taken:

INTERGROWTH-21 st

International Symphysis-Fundal Height Standards



Appendix 3 Intergrowth chart in handheld notes (on reverse of SGA risk assessment)



SFH <10th centile before 28 weeks

Women are generally assessed at 22 and 28 weeks by community midwife (CMW). Occasionally symphysial fundal height (SFH) is measured in between. SGA guidance suggests ultrasound growth measurements are required if SFH<10th centile at gestations from4+0 weeks.
It should be remembered that absolute SFH < 24wks is more indicative of maternal BMI than fetal size and should NOT routinely be plotted. It is the trend of SFH growth that is important.If a CMW has clinical concern the below is a guide for review.

If SFH <10th centile suggest:
22-23 weeks: review growth measurements at anomaly US. If AC >10th centile considerrepeat SFH at 25wks
≥24 weeks: if <10th centile refer for growth US

RIE Fetal medicine 08/06/20

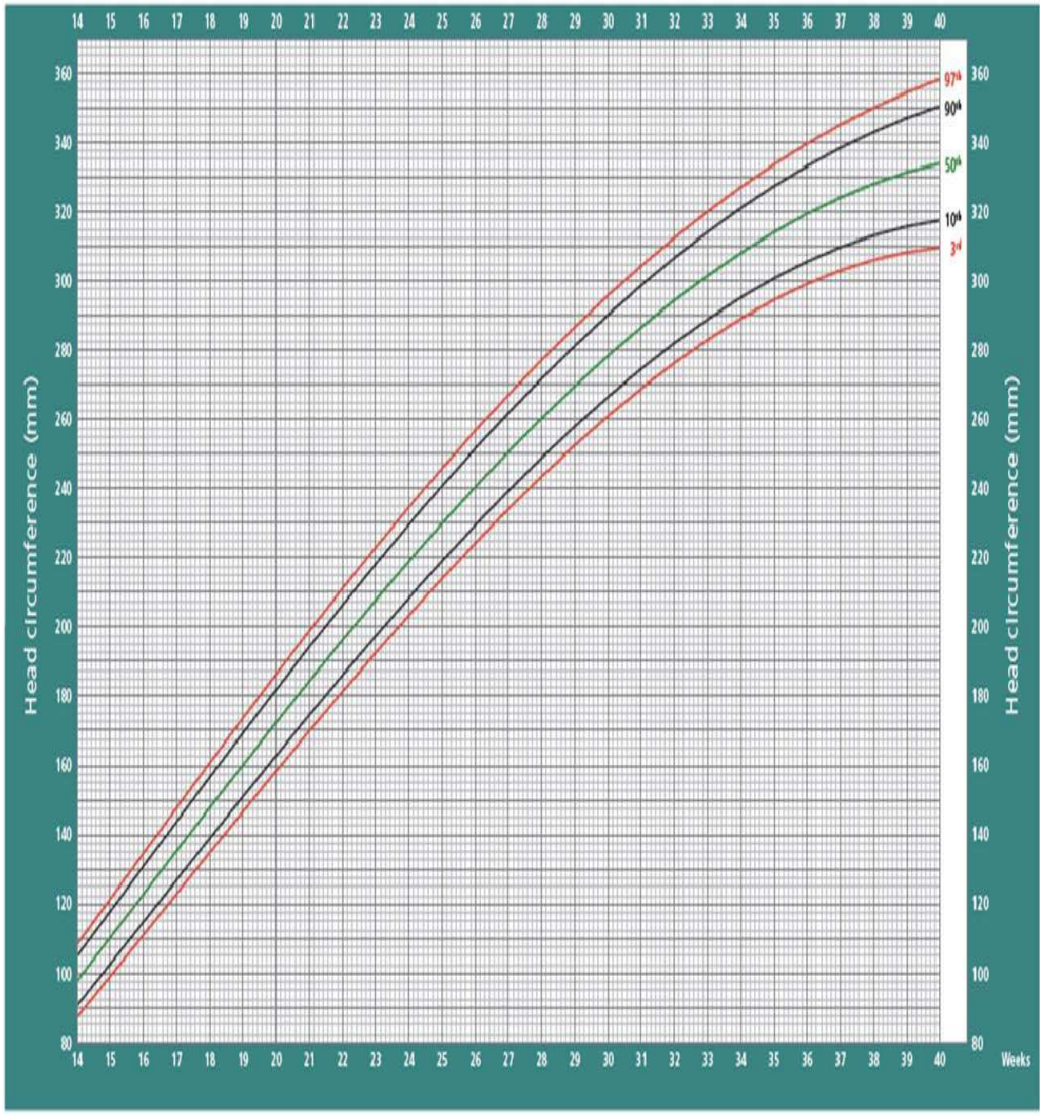
Appendix 4
Plotting Ultrasound Results

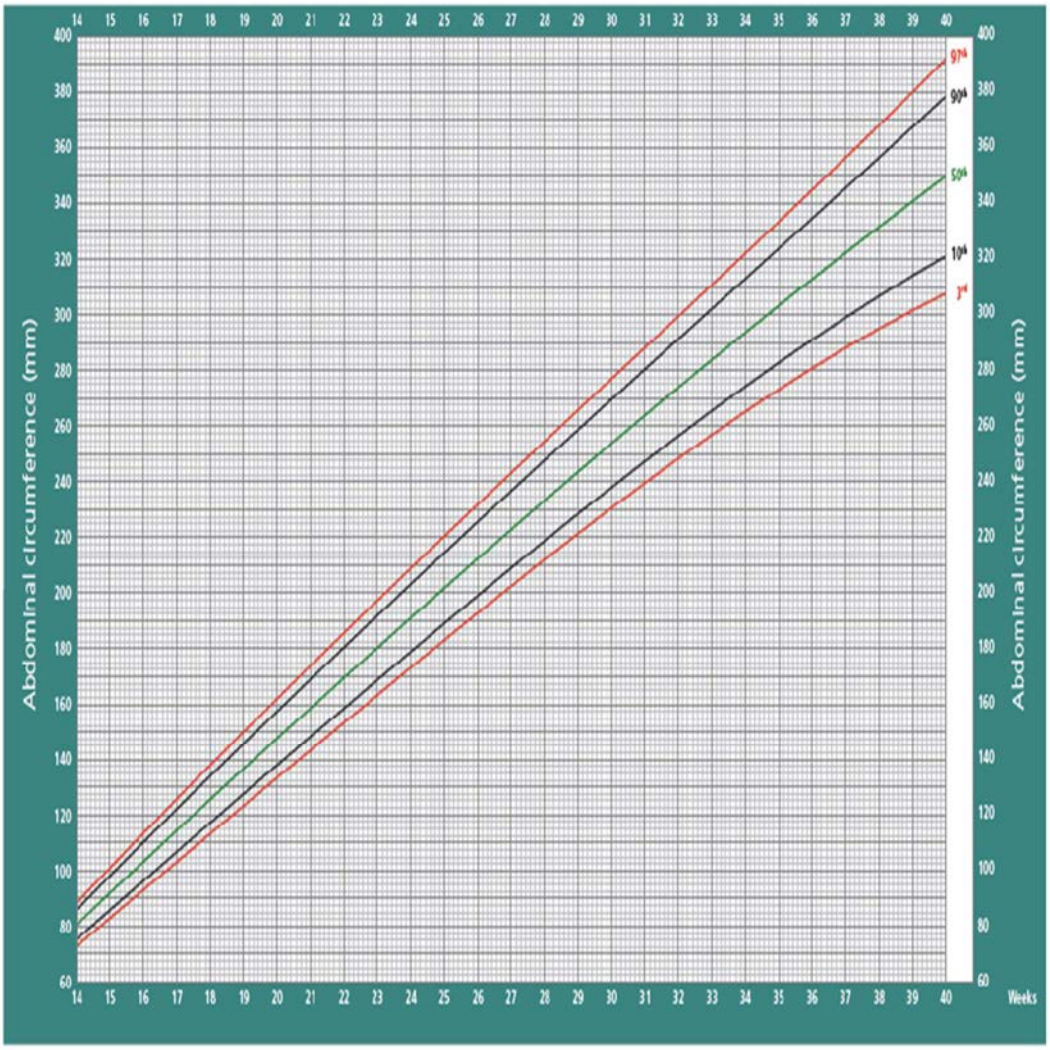
1. Plot HC and AC for appropriate **weeks** and **days** gestation
2. **Ensure measurements from **fetal anomaly** ultrasound are plotted for comparison**

How to interpret results

- If AC is less than 10th centile or the trajectory is reduced (crossing >20 centiles) thenrefer to DAU / DBA/ consultant ANC
- If HC is less than 3rd centile then refer to fetal medicine
- If ultrasound measurements are reassuring, continue routine antenatal care with SFH monitoring. If ongoing concern about SFH measurements **3 or more weeks** after ultrasound, refer for further scan and consultant review.

Appendix 5 Growth charts





Papageorghiou et al. Lancet 2014;384:869-79

Appendix 6
3rd/ 10th centile table

This table below contains the weight in grams of a baby born on the 10th centile according to gestation and gender. Please use this table to assist completion of the risk assessment in appendix 1.

Gestation	Girls (10th centile)	Girls (3rd centile)	Boys (10th centile)	Boys (3rd centile)
23-23+6	425g	350g	475g	400g
24 – 24+6	500g	400g	550g	475g
25 – 25+6	575g	475g	625g	550g
26 – 26+6	650g	525g	700g	600g
27 – 27+6	725g	600g	775g	675g
28 – 28+6	800g	675g	875g	750g
29 – 29+6	900g	750g	975g	825g
30 – 30+6	1000g	850g	1075g	925g
31 – 31+6	1150g	950g	1200g	1025g
32 – 32+6	1300g	1075g	1350g	1150g
33 – 33+6	1450g	1250g	1550g	1300g
34 – 34+6	1650g	1400g	1750g	1475g
35 – 35+6	1850g	1600g	1950g	1675g
36 – 36+6	2050g	1800g	2150g	1875g
37 – 37+6	2275g	2000g	2375g	2075g
38 – 38+6	2475g	2200g	2575g	2275g
39 – 39+6	2675g	2400g	2775g	2475g
40 – 40+6	2850g	2600g	2950g	2675g
41 – 41+6	3000g	2750g	3100g	2800g
42 – 42+6	3150g	2900g	3250g	2950g

1. INTRODUCTION:

Small for gestational age

Babies that have biometry (abdominal circumference (AC), head circumference (HC), femur length (FL)) or estimated fetal weight (EFW) in the smallest 10 percent of the expected range for their gestation are termed small for gestational age (SGA). These babies have increased incidence of stillbirth, complications in labour (eg intrapartum hypoxia), neonatal problems, and poorer adult health.

The definition in Lothian for SGA is abdominal circumference or estimated fetal weight less than 10th centile.

Fetal growth restriction

Small for gestational age babies may be constitutionally small or may be affected by fetal growth restriction (FGR). FGR is the term used for fetuses that have not achieved their growth potential because of placental dysfunction. Not all fetuses that have FGR are SGA, some babies may still be within normal gestational weight ranges (appropriate for gestational age: AGA) but experience growth restriction. FGR is further subdivided into early (<32 weeks) and late (>32 weeks) by the gestation at diagnosis. All babies affected by FGR are at higher risk of poor outcomes than normally grown or constitutionally small SGA babies. The risk of fetal death for each week of gestation is the highest at birthweights of <3rd percentile. These babies have a 3 times greater risk of intrauterine death than those with weights between the 3rd the 5th percentiles and 4 to 7 times greater than those with weights between the 5th and 10th percentiles.[i]

Multiple definitions of FGR exist, in an attempt to exclude constitutionally small but normal babies while still capturing AGA babies with faltering growth. The most detailed is the recent Delphi consensus criteria agreed by international experts in fetal growth.[ii]

Early FGR (<32 weeks)	**Late FGR (>32 weeks)**
AC or EFW <3rd centile **OR** UA-AEDF	AC or EFW <3rd centile
AC or EFW <10th centile **AND** UtA PI>95th OR UAPI >95th	At least 2 of: - AC or EFW <10th centile - AC or EFW falling >50 percentiles - CPR <5th - UA-PI >95th

Screening and diagnosis of SGA/FGR

In the antenatal period, screening for SGA and FGR is based on clinical assessment through symphysis fundal height [SFH] measurement. Diagnosis of SGA and FGR is by ultrasound.

Detection of SGA and FGR is difficult - the aim is to detect and monitor these babies and deliver them at a time that minimises risk. Decisions to deliver may be complex (particularly at early gestations) and should be made by a consultant obstetrician, in conjunction with fetal medicine and neonatology as appropriate.

This guideline does not apply to babies with antenatally identified congenital anomalies, who

will have an individualised plan of care and be managed within the fetal medicine service.

2. AIM:

To provide guidance on

A. screening for SGA through SFH measurement
B. identifying women at risk of SGA who may require additional ultrasound screening for SGA
C. screening for SGA through additional growth scans
D. surveillance of babies with SGA
E. indications for delivery of babies with confirmed SGA
F. audit and surveillance of SGA diagnosis and management in Lothian

Glossary

AC: abdominal circumference
HC: head circumference
FL: femur length
ACS: antenatal corticosteroids
AGA: appropriate for gestational age
AREDF: absent or reversed end diastolic flow
cCTG: computerized CTG
CEFM: continuous electronic fetal monitoring
CPR: cerebroplacental ratio
CRP: C reactive protein
CS: caesarean section
DAU: day assessment unit
DV: ductus venosus
DVP: deepest vertical pocket
EDF: end diastolic flow
SFH: symphysiofundal height
EFW: estimated fetal weight
FA: fetal anomaly
FGR: fetal growth restriction
IOL: induction of labour
LGA: large for gestational age
MCA: middle cerebral artery
NNU: neonatal unit
OOH: out of hours
OTA: obstetric triage area
PET: pre-eclampsia
PIH: pregnancy induced hypertension
PLGF: placental growth factor
SGA: small for gestational age
STV: short term variability
UAPI: umbilical artery pulsatility index
UARI: umbilical artery resistance index
UtAPI: uterine artery pulsatility index

3. Summary guidelines

1. Gestation should be checked using the date estimated at booking scan performed at 11.0-13.6 weeks and recorded in TRAK.

2. Risk factors for SGA should be assessed at booking and the screening pathway for SGA filled out and recorded in woman's record (see appendix 1). Ultrasounds for women identified as unsuitable for screening by SFH or at moderate or high risk of SGA should be requested at the fetal anomaly scan review visit.

3. Symphysio-fundal height measurement (SFH) should be measured at each antenatal attendance (including triage and day assessment) after 24 weeks, but not more often than every 2 weeks, and recorded on SFH charts in handheld records.

4. If pregnancy complications associated with altered fetal growth arise (eg clinical concern about SFH measurements, recurrent APH, reduced fetal movements) then referral for departmental growth scan should be made within 3 days.

5. Women referred for growth scans should have measurement of abdominal circumference (AC) and head circumference (HC) plotted on growth charts and estimated fetal weight (EFW) calculated using HC, AC and femur length. AC and HC from fetal anomaly (20 week) scan must also be plotted and comparison should be made to these.

6. Women at very high risk of FGR (see appendix 2) should be referred to fetal medicine for assessment at 20-22 weeks and individualised management planning. This may include further monitoring through the RIE Small Baby clinic.

7. PLGF/SFlt-1 testing may be performed when SGA or FGR is diagnosed on ultrasound scan as part of the maternal assessment for pre-eclampsia. The test should be used to rule in or rule out pre-eclampsia as per the NHS Lothian protocol for PLGF/SFlt1 testing.

8. Women with SGA/FGR diagnosed on a surveillance scan and women diagnosed with PIH/PET <34 weeks with a plan for expectant management should be referred to the small baby research clinic team or fetal medicine for an ongoing surveillance plan.

9. Growth scans are less accurate after 38 weeks gestation. Where clinical concerns arise after 40 weeks, a growth scan or ultrasound assessment of liquor volume and umbilical artery doppler may be undertaken where the treating clinician believes that the examination will meaningfully inform clinical decision making.

10. For babies with suspected SGA/FGR the decision to deliver should in all cases consider the whole clinical picture. Where there is significant concern about maternal co-morbid pre-eclampsia, persistently reduced fetal movement, recurrent APH or coincident maternal diabetes delivery may be indicated even in the absence of the trigger criteria described in the table below.

11. For babies with suspected SGA, normal liquor and umbilical and middle cerebral artery Dopplers and no additional concerns about maternal or fetal wellbeing scheduled delivery should be offered between 39 and 40 weeks gestation.

12. For babies with suspected FGR (AC or EFW <3rd centile) or with suspected SGA and associated oligohydramnios, raised UAPI >95th centile or MCA or cerebroplacental ratio (CPR) <5th centile, delivery should be offered between 37 and 38 weeks gestation.

A. Screening for SGA using symphysiofundal height measurement

Both abdominal palpation and symphysio-fundal height measurement (SFH) have limited accuracy to predict an SGA fetus. However, routine ultrasound scans for growth in the third trimester have not been shown to improve outcome in low-risk pregnancies. Therefore, measurement of SFH is used as a screening test in routine care.

Symphysio-fundal height measurement:

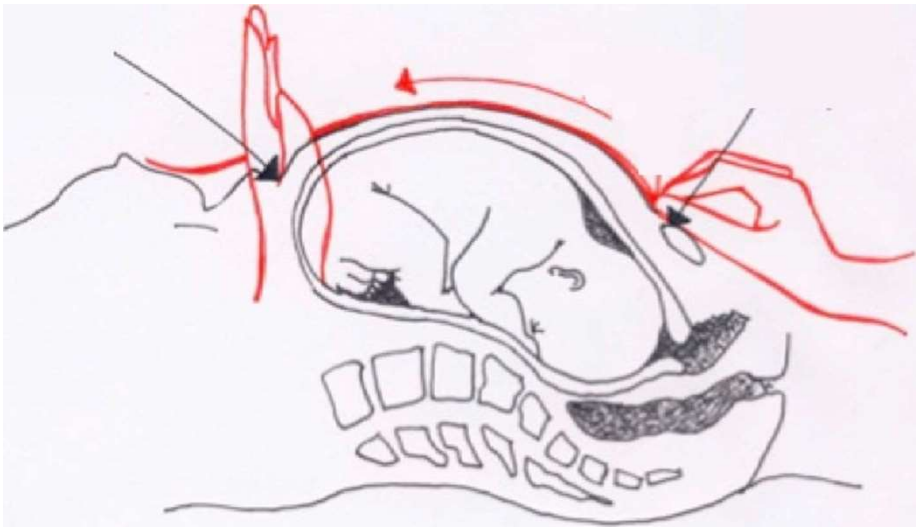
All women should have the SFH measured at each antenatal visit from 24 weeks gestation onwards. Women with high BMI, multiple fibroids or multiple pregnancy are unsuitable for SFH surveillance and should have monitoring via ultrasound.

The SFH measurement should be plotted on the SFH chart in the handheld notes.

- There is some evidence that plotting serial measurements on an SFH chart improves the detection of the SGA fetus.
- If the SFH measurement is less than the 10th centile on the SFH chart or there is static growth (in cm) or a reduction in growth velocity (crossing >40 centiles), then a growth scan should be requested if the woman has not had one in the last 2 weeks.
- The scan should be performed within 2-3 working days of the request. If the request is in the context of current reduced fetal movements (second presentation or other risk factors) then the scan should usually be performed within 24 hours if possible

Measuring and Plotting Symphysio-Fundal Height (SFH)[iii]

1. Explain the procedure to the mother, gain verbal consent, wash hands.
2. The expectant mother should be in a semi-recumbent position (45 degree angle) on a firm surface, with an empty bladder and expose enough of the abdomen to allow thorough two-handed palpation.
3. Use a non-elastic tape measure. Turn the tape measure over so no numbers are visible during the measurement.
4. With the palm of the other hand on the abdomen, pass the tape from the fundus of the uterus along the longitudinal axis of the uterus (not correcting to the midline) to the top of the symphysis pubis - the fixed point and more easily identified landmark.
5. Measure once only, and plot immediately on the chart for the right gestation (weeks and days) to the nearest half centimeter.
6. SFH measurements should not occur more frequently than every two weeks.



How to interpret results

You **do not** need to allow for descent of the head. The curves do not flatten towards term; uncompromised babies should continue growing until delivery.

Symphysio-fundal height **at or above** 10th centile	Routine antenatal care with continued SFH monitoring
SFH **increased** since last measurement*	
Symphysio-fundal height **<10th** centile	**Directly refer for ultrasound scan (should be performed within 3 working days in main department)**
Static or falling SFH in cm (ie 32 cm and then 30 or 32 cm) or dropped >40 centiles	

*Accelerated growth trajectory is **not** an indication for growth scan referral. If there are clinical concerns about excessive growth, discuss with named consultant (email discussion is appropriate).

SFH <10th centile before 28 weeks

Women are generally assessed at 22 and 28 weeks by community midwife (CMW). Occasionally symphysial fundal height (SFH) is measured in between. SGA guidance suggests ultrasound growth measurements are required if SFH <10th centile at gestations from 24+0 weeks.

It should be remembered that absolute SFH < 24wks is more indicative of maternal BMI than fetal size and should NOT routinely be plotted.

SFH <10th centile or static or falling at term

Where new concern about SFH is identified >38 weeks a growth scan may be indicated. Patients should be referred to DAU for assessment and consideration of the full medical picture.

B. Identifying women at risk of SGA who may require additional ultrasound screening for SGA

Formal risk assessment should be made by the community midwife by 16-20 weeks and growth scans requested. If there is a concern or maternal condition which is not included below or in the risk assessment table, please contact the patient's named consultant for an individual management plan.

30 and 36 weeks	28, 32, 36 weeks	Refer to Fetal Med (including Small Baby Clinic) for plan
Unsuitable for monitoring by SFH - Large fibroids (at least 1 >6cm) - BMI >40	High risk factors for SGA*	Very high risk for SGA* (Fetal Med)
Moderate risk factors for SGA*		Pre-eclampsia or PIH <34 weeks gestation (Small Baby Clinic)

*See Appendix 1 for full list

Unscheduled growth scans when pregnancy complications occur

Where women develop pregnancy complications that could be associated with altered fetal growth prior to 40 weeks, a departmental growth scan should be performed within 3 days. These include (but are not exclusively limited to):

- Abnormal SFH measurements as described above
- As soon as possible at the time of diagnosis of pre-eclampsia or PIH
- Reduced fetal movements (after 28 weeks gestation)

When this scan demonstrates fetal biometry appropriate for gestational age with normal liquor volume and umbilical artery dDoppler, it can be repeated in 2-3 weeks time.

If the biometry, liquor or Dopplers are not normal, the patient should be referred to DAU for consultant review within 24 hours as above.

Where there are additional clinical concerns (eg further PV bleeding, ongoing RFM, symptomatic or untreated hypertensive disorders) medical review may be necessary even where the scan findings are normal. This should primarily be arranged through DAU, with triage referral reserved for acute clinical concerns out of hours. These patients may be suitable for review in locality clinics rather than in DAU/OTA.

Where clinical concerns arise after 40 weeks, a growth scan or ultrasound assessment of liquor volume, umbilical artery and middle cerebral artery doppler may be undertaken where the treating clinician decides that the examination will meaningfully inform clinical decision making.

C. Screening for SGA through additional ultrasound ("growth") scans

Protocol for third trimester growth scans undertaken for one of the above criteria

- Confirm dating of the pregnancy by reviewing previous scans
- Biometry at an interval of less than 2 weeks should not be done
- Women referred for growth ultrasound should have measurement of abdominal circumference (AC) and head circumference (HC) plotted on growth charts and placed in the notes.
- EFW should be calculated according to the Hadlock formula (HC/AC/FL) and centile according to Intergrowth charts reported. (Appendix)
- AC and HC should be plotted from fetal anomaly (20 week USS) and comparison should be made to these.
- Liquor volume (LV) should also be documented (normal/abnormal) Deepest Vertical Pool (DVP) should be recorded for abnormal results. Low = <2cm, High = >8cm.
- Umbilical artery pulsatility index should be measured at all growth scans 24-32 weeks, and where biometry, growth velocity or liquor volume are abnormal after 32 weeks.
- MCA PI should be measured where there is suspected SGA/ FGR with normal umbilical artery doppler > 32wks.

Management after third trimester screening 'growth' scans according to findings - it is expected that community midwife will co-ordinate management of normal results				
	Biometry	**Liquor Volume**	**Doppler**	**Management**
Normal	Appropriate for gestational age and normal growth velocity	Normal (DVP >2cm)	Normal UAPI	Routine antenatal care and screening growth USS as per protocol Can repeat growth scan in main department after 2-3 weeks if ongoing concern, up to 40 weeks.
Normal	Reduction in growth velocity – fall of 20-40 centiles.	Normal liquor volume	Normal UAPI	Repeat growth scan in 2-3 weeks in main department
Abnormal - these scan findings would usually be actioned by the operating sonographer in the first instance				
SGA with normal LV and Doppler	AC /EFW<10th centile or reduced growth velocity (>40 centiles from previous scan)	Normal (DVP >2cm) or increased	Normal UAPI	<37 weeks: Refer small baby clinic/fetal med for review within 2 weeks >37 weeks: Refer DAU within 48 hours
Oligohydramnios with or without SGA and normal Dopplers	AC/EFW <10th centile or reduced growth velocity (>40 centiles from previous scan) **OR** Appropriate for gestational age. Normal growth velocity	Reduced (DVP <2cm)	Normal UAPI	Refer OTA for assessment ?ROM and CTG. *From OTA:* <37 weeks and no other concerns - follow up in small baby clinic/fetal med within 1 week >37 weeks or additional concerns: Refer SR/consultant
SGA with abnormal Doppler	AC <10th centile or reduced growth velocity (>40 centiles from previous scan)	Normal or reduced (DVP <2cm)	Abnormal UAPI and/or absent or reversed EDF	Refer DAU - may be suitable for follow up in small baby clinic/fetal med at discretion of consultant or SR

DAU assessment after abnormal scan result:

DAU team: Review antenatal notes and history, check fetal movements, temperature, pulse, blood pressure and urine dip. Where hypertension exists and PET bloods have not been checked within 48 hours, repeat blood tests. When >28 weeks perform a CTG and make note of the short-term variability (STV) where available.

PLGF/SFlt-1 testing may be performed when SGA or FGR is diagnosed on ultrasound scan as part of the maternal assessment for pre-eclampsia. The test should be used to rule in or rule out pre-eclampsia as per the NHS Lothian protocol for PLGF/SFlt1 testing. Testing should be offered the same day as the scan - if clinically well the woman may go home and await results. If normal, standard SGA follow up should occur.

Interpreting PlGF results:

Before 37+0 weeks:
If abnormal, the patient should be referred to DAU for assessment within 48 hours (red result) or 1 week (amber result). PLGF results should not be used to make decisions about timing of delivery prior to 37 weeks.

After 37+0 weeks:
Confirmed SGA on scan (EFW/AC 3rd-10th centile) and an **abnormal** PLGF/SFlt-1 ratio is consistent with a diagnosis of FGR and delivery should be offered from 37 weeks' gestation.

With EFW/AC 3-10th centile on scan, normal umbilical and middle cerebral artery Dopplers and normal fetal movement, a **normal** PLGF/sFLt-1 result is consistent with a diagnosis of SGA and delivery can be offered at 39-40 weeks if no other indication for delivery arises.

Discuss all results and management plan with Tier 3 Obstetrics consultant . Outcomes may include fetal medicine review, small baby clinic referral or delivery planning.

D. Surveillance of babies with SGA

Where delivery is not planned imminently, surveillance of babies with diagnosed SGA/FGR will be co-ordinated via the small baby clinic, managed by fetal medicine. (Appendix 4) Where possible, the patient will be seen at each appointment by the same clinician to optimise counselling and continuity of care.

The usual schedule of surveillance is outlined below, but may be individualised to the patient at the discretion of the managing consultant. In particular not every doppler measurement will be required at every scan.

When SGA/FGR and/or Echogenic bowel and/or femur length <5th centile is diagnosed at the anomaly scan (20-22 weeks), the first referral should be to fetal medicine for detailed anatomical assessment and consideration of invasive testing.

Further surveillance may then be arranged through fetal medicine or the small baby clinic as appropriate.

	Ultrasound	**Clinical assessment**
SGA (3-10th centile) with normal Dopplers		
24-32 weeks	Biometry, UAPI, (+/- DV) and LV fortnightly	Blood pressure and urine dip fortnightly
32-38 weeks	Biometry, UAPI, LV (+/- MCA) fortnightly	Blood pressure and urine dip weekly
SGA <3rd centile with normal Dopplers		
24-32 weeks	Biometry, UAPI, (+/- DV) and LV fortnightly	Blood pressure and urine dip fortnightly
32-38 weeks	Biometry fortnightly UAPI, LV (+/- MCA) weekly	Blood pressure and urine dip weekly
SGA <10th centile with abnormal UA Doppler		
24-32 weeks	Biometry fortnightly UAPI, DV and LV twice weekly	cCTG (where available) three times a week Blood pressure and urine dip twice weekly
32-38 weeks	Customised monitoring until delivery	

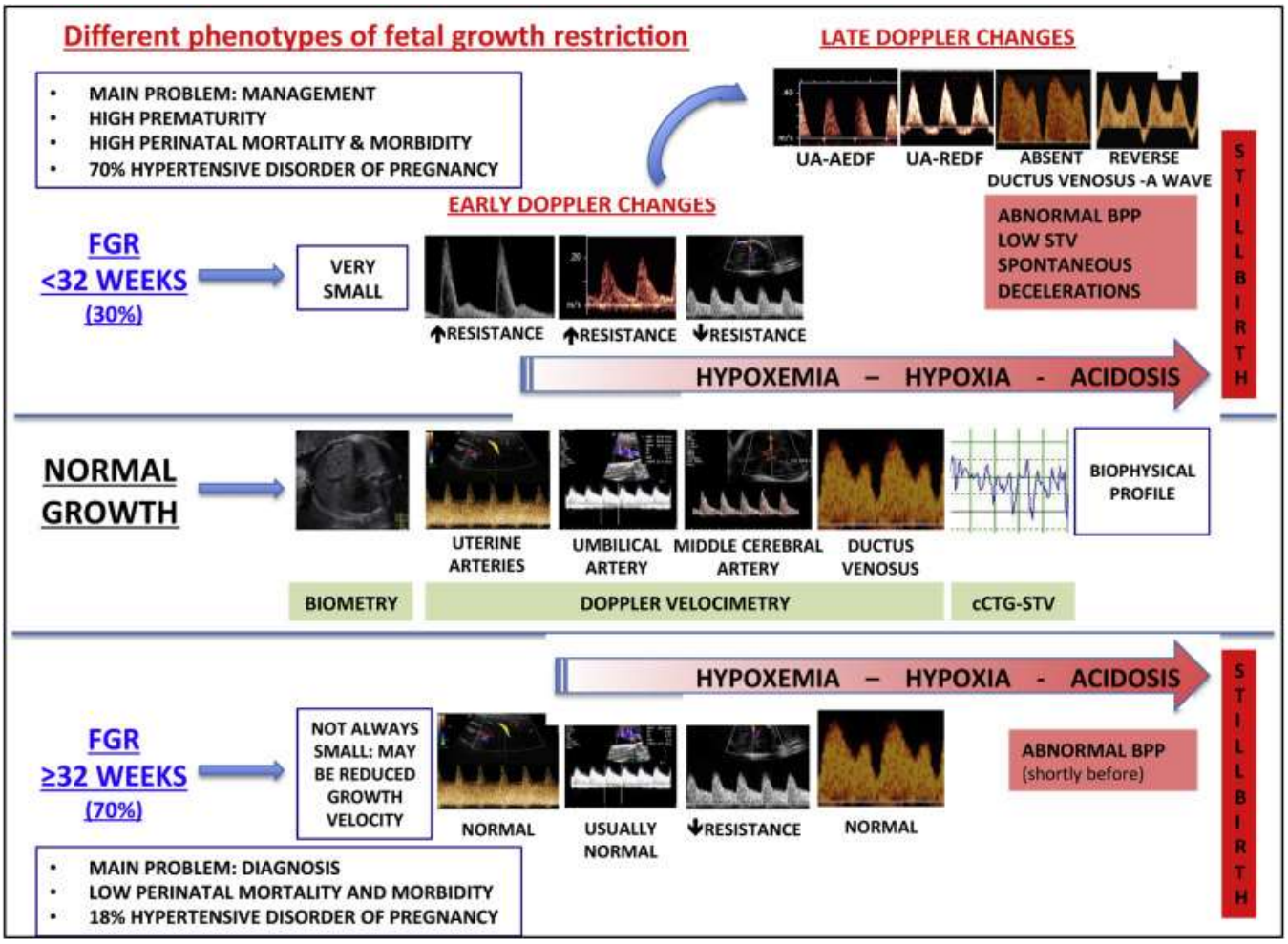


Figure 1 Lees AJOG 2022

E. Indications for and management of delivery of babies with confirmed SGA

Decisions to deliver may be complex (particularly at early gestations) and should be made by a consultant obstetrician, in conjunction with fetal medicine and neonatology as appropriate.

Decision to deliver should in all cases consider the whole clinical picture. Where there is significant concern about maternal co-morbid pre-eclampsia, persistently reduced fetal movement, recurrent APH or coincident maternal diabetes delivery may be indicated even in the absence of the trigger criteria described in the table below.

At **any gestation** repetitive unprovoked decelerations on an antenatal CTG in the context of known SGA/FGR should prompt consideration of delivery.

When preterm delivery is planned, MgSO4 and antenatal corticosteroids should be offered in line with existing NHS Lothian guidelines and early discussion with the neonatal team is recommended.

Gestation (weeks)	Ultrasound triggers for delivery	cCTG triggers for delivery
26-28	DV a-wave absent or reversed	STV <2.6ms
29-30	DV a-wave absent or reversed	STV <3.0ms
30-32+0	DV a-wave absent or reversed **OR** UA reversed EDF	STV <3.0ms
32-34+0	UA AREDF	STV <3.5ms
34-37	UA AREDF	STV <4.5ms
37	UA PI >95th centile	STV <4.5ms
38-39	MCA <5th centile	STV <4.5ms

For babies with suspected SGA, normal liquor and Dopplers and no additional concerns about maternal or fetal wellbeing scheduled delivery should be offered between 39 and 40 weeks gestation.

For babies with FGR (AC/EFW <3rd centile, oligohydramnios, abnormal UAPI or MCA/CPR <5th centile) scheduled delivery should be offered between 37-38 weeks.

The mode of delivery should be discussed with the patient by a senior obstetrician taking into account the clinical assessment of fetal wellbeing, her past obstetric history and preferences for delivery. For babies with reassuring liquor volume and dopplers and a normal fetal growth trajectory, induction of labour and planned vaginal delivery is appropriate. Delivery on labour ward with CEFM is recommended.

In general, vaginal delivery should be avoided where significant concerns about placental dysfunction exist (ie. abnormal umbilical doppler, EFW<3rd centile, severe oligohydramnios). Where the patient's preference is to attempt vaginal delivery in these circumstances, counselling must include the increased risk of operative delivery for suspected intrapartum fetal compromise.

Where the indication for delivery is suspected FGR the placenta should be sent for histological examination.

F. Audit and surveillance of SGA diagnosis and management in Lothian

The incidence, detection and management of SGA babies will be audited in Lothian in line with the Saving Babies Lives Care Bundle recommendations implemented in NHS England.

A monthly report from TRAK will identify:

- Babies with birthweight <3rd centile
- Babies with birthweight <10th centile
- Babies born >40 weeks with birthweight <10th centile
- Babies born >38 weeks with birthweight <3rd centile

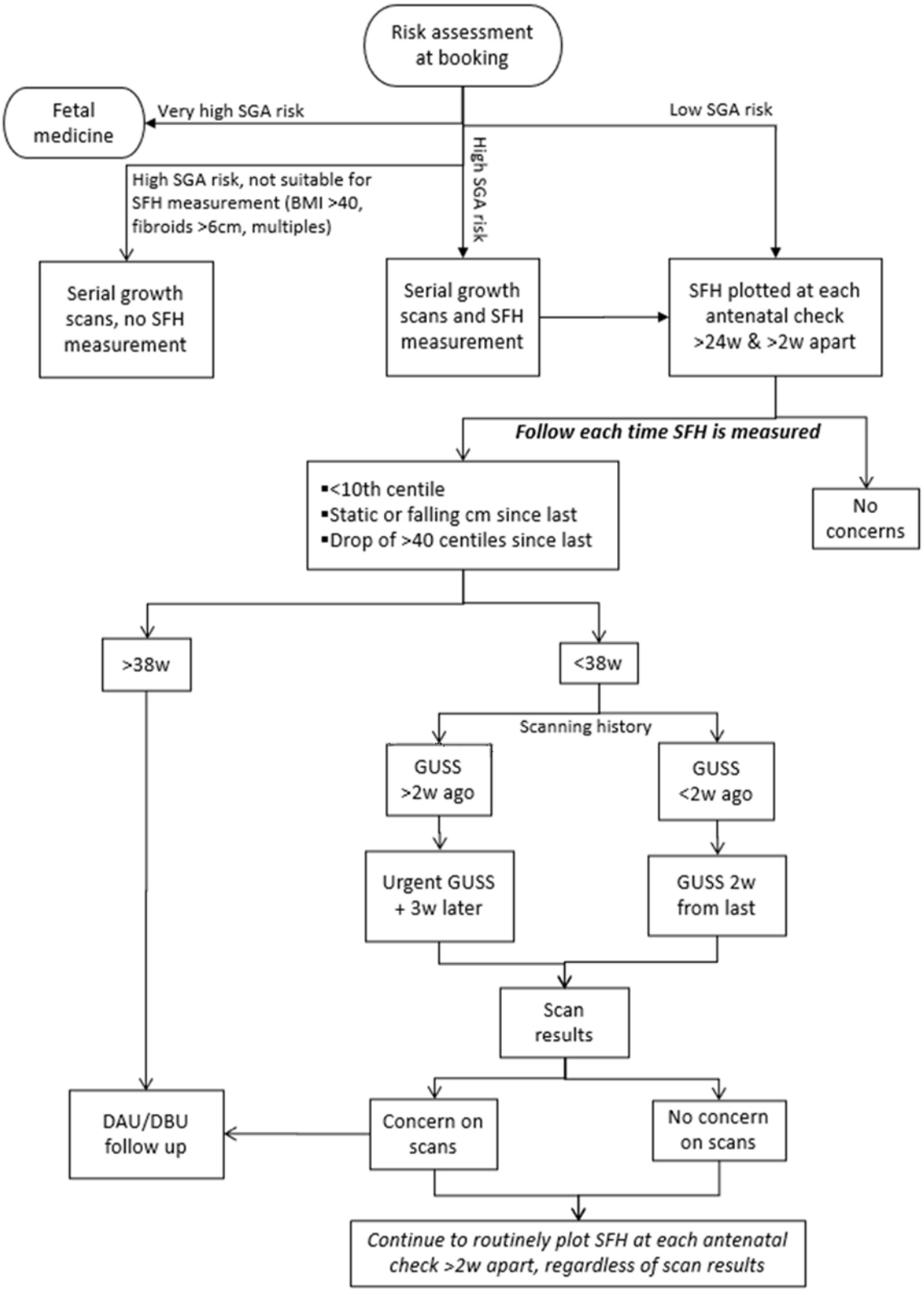
This report will be analysed by the small baby clinic team, who will report back to the QI leads in order to set and monitor local standards on a quarterly basis.

An annual audit will conduct a notes review of a sample of SGA babies born in Lothian to identify.

- How many had a growth scan conducted within 6 weeks of delivery.
- Of those with a third trimester growth scan, how many were correctly identified as SGA
- Of those identified as SGA how many were delivered in accordance with this guideline
- Mode of delivery
- Incidence of perinatal mortality

Appendix 1

SGA Guideline Flowchart for Community Midwives



Version 0.7 November 2024

Appendix 2 SGA risk assessment in handheld notes

Patient Name:	DOB: / /	CHI number:

NHS Lothian

Maternity Service Risk Assessment and Screening Pathway - Small for Gestational Age (SGA)

1. Complete and file in handheld record at booking assessment
2. Update pathway and request any required ultrasound scans at the time of Fetal Anomaly (FA) scan review
3. State the scan indication on the Scan Request Form as listed below (N.B. scans for any indication not listed; or deviating from the suggested scanning schedule will need to be discussed with the Ultrasound department at the RIE or SJH)
4. Assess the fetal growth trajectory of plotted measurements from FA scan and growth scans on the chart overleaf

Risk Factors	Tick	SGA Screening Pathway	Request (initials)	Review of Results
Large fibroids, 1 or more over 6cm	☐	2 growth ultrasounds at (30 and 36 weeks gestation)		Midwife led
Maternal age over 40yrs	☐			
Smoker with CO level 5ppm or more	☐			
Late bookers (at or after 21 weeks gestation)	☐			
PAPP-A less than 0.4MoM on 1st trimester screen (or hCG more than 4 or AFP more than 2.5MoM on 2nd trimester screen)	☐			
Recurrent miscarriage clinic patient immediately prior to this pregnancy (i.e. no live children after 3 miscarriages)	☐			
Recurrent bleeding (similar to menses, not spotting)	☐			
Previous SGA (less than 10th centile at delivery)	☐			
Asthma requiring current use of oral steroids or recent hospital admission	☐	2 growth ultrasounds at (30 and 36 weeks gestation)		Midwife led (with AN care input from named consultant)
Chronic hypertension	☐			
Chronic kidney disease (CKD)	☐			
Uterine anomaly	☐			
Substance misuse including alcohol	☐			Midwife led (with AN care named consultant/PREPARE team)
BMI more than 40 or previous bariatric surgery	☐			Metabolic Antenatal Clinic Team
Newly diagnosed or uncontrolled hyperthyroidism	☐	3 growth ultrasounds at 28/32/36 weeks gestation		Midwife led (with AN care input from named consultant)
Previous stillbirth (not associated with Fetal Growth Restriction [FGR]	☐			
SLE/Connective Tissue Disease	☐			
Eating disorder	☐			
Maternal Cardiac Disease	☐			Cardiac Antenatal Clinic Team
Cystic fibrosis	☐			Cystic fibrosis Team
Pre-existing Diabetes – Type 1 and 2	☐			Diabetic Clinic Team
Positive Uterine Artery Doppler's (bilateral notching or mean Pulsatiity Index (PI) more than 95th centile)	☐	Refer to Fetal Medicine Team for personalised growth assessment schedule		Fetal Medicine Team
SGA (AC less than 10th centile) and/or Echogenic bowel and/or femur length less than 5th centile on FA scan *(sonographer to refer)*	☐			
Sickle cell disease (not sickle cell trait)	☐			
Severe early onset FGR in a previous pregnancy (delivery before 34 weeks for SGA and/or less than 3rd centile at delivery)	☐			
Previous stillbirth (Birthweight less than 10th centile for gestation or pathology suggests placental insufficiency)	☐			
Antiphospholipid syndrome	☐			
None of the above	☐			Routine Fetal Anomaly Scan

For all pregnancies (with the exception of a BMI over 40 and large fibroids) measure SFH and plot overleaf at each antenatal attendance.

If any of the following are present:
SFH is less than 10th centile static or falling
Recurrent APH (2x bleeds post 20 weeks)
Pre- Eclampsia/ PIH
Reduced fetal movements

Actions:
Arrange for a growth scan (within 3 working days) and review results on the day of scan
> If more than 20 centile drop from FAS, contact DAU for follow up
> If normal growth, arrange a follow up scan for 3 weeks' time

Note of any actions taken:

Appendix 3 Risk factors for SGA

Moderate RISK for SGA

Maternal age>40yrs
Smoker with CO level 5ppm or more
Substance misuse including alcohol.
Previous SGA (<10th centile for birthweight *-see appendix 6 for 10th centile birthweight)*
Chronic hypertension
Chronic kidney disease
Recurrent bleeding (not spotting)
PAPP-A<0.4 MoM on first trimester screen (or hCG >4 or AFP>2.5 MoM on second trimester screen)
Recurrent miscarriage clinic patient immediately prior to this pregnancy (i.e. no live children after miscarriages)
Late bookers (at or after 21 weeks gestation)
Asthma requiring current use of oral steroids or recent hospital admission.
Uterine anomaly
Previous bariatric surgery/ BMI 40
Epilepsy on antiepileptic drugs (AED)

High RISK for SGA

Newly diagnosed or uncontrolled hyperthyroidism
Previous stillbirth (not associated with Fetal Growth Restriction [FGR] see also below)
SLE/Connective Tissue Disease
Eating disorder
Maternal Cardiac Disease (under Maternal Cardiology clinic)
Cystic fibrosis
Diabetes -Type 1&2

VERY HIGH RISK for SGA/FGR.

SGA (<10th centile) on FA scan (after fetal medicine assessment)

Previous stillbirth with FGR as the likely cause of stillbirth (<10th centile for gestation or pathology suggests placental insufficiency)

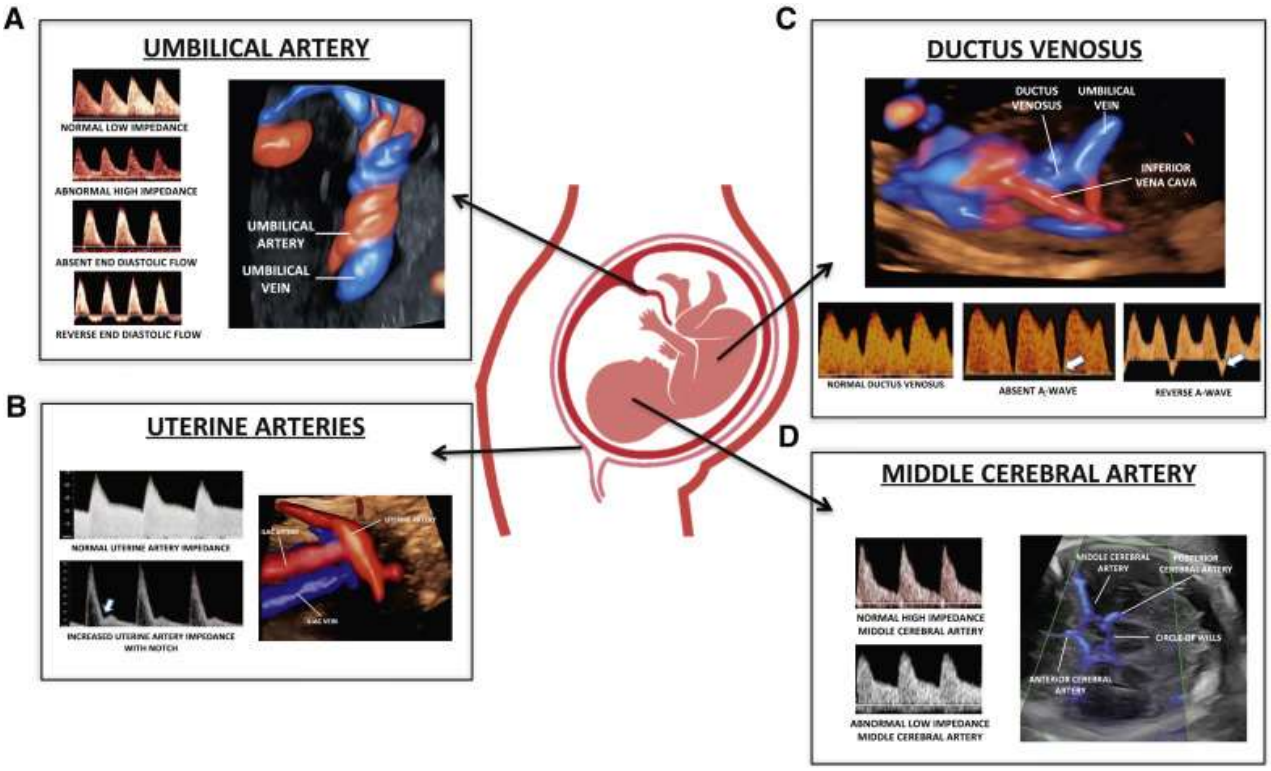
Severe early onset FGR in a previous pregnancy (delivery before 34 weeks for growth restriction and/or SGA <3rd centile at delivery)

Antiphospholipid syndrome

Positive Uterine Artery Dopplers (bilateral notching or mean PI >95th centile)

Sickle cell disease (NOT sickle cell trait)

Appendix 4 Doppler assessment in fetal growth restriction



Appendix 5 Small baby research clinic

The Small Baby Research Clinic (SBRC) is run within NHS Lothian by the University of Edinburgh Pregnancy Research Team (EPRT). The clinic provides midwifery and fetal medicine review for patients with suspected SGA/FGR babies. These patients may be invited to participate in ongoing EPRT research into pregnancy health and perinatal risk prevention but are not required to join any research studies in order to benefit from the clinic.

Population: patients with evidence of placental dysfunction >22 weeks gestation with a current plan for expectant management.

Service: Ultrasound, cCTG and clinical (midwifery and obstetric) assessment and longitudinal follow up from a multidisciplinary team with experience in the management of FGR and hypertension.

Referral criteria:

- **Suspected SGA/FGR identified on departmental growth scan as per SGA guideline.**
- **New diagnosis of pregnancy induced hypertension or pre-eclampsia <34 weeks with a plan for expectant management.**

Referral process

Patients may be identified for referral via DAU/OTA, community midwife or sonographers. Referrals are handled by the fetal medicine and research midwives and patients may be seen in fetal medicine when SBRC slots are fully booked.

The referral form is attached as Appendix 5 and available on the S drive: *Reproductive Health > Fetal Med Admin > Referrals > SBRC referral*. The form should be completed and emailed to the fetal medicine and research midwives who will schedule the SBRC appointment and telephone the patient to confirm time and date. Alternatively, a hard copy may be completed and handed in to the fetal medicine office directly during working hours.

SCAN ME

What to tell the patient:

They have been referred to a specialist antenatal clinic where they will have a scan, a midwifery assessment and a consultant discussion. They can find out more about the clinic on our website by scanning the QR code. We will confirm the time of the appointment with them by phone or letter prior to the clinic date.

If you or they have any questions about the clinic, including appointment queries, please contact: 0131 242 2480 (Research Midwives).

Resource:

Consultant time, Midwife time

Waiting space, Counselling space, Phlebotomy facilities

Computerised CTG, Blood pressure, pulse and urine testing, PLGF testing (research only)

Additional service benefits:

Increased consultant presence/availability for DAU

Consistent management of SGA/FGR with continuity of obstetric and midwifery care for high-risk pregnancies

Designated team leading on audit and QI of SGA pathway in Lothian.

Training opportunities (eg senior trainees undertaking high risk antenatal care or fetal medicine ATSMs, junior trainees undertaking basic and intermediate obstetric ultrasound training and midwives working in DAU)

Appendix 6 Small Baby Research Clinic Referral Form

Demographics (or attach label)

Patient's name:	
CHI:	

Clinical details

EDD:	
Gestation:	
Parity:	

Reason for referral
Please select all that apply.

NB: if you have identified a fall in growth velocity of 20-40 centiles on a third trimester growth scan with normal liquor, normal UAPI and no other concerning features please arrange another growth scan in 2 weeks.

Current pregnancy: Should be seen 2 weeks after last growth scan	
Suspected SGA identified on ultrasound (AC or EFW <10th centile or drop of >40 centiles in AC) with normal umbilical Doppler PI (<95th centile) and liquor volume	☐

Current pregnancy: Should be seen within 1 week	
New diagnosis of PIH or pre-eclampsia <34 weeks with a plan for expectant management	☐
SGA with concerning features if reviewed by fetal medicine consultant/SR, and determined suitable for Small Baby Clinic Research Clinic f/u	☐

Relevant history (eg reason for growth scan, birthweight of prior babies):
Please confirm: normal fetal movements, no abdominal pain, PV bleeding or discharge. If any of these concerns are present, please refer to DAU.

Referral details

Referring clinician:	
Contact telephone no:	
Date of referral:	

Please send completed form to fetal.medicine@nhslothian.scot.nhs.uk and researchmidwives@nhslothian.scot.nhs.uk or hand into fetal medicine office

Appendix 7 How to refer to SBRC poster (for clinical areas)

The Small Baby Research Clinic (SBRC) is run within NHS Lothian, at present by the University of Edinburgh Pregnancy Research Team (EPRT). The clinic runs on a Wednesday afternoon at RIE in the antenatal clinic corridor and provides midwifery and fetal medicine review for patients with suspected SGA/FGR babies. These patients may be invited to participate in ongoing EPRT research into pregnancy health but are not required to join any research studies in order to benefit from the clinic.

Population: patients with evidence of placental dysfunction >22 weeks gestation with a current plan for expectant management.

Service: Ultrasound, cCTG and clinical (midwifery and obstetric) assessment and longitudinal follow up from a multidisciplinary team with experience in the management of FGR and hypertension.

Referral criteria:

- **Suspected SGA/FGR identified on departmental growth scan.**
- **New diagnosis of pregnancy induced hypertension or pre-eclampsia <34 weeks with a plan for expectant management.**

How do I refer to SBRC?

The referral form is available on the S drive:
Reproductive Health > Fetal Med Admin > Referrals > SBRC referral
Complete the form and email to fetal medicine (fetal.medicine@nhslothian.scot.nhs.uk and researchmidwives@nhslothian.scot.nhs.uk)

Who should I refer to SBRC?

Current pregnancy: Should be seen 2 weeks after last growth scan
Suspected SGA identified on growth scan (AC or EFW <10th centile or drop of >40 centiles in AC or EFW) with normal umbilical Doppler and liquor volume

Current pregnancy: Should be seen within 1 week
New diagnosis of PIH or pre-eclampsia <34 weeks with a plan for expectant management
SGA with concerning features (ie oligo or abnormal UARI) should be reviewed by fetal medicine consultant/SST, and agreed suitable for SBRC f/u

What should I tell the patient?

SCAN ME

They have been referred to a specialist antenatal clinic where they will have a scan, a midwifery assessment and a consultant discussion. They can find out more about the clinic on our website by scanning this QR code. We will confirm the time of the appointment with them by phone or letter prior to the clinic date.

If you or they have any questions about the clinic, including appointment queries, please contact: 0131 242 2480 (Research Midwives).

Appendix 8 Intergrowth Estimated Fetal Weight centiles (for identifying SGA/FGR on ultrasound assessment in this pregnancy)

International Newborn Size Standards

UNIVERSITY OF OXFORD

Birthweight (kg) Boys

INTERGROWTH-21st

Gestational age (weeks+days)	Centiles						
	3rd	5th	10th	50th	90th	95th	97th
33+0	1.18	1.28	1.43	1.95	2.52	2.70	2.82
33+1	1.22	1.32	1.47	1.99	2.56	2.74	2.86
33+2	1.26	1.36	1.51	2.03	2.60	2.77	2.90
33+3	1.30	1.40	1.55	2.07	2.64	2.81	2.93
33+4	1.34	1.44	1.59	2.11	2.67	2.85	2.97
33+5	1.38	1.48	1.63	2.15	2.71	2.89	3.01
33+6	1.42	1.52	1.67	2.18	2.75	2.93	3.05
34+0	1.45	1.55	1.71	2.22	2.79	2.96	3.08
34+1	1.49	1.59	1.74	2.26	2.82	3.00	3.12
34+2	1.53	1.63	1.78	2.29	2.86	3.03	3.15
34+3	1.56	1.66	1.82	2.33	2.89	3.07	3.19
34+4	1.60	1.70	1.85	2.36	2.93	3.10	3.22
34+5	1.63	1.73	1.89	2.40	2.96	3.14	3.26
34+6	1.67	1.77	1.92	2.43	3.00	3.17	3.29
35+0	1.70	1.80	1.95	2.47	3.03	3.20	3.32
35+1	1.74	1.84	1.99	2.50	3.06	3.24	3.36
35+2	1.77	1.87	2.02	2.53	3.09	3.27	3.39
35+3	1.80	1.90	2.05	2.56	3.13	3.30	3.42
35+4	1.83	1.94	2.09	2.60	3.16	3.33	3.45
35+5	1.87	1.97	2.12	2.63	3.19	3.36	3.48
35+6	1.90	2.00	2.15	2.66	3.22	3.39	3.51
36+0	1.93	2.03	2.18	2.69	3.25	3.42	3.54
36+1	1.96	2.06	2.21	2.72	3.28	3.45	3.57
36+2	1.99	2.09	2.24	2.75	3.31	3.48	3.60
36+3	2.02	2.12	2.27	2.78	3.34	3.51	3.63
36+4	2.05	2.15	2.30	2.81	3.37	3.54	3.66
36+5	2.08	2.18	2.33	2.84	3.39	3.57	3.69
36+6	2.11	2.21	2.36	2.86	3.42	3.60	3.72
37+0	2.13	2.24	2.38	2.89	3.45	3.62	3.74
37+1	2.16	2.26	2.41	2.92	3.48	3.65	3.77
37+2	2.19	2.29	2.44	2.95	3.50	3.68	3.80
37+3	2.22	2.32	2.47	2.97	3.53	3.70	3.82
37+4	2.24	2.34	2.49	3.00	3.55	3.73	3.85
37+5	2.27	2.37	2.52	3.02	3.58	3.75	3.87
37+6	2.29	2.39	2.54	3.05	3.61	3.78	3.90

Villar et al. *Lancet* 2014;384:857-68

International Newborn Size Standards

Birthweight (kg)
Boys

Gestational age (weeks+days)	Centiles						
	3rd	5th	10th	50th	90th	95th	97th
38+0	2.32	2.42	2.57	3.07	3.63	3.80	3.92
38+1	2.34	2.44	2.59	3.10	3.65	3.83	3.95
38+2	2.37	2.47	2.62	3.12	3.68	3.85	3.97
38+3	2.39	2.49	2.64	3.15	3.70	3.87	3.99
38+4	2.42	2.52	2.67	3.17	3.72	3.90	4.02
38+5	2.44	2.54	2.69	3.19	3.75	3.92	4.04
38+6	2.46	2.56	2.71	3.22	3.77	3.94	4.06
39+0	2.49	2.59	2.73	3.24	3.79	3.96	4.08
39+1	2.51	2.61	2.76	3.26	3.81	3.99	4.10
39+2	2.53	2.63	2.78	3.28	3.83	4.01	4.12
39+3	2.55	2.65	2.80	3.30	3.86	4.03	4.15
39+4	2.57	2.67	2.82	3.32	3.88	4.05	4.17
39+5	2.59	2.69	2.84	3.34	3.90	4.07	4.19
39+6	2.61	2.71	2.86	3.36	3.92	4.09	4.21
40+0	2.63	2.73	2.88	3.38	3.94	4.11	4.22
40+1	2.65	2.75	2.90	3.40	3.95	4.13	4.24
40+2	2.67	2.77	2.92	3.42	3.97	4.15	4.26
40+3	2.69	2.79	2.94	3.44	3.99	4.16	4.28
40+4	2.71	2.81	2.96	3.46	4.01	4.18	4.30
40+5	2.73	2.83	2.98	3.48	4.03	4.20	4.32
40+6	2.75	2.85	2.99	3.49	4.04	4.22	4.33
41+0	2.76	2.86	3.01	3.51	4.06	4.23	4.35
41+1	2.78	2.88	3.03	3.53	4.08	4.25	4.37
41+2	2.80	2.90	3.05	3.55	4.09	4.27	4.38
41+3	2.82	2.91	3.06	3.56	4.11	4.28	4.40
41+4	2.83	2.93	3.08	3.58	4.13	4.30	4.42
41+5	2.85	2.95	3.09	3.59	4.14	4.31	4.43
41+6	2.86	2.96	3.11	3.61	4.16	4.33	4.45
42+0	2.88	2.98	3.12	3.62	4.17	4.34	4.46
42+1	2.89	2.99	3.14	3.64	4.19	4.36	4.47
42+2	2.91	3.01	3.15	3.65	4.20	4.37	4.49
42+3	2.92	3.02	3.17	3.67	4.21	4.39	4.50
42+4	2.94	3.04	3.18	3.68	4.23	4.40	4.52
42+5	2.95	3.05	3.20	3.69	4.24	4.41	4.53
42+6	2.96	3.06	3.21	3.71	4.25	4.43	4.54

Villar et al. *Lancet* 2014;384:857-68

International Newborn Size Standards

UNIVERSITY OF OXFORD

Birthweight (kg) Girls

INTERGROWTH-21st

Gestational age (weeks+days)	Centiles						
	3rd	5th	10th	50th	90th	95th	97th
33+0	1.20	1.29	1.41	1.86	2.35	2.51	2.61
33+1	1.24	1.33	1.45	1.90	2.40	2.55	2.66
33+2	1.28	1.37	1.49	1.94	2.44	2.59	2.70
33+3	1.32	1.40	1.53	1.98	2.48	2.63	2.74
33+4	1.36	1.44	1.57	2.02	2.52	2.67	2.78
33+5	1.39	1.48	1.61	2.06	2.56	2.72	2.82
33+6	1.43	1.52	1.65	2.09	2.60	2.75	2.86
34+0	1.47	1.55	1.68	2.13	2.64	2.79	2.90
34+1	1.50	1.59	1.72	2.17	2.67	2.83	2.94
34+2	1.54	1.62	1.75	2.20	2.71	2.87	2.98
34+3	1.57	1.66	1.79	2.24	2.75	2.91	3.01
34+4	1.61	1.69	1.82	2.28	2.79	2.94	3.05
34+5	1.64	1.73	1.86	2.31	2.82	2.98	3.09
34+6	1.67	1.76	1.89	2.35	2.86	3.02	3.12
35+0	1.71	1.79	1.92	2.38	2.89	3.05	3.16
35+1	1.74	1.83	1.96	2.41	2.93	3.09	3.19
35+2	1.77	1.86	1.99	2.45	2.96	3.12	3.23
35+3	1.80	1.89	2.02	2.48	2.99	3.15	3.26
35+4	1.83	1.92	2.05	2.51	3.03	3.19	3.30
35+5	1.86	1.95	2.08	2.54	3.06	3.22	3.33
35+6	1.89	1.98	2.11	2.57	3.09	3.25	3.36
36+0	1.92	2.01	2.14	2.60	3.12	3.28	3.39
36+1	1.95	2.04	2.17	2.63	3.15	3.31	3.42
36+2	1.98	2.07	2.20	2.66	3.18	3.34	3.45
36+3	2.00	2.09	2.23	2.69	3.21	3.37	3.48
36+4	2.03	2.12	2.25	2.72	3.24	3.40	3.51
36+5	2.06	2.15	2.28	2.75	3.27	3.43	3.54
36+6	2.08	2.17	2.31	2.77	3.30	3.46	3.57
37+0	2.11	2.20	2.33	2.80	3.32	3.49	3.60
37+1	2.14	2.23	2.36	2.83	3.35	3.52	3.63
37+2	2.16	2.25	2.38	2.85	3.38	3.54	3.65
37+3	2.18	2.27	2.41	2.88	3.40	3.57	3.68
37+4	2.21	2.30	2.43	2.90	3.43	3.60	3.71
37+5	2.23	2.32	2.46	2.93	3.46	3.62	3.73
37+6	2.25	2.35	2.48	2.95	3.48	3.65	3.76

Villar et al. *Lancet* 2014;384:857-68

International Newborn Size Standards

Birthweight (kg)
Girls

Gestational age (weeks+days)	Centiles						
	3rd	5th	10th	50th	90th	95th	97th
38+0	2.28	2.37	2.50	2.97	3.51	3.67	3.78
38+1	2.30	2.39	2.53	3.00	3.53	3.69	3.81
38+2	2.32	2.41	2.55	3.02	3.55	3.72	3.83
38+3	2.34	2.43	2.57	3.04	3.58	3.74	3.85
38+4	2.36	2.45	2.59	3.06	3.60	3.76	3.88
38+5	2.38	2.47	2.61	3.09	3.62	3.79	3.90
38+6	2.40	2.50	2.63	3.11	3.64	3.81	3.92
39+0	2.42	2.51	2.65	3.13	3.66	3.83	3.94
39+1	2.44	2.53	2.67	3.15	3.68	3.85	3.96
39+2	2.46	2.55	2.69	3.17	3.70	3.87	3.99
39+3	2.48	2.57	2.71	3.19	3.72	3.89	4.01
39+4	2.50	2.59	2.73	3.21	3.74	3.91	4.03
39+5	2.51	2.61	2.74	3.22	3.76	3.93	4.04
39+6	2.53	2.62	2.76	3.24	3.78	3.95	4.06
40+0	2.55	2.64	2.78	3.26	3.80	3.97	4.08
40+1	2.56	2.66	2.80	3.28	3.82	3.99	4.10
40+2	2.58	2.67	2.81	3.29	3.84	4.00	4.12
40+3	2.60	2.69	2.83	3.31	3.85	4.02	4.14
40+4	2.61	2.70	2.84	3.33	3.87	4.04	4.15
40+5	2.63	2.72	2.86	3.34	3.89	4.05	4.17
40+6	2.64	2.73	2.87	3.36	3.90	4.07	4.19
41+0	2.65	2.75	2.89	3.37	3.92	4.09	4.20
41+1	2.67	2.76	2.90	3.39	3.93	4.10	4.22
41+2	2.68	2.77	2.91	3.40	3.95	4.12	4.23
41+3	2.69	2.79	2.93	3.41	3.96	4.13	4.25
41+4	2.71	2.80	2.94	3.43	3.97	4.15	4.26
41+5	2.72	2.81	2.95	3.44	3.99	4.16	4.27
41+6	2.73	2.82	2.96	3.45	4.00	4.17	4.29
42+0	2.74	2.84	2.98	3.46	4.01	4.19	4.30
42+1	2.75	2.85	2.99	3.48	4.03	4.20	4.31
42+2	2.76	2.86	3.00	3.49	4.04	4.21	4.33
42+3	2.77	2.87	3.01	3.50	4.05	4.22	4.34
42+4	2.78	2.88	3.02	3.51	4.06	4.23	4.35
42+5	2.79	2.89	3.03	3.52	4.07	4.24	4.36
42+6	2.80	2.90	3.04	3.53	4.08	4.26	4.37

Villar et al. *Lancet* 2014;384:857-68

Appendix 9. Birthweight centiles (for determining if previous children were SGA at birth)

Gestation	Girls (10th)	Girls (3rd)	Boys (10th)	Boys (3rd)
23-23+6	425g	350g	475g	400g
24-24+5	500g	400g	550g	475g
25-25+5	575g	475g	625g	550g
26-26+6	650g	525g	700g	600g
2?-2r6	725g	600g	775g	675g
28-28+6	800g	675g	875g	750g
29-29+5	900g	750g	975g	825g
30-30+5	1000g	850g	1075g	925g
31-31+5	1150g	950g	1200g	1025g
32-32+5	1300g	1075g	1350g	1150g

[i] Lees AJOG 2022
[ii] Gordijn 2016 UOG
[iii] Belizan J, Villar J et al. Diagnosis of intrauterine growth retardation by a simple clinical method: Measurement of uterine height. Am J Obstet Gynecol 1978 131:6: 643-64

SIMPSON CENTRE FOR REPRODUCTIVE HEALTH
ROYAL INFIRMARY of EDINBURGH

Clinical Protocol

UMBILICAL ARTERY DOPPLER

Definition
The examination of the umbilical artery with colour and spectral Doppler and the measurement of the resistance index to assess placental circulatory reserve

Indications
AC<5th Centile for gestation
Static Growth on Centile chart
Oligohydramnios with intact membranes
Follow up of established IUGR (AC<5th Centile) – monitor as requested by Consultant Obstetrician

Procedure
- Explain the purpose of the examination and obtain verbal consent
- Select a free loop of cord, away from the fetus if possible, and preferably during a period when it is not breathing
- Press colour flow button
- Place Doppler cursor over umbilical artery (UA). Ideally choose a portion in which the flow is directly to or from the transducer, i.e. minimise the angle of interrogation
- Freeze the spectral Doppler trace and measure resistance index(RI)
- If end diastolic flow poor/absent/reversed, repeat the examination a further 2 times attempting to select a different portion of the cord and/or improve the angle of interrogation
- Take images of the measurements
- Report: state indication for the examination. Give UARI and comment if it is normal or increased for the gestation. If end diastolic flow (EDF) is absent or reversed comment on it.

NB. If some loops have reduced EDF and others have absent EDF comment, “there is reduced EDF” i.e. always give the better result – technical factors may account for the poorer one

- Agree an action plan with a senior obstetrician in those women in whom a Doppler examination has been performed

Note :
Due to the higher acoustic output used during Doppler examinations there may be thermal effects that may result in fetal tissue being heated if exposed. Because of this it should only be used when there is clear indication for the examination, Umbilical artery Doppler studies should not be performed for fetal assessment in post dates pregnancies or for the assessment of reduced fetal movements.

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