



Screening for fetal growth disorders

Including:

- Risk factors
- Symphyseal fundal height
- Ultrasound findings

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July 2023

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1 Introduction

All pregnancies are at risk of fetal growth disorders (FGD). The fetus may be unusually large for gestational age (LGA), or small for gestational age (SGA). Pregnancies complicated by impaired glucose control are particularly at risk of a LGA fetus. However, all pregnancies (including those with impaired glucose control) are at risk of fetal growth restriction (FGR). Each woman is therefore assigned as low risk or high risk for FGR based upon their individual risk factors.

Those identified as low risk will continue to receive interventions that screen for FGR such as symphyseal fundal height measurements or ultrasound scans for other indications that also incorporate fetal growth measurements. Similarly, their risk factors for FGR may require updating if additional problems arise later in pregnancy. Consequently FGR screening is a continuous process throughout pregnancy whether or not the initial screening result is a low or high risk of FGR.

Ultrasound may be applied as a screening test for FGD to estimate the fetal weight (EFW) or it may form part of the management plan for surveillance of a pregnancy in which fetal growth is already a concern.

Some small for gestational age (SGA) fetuses will not have achieved their inherent growth potential (fetal growth restriction FGR) others will be constitutionally small without an underlying pathological process.

2 Guideline Scope

The purpose of this guideline is to provide advice to guide healthcare professionals regarding the *screening* of FGD. The guideline covers screening for both the small and large for gestational age fetus.

This guideline explores ultrasound uses as a *screening* test, for the management of fetal growth disorders which also incorporates ultrasound see the accompanying guideline 'The management of fetal growth disorders.'

The guidance is based on best practice and best evidence available(1).

3 Definitions

Small for gestation age (SGA)

- EFW <10th centile but ≥3rd centile on Intergrowth IG21 chart with normal umbilical artery Doppler pulsatility index (UAPI) (2)

Fetal growth restriction (FGR) in a previous pregnancy as a risk factor ^(SVBLCBv3)

Definition of FGR in a previous pregnancy as a risk factor: defined as any of the following:

- birthweight <3rd centile
- birthweight <10th centile with evidence of placental dysfunction as defined below for current pregnancy.

FGR in a current pregnancy ^(SVBLCBv3)

Definition of FGR in a current pregnancy: defined as either of the following:

- EFW or abdominal circumference (AC) <3rd centile
- EFW or AC <10th centile with evidence of placental dysfunction (either):
 - Abnormal uterine artery Doppler (mean pulsatility index >95th centile) earlier in pregnancy (20 – 24 weeks) and/or
 - Abnormal umbilical artery Doppler ie. absent or reversed end diastolic flow (AREDF) or pulsatility index PI >95th centile).

Large for gestational age (LGA)

- EFW >97th centile on IG21 chart

4 Screening for Fetal Growth Disorders

This screening guideline includes singleton pregnancies only, multiple pregnancies should be managed in accordance with NICE guideline Multiple pregnancy CG129.

4.1 Screening based on Risk Assessment

All women should have a holistic risk assessment undertaken at each contact. For FGD specifically offer risk assessment for FGR at the first trimester antenatal (booking) appointment prior to 14 weeks, and again at the midtrimester scan. Within Badgernet the risk assessment tool for FGR is found on the pregnancy summary page in the Fetal Growth and Pre-eclampsia (aspirin) section under Risk Factors and Medical History. The program will automatically assign a high moderate or low risk of FGR according to table below.

BadgerNet FGR and Pre-eclampsia Risk factors	Sufficient alone to trigger HIGH risk of FGR?	Sufficient alone to trigger MODERATE risk of FGR
Hypertensive disease during a previous pregnancy*	YES	
Chronic kidney disease*	YES	
Autoimmune disease ie SLE / APS	YES	
Type 1 or type 2 diabetes*		
Chronic hypertension*	YES	
Age 40 years or older*		YES
Pregnancy interval of more than 10 years*		
BMI of 35kg/m ² or more at first visit*		
FH of pre-eclampsia*		
Multiple pregnancy*		
First pregnancy*		
Placental histology confirming placental dysfunction in a previous pregnancy		
fibroids		
Previous SGA		YES
Previous stillbirth, appropriate gestational age birthweight		YES
Current smoker at booking*		YES
Drug misuse*		YES
Previous FGR*	YES	
Cyanotic congenital heart disease	YES	
Previous SGA stillbirth	YES	
PAPPA <5 th centile	YES	
Echogenic bowel	YES	
Significant bleeding	YES	
EFW <10 th centile	YES	
Previous pre-eclampsia / PIH <34 weeks	YES	
Previous pre-eclampsia / PIH > 34 weeks	YES	
Epilepsy on anticonvulsants		YES
Pre-eclampsia	YES	
Previous SGA (3 rd -10 th centile)		YES
Previous FGR (<3 rd centile)	YES	
PAPPA <0.415 MoM (<24 weeks gestation)	YES	
*mandatory field in BN.		



FGR risk factor screening outcomes

Women at **low** risk of FGR will continue FGR screening based upon serial symphyseal fundal height measurements from 28 weeks as well as routine assessment of risk factor at each visit.

Women at **moderate** risk of FGR should receive serial ultrasound assessment of fetal growth and umbilical doppler at 32, 35 and 38 weeks.

Women at **high** risk of FGR should receive a UtA doppler assessment between 18+0 and 24+0 weeks, then recommend serial ultrasound assessment of fetal growth and umbilical doppler at 2-4 week intervals from 28 weeks if their UtAD was >95th centile or from 32 weeks if their UtAPI was < 95th centile.

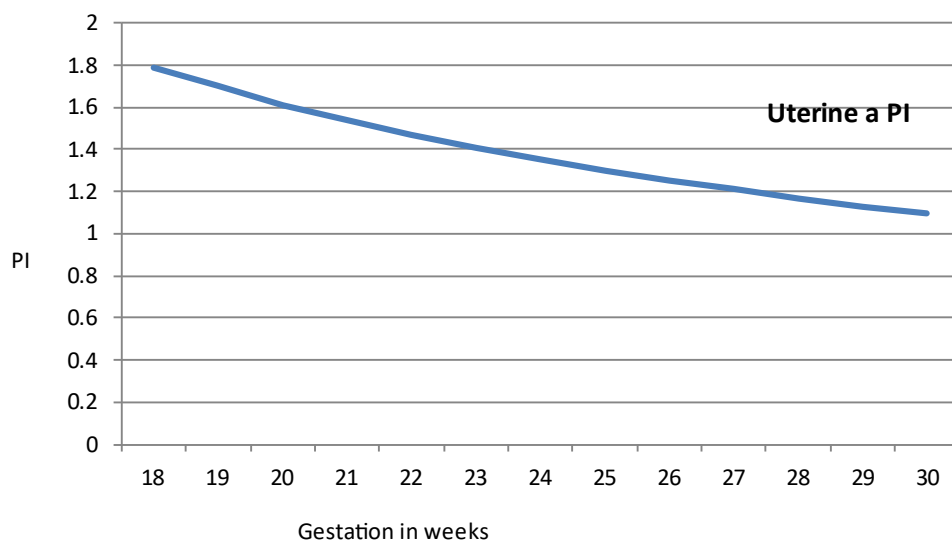
4.2 Screening based on Uterine artery Dopplers (UtAD)

Not all women will receive Uterine artery doppler assessment. Should UtA doppler be indicated (women at high risk of pre-eclampsia and or **high** risk of FGR) it is performed between 18+⁰ and 24+⁰ weeks gestation. There is no need to repeat the UtAPI, but it can be performed later if the woman books late.

Assess both uterine arteries and a mean UtAPI is calculated and plotted on a chart. Do not use notching to stratify risk as this is subjective. The recommended chart is Figure 1 (below). The value can be entered into viewpoint charts or it can be printed and plotted(3).

Uterine Artery PI 95th Centile Range adapted from Gomaz et al 2008 Reference

Ranges for Uterine artery Mean Pulsatility Index at 11-41 weeks of gestation Ultrasound in Obstetrics and Gynaecology
<https://obgyn.onlinelibrary.wiley.com/doi/full/10.1002/uog.5315>
accessed on line 20/10/20

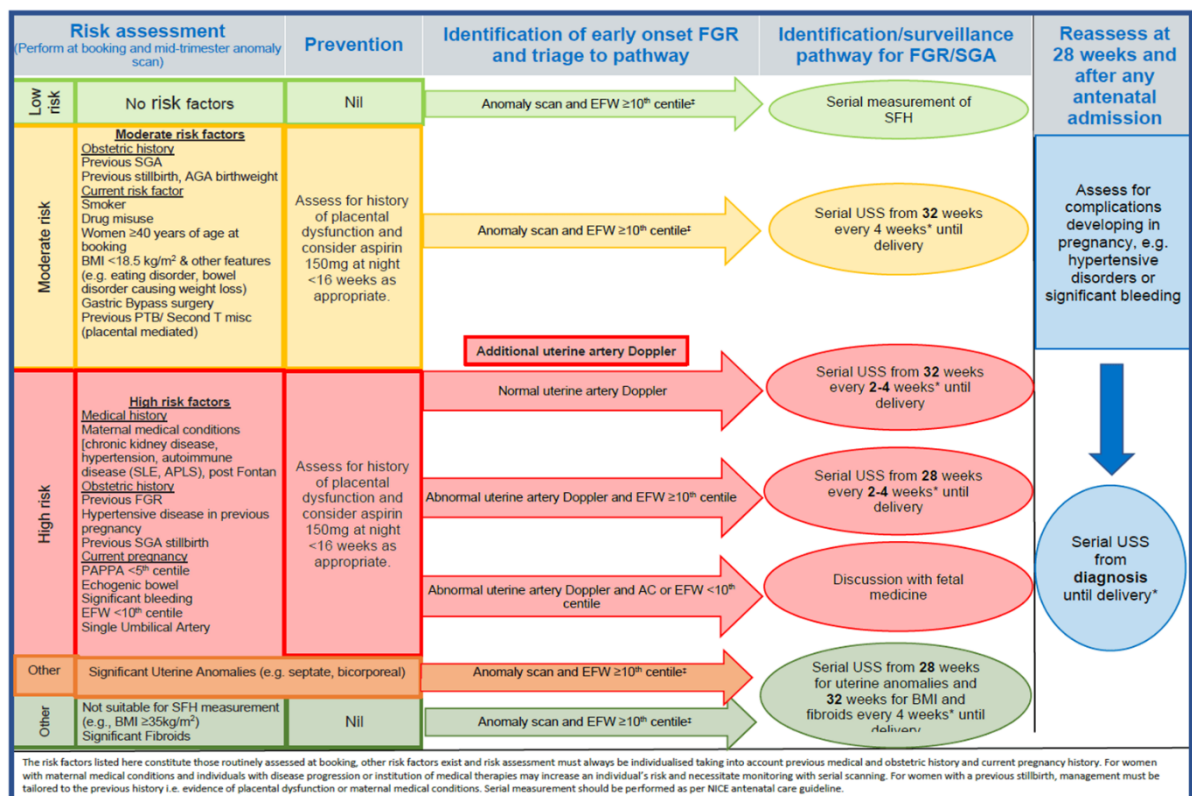


UtAD screening outcomes

UtA doppler is used to determine from which point serial growth scans should commence.

Figure 1. provides an algorithm for using uterine artery Doppler as a screening tool for risk of early onset FGR (SVBLCBv3). Note the use of <10th centile EFW calculated at the time of the routine anomaly scan is preferred over <10th centile AC.

Figure 1.



4.3 Screening based upon blood pressure (BP)

BP should be assessed using a digital BP monitor validated for pregnancy at each antenatal appointment and emergency attendance.

BP screening outcomes

Pre-eclampsia if diagnosed is a risk factor that triggers a high risk of FGR pathway. Similarly, women who develop pregnancy induced hypertension (BP >140/90mmHg as defined by NICE NG133) require ultrasound assessment and if normal repeat every 2-4 weeks(4).

4.4 Screening based upon Symphyseal fundal height (SFH)

SFH is a screening tool as it is only an indirect assessment of the fetal size and liquor volume. Women at low risk for FGR should have surveillance using SFH which should be commenced before 28+6 weeks gestation (SVBLCBv3).

SFH measurements should be plotted or recorded on the IG 21 SFH charts using the electronic patient record (or using a ruler if on paper). IG21 symphyseal fundal height charts are population based charts, for which the 97th 90th 50th 10th and 3rd centiles are provided.

Although the SFH measurements can be plotted from 16 weeks gestation it's use to screen for fetal growth disorders is typically from 24+0 weeks and not more frequently than every 2 weeks (NICE CG201)(5). SFH screening for FGD therefore starts ahead of planned ultrasound surveillance for women at moderate or high risk of FGR.

Women who are undergoing serial ultrasound growth surveillance (whether planned or moved onto a serial ultrasound pathway) should cease SFH measurement **once** serial ultrasound surveillance begins.

Do not measure SFH if within 2 weeks of an ultrasound scan, except as part of the initial risk assessment on presentation at the onset of suspected labour (NICE CG190 Intrapartum care for healthy women and babies)(6,7).

SFH screening outcomes

If there are no SFH concerns, document this and repeat SFH no sooner than 2 weeks.

The following SFH concerns should result in an ultrasound assessment within 3 working days. If this standard cannot be met then a cCTG (computerised CTG) is undertaken at referral followed by medical review.

- The SFH trajectory is suboptimal (use the SFH trajectory curve of the 10th centile line as a reference, i.e. a flatter trajectory between SFH measurement points 2 weeks apart compared to the 10th centile line is suboptimal).
- The SFH is static (no change between measurements 2 weeks apart)
- The SFH measurement is <10th IG21 SFH centile suggesting SGA

For the management outcome based on the ultrasound assessment please refer to NENC Guideline: Management of Fetal Growth Disorders if the fetus is found to be; SGA or FGR. If the EFW is >10th centile and <97th centile the woman should return to screening via SFH. If 2 or more referrals are made for a suspicion of SGA on SFH then a serial scanning pathway should commence.

Women unsuitable for Screening based upon SFH.

Maternal habitus or a fibroid uterus may render SFH less accurate. In these circumstances despite a low risk of FGR (based upon the risk factors within BN) offer serial fetal growth assessments from 32 weeks, even if SFH are within the expected range.

Women with increased SFH measurements:

- **Please follow LGA guidance in NENC Guideline: Management of Fetal Growth disorders**
- If the first measurement is above >97th centile and continues with a normal trajectory, a scan is not required unless previous history of shoulder dystocia.
- If there is an increase in velocity taking a measurement above the 97th centile then refer for a scan
- If there is a clinical suspicion of polyhydramnios, refer for DVP and Doppler.
- Do not offer assessment of blood glucose based on SFH measurements

5. Women commencing pregnancy on a growth chart other than IG21.

This is addressed within the SOP provided in Appendix 1.

References

1. ISUOG Practice Guidelines: diagnosis and management of small-for-gestational-age fetus and fetal growth restriction. *Ultrasound Obstet Gynecol* 2020; 56: 298-312.
2. Papageorgiou AT, Ohuma EO, Gravett MG, et al.: International standards for symphysis fundal height based on serial measurements from the fetal growth



- longitudinal study of the intergrowth 21st project. Prospective cohort study in eight countries. *BMJ*. Nov 07.2016;355:15662.Doi:10.1136/BMJ.15662
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 - National Institute for Health and Care Excellence. (2019, updated 2023) Hypertension in Pregnancy: Diagnosis and management.
 - National Institute for Health and Care Excellence (2021) Antenatal care. NICE guideline NG201
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Appendix 1.

NENC SOP for use during the transition period between GAP and IG21

Version 1.0 April 2023

(Please use this SOP in conjunction with the NENC guidelines on management and screening for fetal growth disorders)

- Following the 'change over' women using Badgernet will no longer have access to GAP/GROW EFW and SFH combined charts
- Those beyond 26 weeks will have had measurements taken; they should be plotted on either IG21 EFW or SFH charts
- There will be a period of 16 weeks for this transitional period
- The premise of this interim SOP is to do what is safest, i.e. if one chart classifies a fetus as either SGA or FGR then management will follow that chart, if this is the IG21 then please see the regional guidance for this use, if this GAP/GROW then see below

EFW charts

- Women with an EFW measurement on GAP/GROW that has been plotted below the 3rd and 10th centile should continue to follow a schedule of serial growth scans unless there is an obvious increase in growth velocity that would justify removing them from a serial scanning pathway as judged by their managing clinician
 - If there is no increase in growth velocity and the EFW continues along its original centile delivery should be recommended at 39 weeks (i.e. manage as SGA)
- Women with an EFW measurement on GAP/GROW that has been plotted below the 3rd centile should continue to follow a schedule of serial growth scans and interim Doppler assessments unless there is an obvious increase in growth velocity that

would justify removing them from a serial scanning pathway as judged by their managing clinician

- If there is no increase in growth velocity and the EFW continues along its original centile delivery should be recommended from 37 weeks (i.e. manage as FGR)
- Women with an EFW measurement on GAP/GROW that was $>10^{\text{th}}$ centile but when moved to IG21 is now $<10^{\text{th}}$ centile should be managed as per the regional guidance for the use of IG21.
 - For those women on serial scanning pathways this will be picked up at their next scan.
 - For those not on serial scanning pathways it will be reliant on the community team checking the IG21 EFW chart when they next see the woman

SFH charts

- All new measurements made on SFH chart should be compared to previous ones (these will automatically transition across when the charts are switched over)
- If a prior SFH measurement was $>10^{\text{th}}$ centile on GROW/GAP but $<10^{\text{th}}$ centile on IG21 SFH and the next SFH measurement is also $<10^{\text{th}}$ centile a scan is required
- If women contact their community team because they have noted that by moving charts their SFH measurements place their baby $<10^{\text{th}}$ centile or $>97^{\text{th}}$ centile they should be reassured no immediate action is required. A plan will be made at their next community midwife visit when a further SFH measurement can be taken, this should be 2-3 weeks from the last measurement
- Women who have a SFH $<10^{\text{th}}$ centile by SFH on GROW/GAP where a scan is planned within 72 hours should keep this planned appointment even if on transition of charts the SFH measurement on IG21 is $>10^{\text{th}}$ centile.

