Small for Gestational Age (SGA) and Fetal Growth Restricted Babies – Antenatal Management All Wales Guidance including management of unexpected SGA following birth in Powys

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The latest approved version of this document is online.
If the review date has passed please contact the Author for advice.

Powys Teaching Health Board is the operational name of Powys Teaching Local Health Board
Bwrdd Iechyd Addysgu Powys yw enw gweithredol Bwrdd Iechyd Lleol Addysgu Powys

Version Control

Version	Summary of Changes/Amendments	Issue Date
1	Initial Issue: supersedes local guideline MAT040	FEB 2023
2	Change of guideline around plotting of measurements and use of a new Perinatal Institute tool.	Oct 2023
3	Acknowledgement that this is overdue review on an all-Wales basis and addition of detail regarding e-cigarettes and nicotine replacement therapy	21/02/2025

ENGAGEMENT & CONSULTATION

Key Individuals/Groups Involved in Developing this Document

Role / Designation
Consultant midwife PTHB – representative on All Wales Maternity and Neonatal Network Guideline Group **PTHB review:** Midwife sonographer Training and Governance Lead Ultrasound Infant feeding coordinator Women and Children's risk and governance lead Consultant midwife

Circulated to the following for Consultation

Date	Role / Designation
23/12/24	Powys Midwives including DAU staff
23/12/24	Midwifery Leadership and Management team
23/12/24	Members of Women and Children's policy and guideline group
23/12/24	Training and Governance Lead Ultrasound
23/12/24	Ultrasound/Radiology team

Groups approved at

Date	Group
06/09/2021	All Wales Maternity & Neonatal Network Guidelines Group
7/1/2025	Maternity Guidelines Group
21/1/2025	Women and Children's policy & Guideline Group

Evidence Base

Please list any National Guidelines, Legislation or Health and Care Standards relating to this subject area?

Growth Assessment Protocol (2020)
NHS England – Saving Babies Lives Care Bundle – version 2 (2019)
NICE guideline for antenatal care in uncomplicated pregnancies: CG62 (2019)
NICE Guideline for preterm labour and birth: NG25 (2019)
RCOG Green top Guideline 31 – Management of small for gestational age (2014 and 2024)
2022 Hugh O, Gardosi J, Fetal weight projection model to define growth velocity and validation against pregnancy outcome in a cohort of serially scanned pregnancies. Ultrasound in Obstetrics & Gynaecology. Vol 60, Issue 1, pages 86-95 accessed on. 31/08/23 Fetal weight projection model to define growth velocity and validation against pregnancy outcome in a cohort of serially scanned pregnancies - Hugh - 2022 - Ultrasound in Obstetrics & Gynecology - Wiley Online Library

January 2025 – it is acknowledged that the all-Wales guideline is overdue for review. The guideline will remain in use until the updated version is received.
For guidance on the use of Aspirin in pregnancy refer to MAT 072: Aspirin in pregnancy guideline and local associated PGD.

Powys Caveats:
The All-Wales Guideline will be adopted for use in Powys Teaching Health Board with the following caveats in place:

Section 2 of all-Wales guideline
Women with a BMI <18kg/m2. This is not currently included under the Perinatal Institute guideline. Powys maternity service will complete growth scans for these women under a midwife-led serial scan pathway. These

women will not need obstetric opinion unless there are comorbidities or history of eating disorder (as per MAT030 midwifery-led care guideline).

Severe anaemia noted to be <90g/l should have an obstetric review for a plan of care regarding growth scans and this should be documented in the pregnancy handheld records and/or the plan emailed to day assessment unit (DAU) team. This is in line with MAT030 midwifery-led care guideline.

Section 3 of all-Wales guideline

Powys will follow the Perinatal Institute guidance on the method to ascertain if fetal growth trajectory is normal using the GROW 2.0 programme.

- Midwives performing standardised fundal height (SFH) measurement or using estimated fetal weight from ultrasound scan should use the current and previous measurement in GROW 2.0 on the woman's electronic customised chart. This will come up with the result of 'normal, slow or accelerated'
    - If 'slow' growth noted using SFH, refer to DAU for a growth scan within 72 hours.
    - If there have been a scan within normal parameters and the client is referred back to MLC, the last SFH and the newest can be entered into the tool. (these may be six weeks apart now)
    - It is not necessary to print a new copy of the chart and put it in the notes unless they are going to an obstetric unit.
    - If 'slow' growth is noted on ultrasound scan, referral to an obstetric unit should be made for review within 72-hours.
- Whilst this is a tool, it is important to consider the wider clinical picture or if there are clinical concerns.
- The recommendation from the Perinatal Institute is to have no less than a gap of 14 days and the tool will not give a figure in this instance.

Section 5 of all-Wales guideline

In accordance with MAT030 midwifery-led care guidelines, cases of previous small for gestational age will be referred for serial growth scans, which can be conducted in Powys. These women should be offered consultant/obstetric opinion in pregnancy following their dating scan. On the referral form the midwife should state that growth scans have been arranged in Powys as per this guideline. The consultant will therefore be aware of the plan for scans and will have the opportunity to review and provide an alternative plan of care. As per MAT030 midwifery-led care guideline, if serial scans are normal in pregnancy, then the woman can be treated as midwifery-led care for labour and birth.

Women who smoke can have serial growth scans in Powys. The criteria for inclusion is any smoker in pregnancy or those who recently quit smoking (within the last 2 weeks) with a CO ≥ 4ppm.
They can be referred for these scans by the community midwife and continue to follow the midwifery-led care pathway. They will require an individual assessment by the midwife to ascertain that there are no additional risk factors, which warrant an obstetric review, if smoking is the only risk factor then a referral for obstetric opinion will not be needed. As per MAT030 midwifery-led care guideline, if serial scans are normal in pregnancy, then the woman can be treated as midwifery-led care for labour and birth.

If at any time during the pregnancy, a fetal growth scan is identified to have an abnormal growth trajectory the midwife sonographer will refer the pregnant woman to the hospital of their choice for review and plan of care by an obstetrician. The referral will be undertaken via telephone initially. It is expected that the woman is seen that day or the following day dependent on the findings and surrounding circumstance.

Use of e-cigarettes (vaping) or nicotine replacement therapy (NRT):
Serial growth scans should be offered for:

- Use of e-cigarettes or vaping with a CO ≥ 4ppm
- Nicotine replacement therapy (NRT) with a CO ≥ 4ppm

For women using NRT or e-cigarettes with a CO < 4ppm the initial surveillance pathway will be CO monitoring at each appointment and SFH measurements. If either of the above criteria is detected prior to the third trimester then the woman will be recommended a serial scan pathway from 28 weeks.
If either of the above criteria is detected within the 3rd trimester, a referral for serial growth USS should be completed and **scan completed within 72 hours.**

Section 6 of the all-Wales guideline
Powys will offer serial growth scans in cases where a low serum PAPP-A is incidentally detected through combined screening. The Day Assessment Unit (DAU) team will contact the woman in this instance and offer the serial growth scans. The DAU team will notify the named midwife who will offer referral for obstetric led care as per the midwifery-led care guidelines (MAT030). Serial growth scans can be arranged and conducted in Powys, but the consultant obstetrician must be informed if these have been put in place in case an alternative plan of care is required. The leaflet in Appendix 4 will be provided to support and inform the discussion.

Section 9 of the all-Wales guideline

Uterine artery dopplers are not available in Powys. Eligible women are automatically classified as obstetric-led care (as per MAT030 midwifery-led care guidelines) and require a referral by the named midwife to the DGH of the pregnant woman's choice. The named midwife should state on the referral the eligibility for the test.

Women requiring fetal mid-cerebral artery dopplers are to be identified and conducted in a DGH fetal medicine department.

Auditing compliance with the guidelines will be undertaken as part of the record-keeping audits and DATIX system reviews. Monthly image audits are to be conducted by the Governance Lead to ensure clinical standards are maintained.

Section 10 of the all-Wales guideline
Where a fetus is known to be plotting below the 10th centile, labour and birth will be recommended within the obstetric unit. The clinical information sharing (CIS) process will need to be followed in cases where a baby is expected to be below the 10th centile.

Unexpected or undetected small for gestational age born in Powys:
All babies have a growth centile generated following birth. This helps to ascertain any additional monitoring that may be required. If a baby is born in Powys and is below the 10th centile but above the 2nd centile then transfer to a DGH is not required unless otherwise clinically indicated. Ensure steps are taken to reduce the risk of hypothermia and hypoglycaemia as per guideline MAT083.

All babies born on or under the 2.0 centile should be recommended to have a neonatal review and observations in hospital (as per MAT030 midwifery-led care guideline). Transfer should be arranged to the nearest DGH for the neonate to be commenced on a hypoglycaemia pathway. Please see guideline MAT083 for more detail.

Undetected SGA audit process – see Appendix 5:
On completion of a Datix by the community midwife following birth, the woman's handheld notes will be given to the relevant DAU to complete an audit and for the information to be submitted on the GAP score system within the Perinatal Institute. An image review will be undertaken by the Ultrasound Governance Lead if the error rate between scan and birth weight is over 10% and the ultrasound scan was undertaken in the 10 days prior to birth.

This guideline should be used in conjunction with:

- MAT030: All-Wales Midwifery-Led Care Guideline
- MAT079- Informed Choice, Personalised Care and The Care Of Women Making Choice Outside Of Recommended Guidelines
- MAT083 – Management and prevention of hypoglycaemia in the undiagnosed/unplanned at-risk neonates born in a community setting

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Rhwydwaith Mamolaeth a Newyddenedigol Cymru
Wales Maternity and Neonatal Network

All Wales Maternity & Neonatal Network Guidelines

Small for Gestational Age and Fetal Growth Restricted Babies – Antenatal Management

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Guideline Group:
Ratified by: Wales Maternity Guideline Committee (WMGC), Wales Maternity and Neonatal Network
Original Publication Date:

Summary of reviews/amendments					
Version	**Date of Review**	**Reviewer name(s)**	**Completed action**	**Ratified on**	**New review date**
1.0	New Guideline				August 2024

Documents to read alongside this guideline	

Contents:

The Investigation and Management of the Small for Gestational Age Fetus

1. Introduction, Purpose and Scope

Small for gestational age (SGA) refers to an infant born with a birth weight less than the 10th centile, and corresponds to an estimated fetal weight (EFW) or abdominal circumference (AC) of <10th centile.

Severe SGA is considered to be an EFW or fetal AC of < 3rd centile. [1]

Fetal growth restriction (FGR) is not synonymous with SGA, as 50-70% of SGA fetuses are constitutionally small with appropriate growth for maternal size and ethnicity. However the likelihood of FGR is higher in SGA infants, and involves a pathological restriction of the genetic growth potential, perhaps leading to fetal compromise.

SGA fetuses are at increased risk of perinatal morbidity and mortality but most adverse outcomes are concentrated to the FGR group.

Diagnosis of SGA fetuses relies on ultrasound measurement of fetal AC or EFW.

This document contains guidelines for management of SGA babies and babies with FGR but they are not meant to be exhaustive or fully comprehensive encompassing all possible clinical variations. While implementing this guideline, health care providers must exercise their own clinical judgement dependent on individual clinical circumstance.

2. Causes

Constitutionally Small	Non-placenta mediated growth restriction	Placenta mediated growth restriction
• Normal growth achieved	• Structural anomaly • Chromosomal anomaly • Inborn error of metabolism • Fetal infection	• Low maternal BMI (<18) • Maternal malnutrition • Substance abuse • Severe anaemia • Pre-eclampsia • Autoimmune disease • Thrombophilias • Renal disease • Diabetes • Essential hypertension (HTN)

3. Diagnosis and definition of Small for Gestational Age (SGA) and Fetal Growth Restriction (FGR)

In Fetal growth restriction (FGR), the fetus does not reach its biological growth potential as a consequence of impaired placental function, which may be because of a variety of factors. Fetuses with FGR are at risk for perinatal morbidity and mortality, and poor long-term health outcomes, such as impaired neurological and cognitive development, and cardiovascular and endocrine diseases in adulthood.

The curve generated by plotting EFW s of a normally growing baby on Gestation Related Optimal Weight (GROW) chart, should follow any particular centile or remain parallel to the printed centile curves on the GROW chart.

SGA is diagnosed when estimated fetal weight (EFW) is <10th centile on Customised growth chart. The EFW should be plotted on a customised fetal weight chart, i.e. Gestation Related Optimum Weight (GROW) chart.

Available individual biometry measurements do not have any customized centiles. For population charts readers should refer to the standard fetal biometry measurements. [*2,3,4,5*]

FGR is diagnosed when the curve resulting from plotting of EFW s on GROW chart crosses centiles and shows a downward trend, that is, their growth curve does not run parallel to any of printed centile curves and it tends to deviate downwards suggesting slowing of rate of growth. For diagnosis of fetal growth restriction (FGR) two consecutive ultrasound measurements of EFW should be at least 3 weeks apart to minimize false positive diagnosis.

SGA (EFW below 10th centile) differs from FGR principally because it also encompasses a majority of constitutionally small but healthy fetuses at lower risk of abnormal perinatal outcome. On the other hand, growth-restricted fetuses with estimated fetal weight (EFW) or biometry>10th centile may not meet their growth potential, and may remain undiagnosed despite being at increased risk of adverse outcome. This means that FGR could be present at EFW s above the 10th centile for gestational age.

Severe SGA is defined as EFW <3rd centile at any gestational age or fetal AC < 3rd centile at routine anomaly scan.

FGR babies might present with abnormal umbilical artery Doppler (UAD) pulsatility index (PI) of > 95th centile, absent or reversed end diastolic flow (EDF) in umbilical artery or cerebroplacental ratio of < 5th centile [6]

For further description about diagnosis of SGA and FGR and plotting of EFW on GROW chart, please refer to the following website links.

https://www.perinatal.org.uk/FetalGrowth/Examples
https://www.perinatal.org.uk?GAP/slow_growth.mp4

4. Fundal height measurement

Fundal height is a better terminology to use to indicate symphysis fundal height as the recommended measurement technique is from the top of the uterine fundus to the symphysis pubis. Whereas Symphysis fundal height is prone to make the wrong impression that uterine fundal height should be measured from the Symphysis pubis to the uterine fundus.
Measurement should commence at 26 to 28 weeks of gestation.
Serial measurement of fundal height should be done at each antenatal appointment from 26 to 28 weeks. All SFH measurement should be plotted on customised growth charts.

Refer to local Health Board Guidelines on this matter.

4.1 First measurement of Fundal height < 10th centile or static growth

A single fundal height measurement below the 10th centile or serial measurements demonstrating slow or static growth should be referred for ultrasound assessment in Ultrasound Department to be done as soon as possible, ideally within 72 hours or as soon as possible. The ultrasound scan should estimate fetal weight, deepest vertical pool of amniotic fluid and umbilical artery Doppler.

If the ultrasound scan findings are all normal in a low risk woman then continue antenatal care as usual

If ultrasound scan is not possible within 72 hours, then obstetric review must take place as soon as possible for clinical examination and consideration about fetal monitoring with cardiotocogram

For women in whom fundal height is prone to be inaccurate (e.g. hydramnios, multiple pregnancy, BMI > 35, uterine fibroid) refer to local guidelines or obstetrician's opinion or guidance below for considering fetal growth scans.

5. Booking Risk Assessment

All women should be assessed at booking for risk factors for an SGA fetus to identify those requiring care led by the consultant team including need for increased surveillance.

Women with **one major** risk factor (section 6) for SGA neonate should be offered serial ultrasound measurement of fetal size and wellbeing with umbilical artery Doppler.

Women with certain major risk factors (section 6) should be offered uterine artery Doppler (UtAD) screening. See section 9.

Women with BMI equal to or more than 35, large or multiple fibroids should be offered serial fetal growth scans.

Uterine artery Doppler will be performed in Fetal Medicine Unit (FMU) or by an appropriately qualified Sonographer between 20 to 23 weeks of gestation.

6. Risk Assessment (by community or hospital midwife, General Practitioner or obstetrician) for small for gestational age fetus.

Major Risk Factors

Personal

- Maternal age equals or more than 40 years
- Smoker (Any)
- Cocaine use or drug misuse
- Maternal BMI at booking <18

Past History

- Previous SGA (Birth weight < 10th centile)
- Previous stillbirth
- Previous pre-eclampsia resulting in birth before 34 weeks of gestation
- Previous pre-eclampsia

Current Pregnancy factors

- Low serum PAPP-A (<0.415 MoM) in first trimester
- Chronic hypertension
- Cyanotic Heart disease
- Diabetes and vascular disease
- Renal disease
- Anti-phospholipid syndrome or Systemic Lupus Erythematosus
- Heavy bleeding (like menstrual period) or recurrent vaginal bleeding in first trimester
- Significant bleed in pregnancy
- Women with large or multiple uterine fibroid which leads to clinically significant distortion of size or shape of uterus
- Maternal BMI > 35.
- Echogenic fetal bowel

7. Overall plan for antenatal care

Women with **one major risk factor** for SGA neonate:

- Should be offered serial ultrasound measurement of fetal weight every 3-4 weeks starting at 28 weeks and where indicated, umbilical artery Doppler, until birth (except those with abnormal uterine artery Doppler)
- All estimated fetal weight (EFW) should be plotted on customized growth chart, that is **G**estation **R**elated **O**ptimal **W**eight (GROW) chart.
- If SGA or FGR is detected then follow guidelines as stated below.
- Consider aspirin (75 to 150 mg) from 12 weeks 0 days if risk factors for pre-eclampsia (see section 8).

Uterine artery Doppler will be performed in Fetal Medicine Unit (FMU) or by an appropriately qualified Sonographer between 20 to 23 weeks of gestation.

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- If SGA or FGR is detected then follow guidelines as stated below.
- Consider aspirin (75 to 150 mg) from 12 weeks 0 days if risk factors for pre-eclampsia (see section 8).

- Refer for UtA Doppler where indicated as mentioned in section 9.

8. Prophylactic administration of 75-150 mg Aspirin (to be started after 12 weeks 0 days until birth) [7]

8.1 High Risk factors

Give prophylactic aspirin if **any one** of the following high-risk factors present

- Hypertensive disease during previous pregnancy
- Chronic kidney disease
- Autoimmune disease- Systemic Lupus Erythematosus (SLE), Anti-phospholipid antibodies (APLA).
- Type 1 or 2 Diabetes Mellitus (DM)
- Chronic hypertension

8.2 Moderate Risk factors

Give prophylactic aspirin from 12 weeks 0 days if **more than one** moderate risk factor present.

- First pregnancy
- Age > 40 years
- Pregnancy interval > 10 years
- BMI >35 kg/m2
- Family history of pre eclampsia
- Multi-fetal pregnancy

9 Uterine Artery Doppler (In Fetal Medicine Unit or by appropriately trained sonographer). See Appendix 2C.

9.1 Indications

- Previous hypertensive disorder of pregnancy (including pre-eclampsia) requiring birth before 34 weeks 0 days.
- Previous stillbirth with EFW <10th centile in the absence of any congenital abnormality or infective etiology.
- Previous SGA or FGR baby weighing < 3rd centile for gestational age in the absence of congenital or infective etiology.
- Hypertensive disease in current pregnancy requiring treatment with anti-hypertensive medication in pregnancy before 20 weeks of gestation.

9.2 Timing of Uterine artery Doppler

20 weeks 0 days to 23 weeks 0 days.

Normalization of uterine artery flow velocity indices at later gestation does not abolish risk of SGA.

9.3 If **normal** Uterine artery Doppler

- Serial ultrasound scan (USS) from 28w 0d every 3 to 4 weeks until birth. USS should include calculation of EFW, measurement of amniotic fluid (AF) deepest vertical pool (DVP).
- Every measurement of EFW should be plotted on GROW chart
- If EFW < 10th centile (i.e. SGA) or FGR then Umbilical artery Doppler and AF DVP should be measured and documented.
- If static growth or FGR then Umbilical artery Doppler and AF DVP should be measured and documented.

9.4 If **abnormal** uterine artery Doppler (pulsatility index > 95th centile) and/or notching.
(For suggested example of uterine artery and other fetal vascular Doppler values, see Appendix 1)

- Serial ultrasound assessment of fetal size, AF DVP and umbilical artery Doppler starting at 24 weeks at intervals of 3 weeks.
- Every measurement of EFW should be plotted on GROW chart

10. Fetal Surveillance

10.1 Umbilical Artery Doppler (UAD)

UAD should be performed for all SGA and FGR babies.

Normal UAD is a Pulsatility Index (PI) value equal to or less than 95th centile.

Abnormal UAD is a PI value of >95th centile or absent or reversed end diastolic flow (EDF).

If EDF is present then UAD examination should be performed to measure and document Pulsatility Index (PI).

All UAD PI more than 95th centile should be documented as such in the report (please see reference values in Appendix 1)

Absent or reversed PI should be documented.

(*For suggested example of reference charts of umbilical artery PI values and other fetal vessel Doppler values, see Appendix 1)*

- For SGA or FGR fetus (where delivery is not indicated) with abnormal UAD more frequent UAD surveillance is necessary as follows (RCOG GTG No.31)[1]

  UAD PI value more than 95th centile but EDF present: repeat UAD **twice every week**

  If absent/reversed EDF (AREDV) or flow: Consultant to review and decide. If

delivery is not indicated, then **daily** UAD should be undertaken

10.2 Cardiotocography (CTG)

- This should be used as complimentary method to other methods of surveillance.
- Ideally computerized CTG (cCTG) should be used and interpretation should be based on short term variation (STV) of fetal heart rate on computerized analysis (RCOG GTG No.31)[1].
  Refer to local Health Board Guidelines on Computerized CTG.
- Generally, if UAD PI >95th centile in a SGA or FGR baby then CTG should be considered twice a week.
- If UAD shows AREDF and **delivery is not indicated** then CTG should be carried out at least twice a day.

10.3 Amniotic fluid volume

- Should be reported as Deepest Vertical Pool (DVP)
- Reference should be made to local Health Board Guidelines on increased amniotic fluid volume.
- This should be used as complimentary method to other methods of surveillance.
- A DVP value between 2 to 8 cm is normal.

10.4. Middle cerebral artery (MCA) Doppler. In most health boards this is likely to be done in Fetal Medicine Unit.

- In preterm SGA fetus MCA Doppler alone has limited role in timing delivery (RCOG GTG No.31)

- In SGA fetus at more than 34w 0d of gestation MCA Doppler may be considered for calculation of Cerebroplacental ratio to time delivery.

  (Refer to chart in Appendix 1)

10.5. Ductus venosus Doppler. In most health boards this is likely to be done in Fetal Medicine Unit.

- Has moderate predictive value for acidaemia and adverse outcome.
- Should be used for surveillance in SGA/FGR fetus at <32 weeks of gestation and with absent or reverse end diastolic flow (AREDF) on umbilical artery Doppler and used to time delivery.

11. Indication for referral to Fetal Medicine Unit (FMU). See Appendix 3.

- EFW < 3rd centile for gestational age (severe SGA) at or less than 24 weeks of gestation.
- Static growth or FGR on ultrasound assessment with EFW < 10th centile **and** at < 32 weeks of gestation with abnormal Umbilical artery Doppler (see below) with or without AF DVP < 2 cm [not spontaneous rupture of membrane (SROM)]
- Normal growth at < 32 weeks of gestation with abnormal umbilical artery Doppler or AF DVP < 2 cm (not SROM).
- Static growth or FGR on ultrasound assessment at > 32 weeks with EFW < 3rd centile and abnormal umbilical artery Doppler
- Fetal abdominal circumference measurement < 3rd centile at routine fetal anomaly scan (FAS).

11.1 Actions to be taken for severe SGA fetus (EFW < 3rd centile for gestation) detected at less than 24 weeks of gestation

- If severe SGA diagnosed at 18-20 week scan refer to the Fetal Medicine Clinic for detailed anatomical survey & uterine artery Doppler.

- Karyotyping should be offered in severely SGA fetuses (EFW < 3rd centile on GROW chart) and/or those babies with structural anomalies and in those < 23 weeks gestation, particularly if uterine artery Doppler is normal.

- Serological screening for cytomegalovirus (CMV) and toxoplasmosis should be offered in severe SGA fetuses.

- In high risk populations consider testing for syphilis and malaria.

- Serial scan for fetal growth, amniotic fluid DVP and UAD should be carried out at intervals of 2 weeks followed by review by obstetrician.

- If abnormal UAD, then act as mentioned in section 8.1.

- If delivery is considered between 24 weeks and 34 weeks 6 days, or if planned caesarean section is necessary for delivery before 39 weeks, a single course of prophylactic antenatal corticosteroids should be offered.

12. TIMING OF DELIVERY

Refer to local Health Board Guidelines for guidance on Computerized CTG.

Prophylactic antenatal steroid should be considered for births before 35 weeks 6 days of gestation. [8]

SGA < 32 weeks with absent or reverse end diastolic flow (AREDF) in Umbilical artery (UA)

Referral to FMU

- Ductus venosus (DV) and umbilical vein Doppler is recommended, and if abnormal, delivery is indicated provided the fetus is considered viable* and steroids have been given. Even with normal DV Doppler, delivery should be considered between 30-32 weeks.
- Computerised CTG (cCTG) should be used if DV Doppler service unavailable. Delivery is recommended with short term variability (STV) equal to or less than 3ms or if persistent deceleration or bradycardia.

SGA equals or >32 weeks with AREDF in UA

- Delivery should be considered if viable baby*.

SGA >32 weeks with abnormal umbilical artery Doppler (PI > 95th centile).

- Dependent on whether associated FGR, delivery should be considered no later than 37/38 weeks of gestation. If no fetal growth for 2-3 weeks then consider delivery before 37 weeks.
- If STV on cCTG is equal to or less than 3 ms or if persistent decelerations or bradycardia, delivery is recommended.

SGA >32 weeks with normal umbilical artery Doppler.

- A senior obstetrician should decide mode of delivery.
- If no FGR, delivery should be considered at 37 to 39 completed weeks of gestation.

Mode of Delivery

- For SGA fetus with AREDV, caesarean section is recommended.
- For SGA fetus with normal or abnormal umbilical artery PI (PI>95th centile but end diastolic velocities present), induction of labour may be offered. Continuous CTG should be performed from onset of uterine contractions.
- Those in spontaneous labour should be admitted early for continuous CTG.

baby may be considered to be viable if EFW is more than 500 g and no fetal abnormality. If delivery is considered then discussion should take place with local neonatologist or paediatrician before delivering baby. A full course of antenatal prophylactic steroids to mother is recommended in these circumstances.

11. References

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Appendix 1: suggested example of reference tables for Doppler of umbilical Artery, middle cerebral artery & uterine artery and cerebroplacental ratio

	Umbilical Artery PI °		MCA PI °		Cerebroplacental Ratio (CPR) °		Mean Uterine Artery PI	
	>95th percentile is abnormal		**<5th percentile is abnormal**		CPR = MCA PI/UA PI **<5th percentile is abnormal**		Mean PI = (RT PI + Lt PI/2) **>95th percentile is abnormal**	
Gestation Weeks	50th percentile	95th percentile	50th percentile	5th percentile	50th percentile	5th percentile	50th percentile	95th percentile
18							1.20	1.79
19	1.25	1.63					1.15	1.70
20	1.22	1.59					1.10	1.61
21	1.19	1.55					1.05	1.54
22	1.17	1.52					1.00	1.47
23	1.14	1.48					0.96	1.41
24	1.12	1.47	1.86	1.38	1.74	1.16	0.93	1.35
25	1.09	1.44	1.94	1.44	1.85	1,24	0.89	1.30
26	1.06	1.41	2.01	1.50	1.95	1.32	0.86	1.25
27	1.03	1.38	2,06	1.55	2.05	1.40	024	1.21
28	LOD	1.35	2.11	1.58	2.14	1.47	0.81	1.17
29	0.98	1.32	2.15	1.61	2.21	1.53	0.79	1.13
30	0.95	1.29	2.16	1.62	2.28	1.58	0.77	1.10
31	0.93	1.27	2.16	1.62	2.32	1.62	0.75	1.06
32	0.90	1.25	2.14	1.61	2.35	1.64	0.73	1.04
33		1.22	2.10	1.58	2.36	1.65	0.71	1.01
34	0.86	1.20	2.04	133	2.35	1.63	0.70	0.99
35	0.84	1.18	136	1.47	2.32	1.60	0.69	0.97
36	0.82	1.16	1.86	1.39	2.27	1.55	0.68	0.95
37	0.80	1.14	1.75	1.30	2.19	1.48	0.67	0.94
38	0.78	1.12	1.63	1.20	2.09	1.40	0.66	0.92
39	0.76	1.10	1.49	1.10	1.97	1.29	0.65	0.91
40	0.75	1.09	1.29	1.02	1.80	1.24	0.65	0.90

References:

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Appendix 2 A: Major Risk Factors (High Risk Pregnancy)

Need serial growth scans from 28 weeks every 4 weeks until birth
(except those who qualify for uterine artery Doppler -see Appendix 2C)

Major Risk Factors

Personal

- Maternal age equals or more than 40 years
- Smoker (Any)
- Cocaine use or drug misuse
- Body mass index less than 18.

Past History

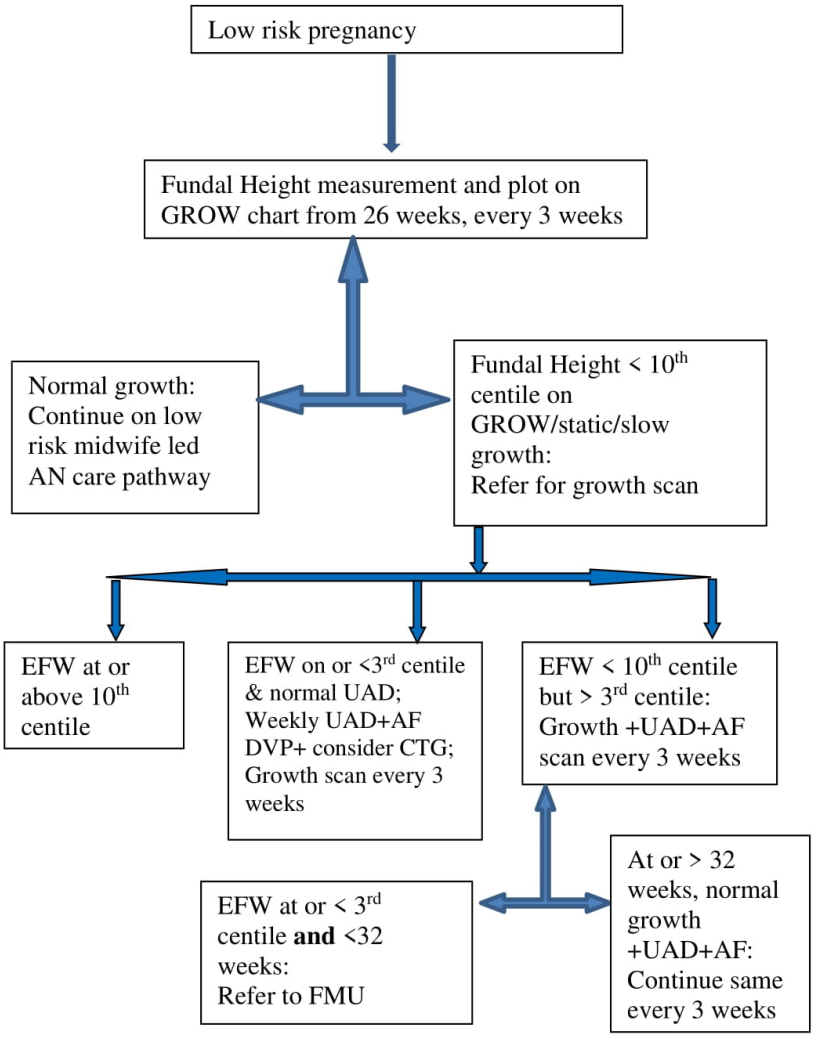
- Previous SGA (Birth weight < 10th centile)
- Previous stillbirth
- Previous pre-eclampsia resulting in birth before 34 weeks of gestation
- Previous pre-eclampsia

Current Pregnancy factors

- Low serum pregnancy associated placental protein (PAPP-A) at <0.415 MoM in first trimester
- Chronic hypertension
- Cyanotic Heart disease
- Diabetes and vascular disease
- Renal disease
- Anti-phospholipid syndrome or Systemic Lupus Erythematosus
- Heavy bleeding (like menstrual period) or recurrent vaginal bleeding in first trimester
- Significant bleed in pregnancy
- Women with large or multiple uterine fibroid which leads to clinically significant distortion of size or shape of uterus
- Maternal BMI > 35.
- Echogenic fetal bowel

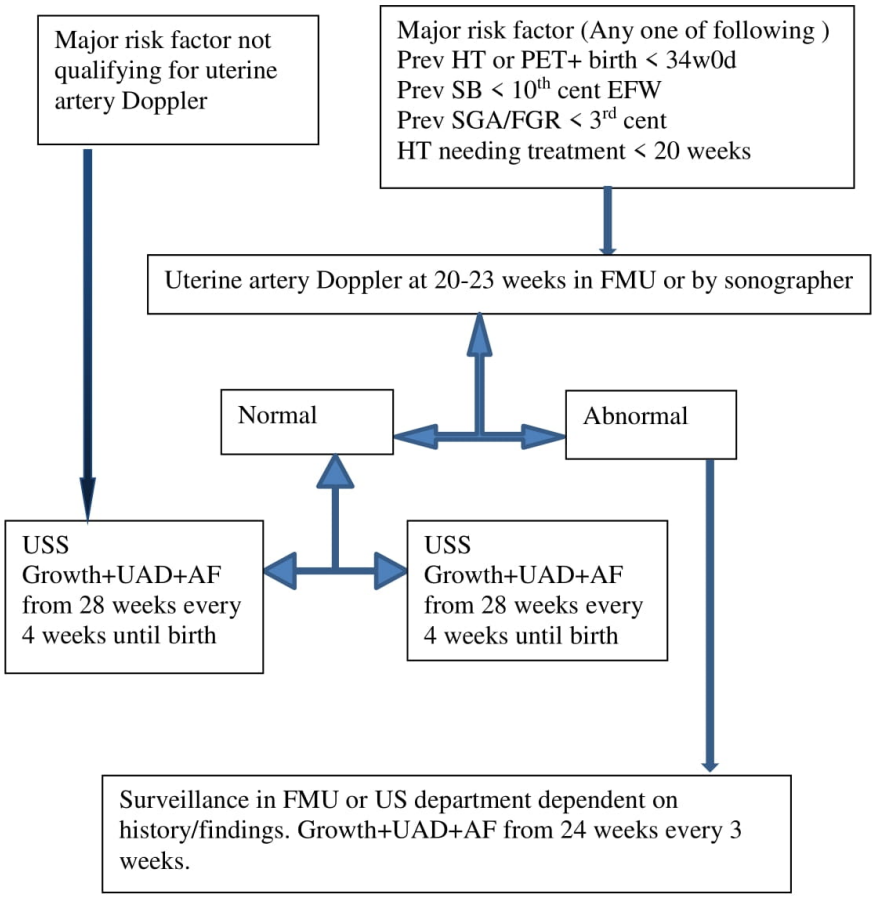
Appendix 2 B : Low Risk Pregnancy

(Abbreviations:AF DVP: amniotic fluid deepest vertical pool; CTG: cardiotocography; EFW: estimated fetal weight; FMU: Fetal Medicine Unit; GROW: Gestation related optimum weight; HT: hypertension; PET: pre-eclampsia; UAD: umbilical artery Doppler)



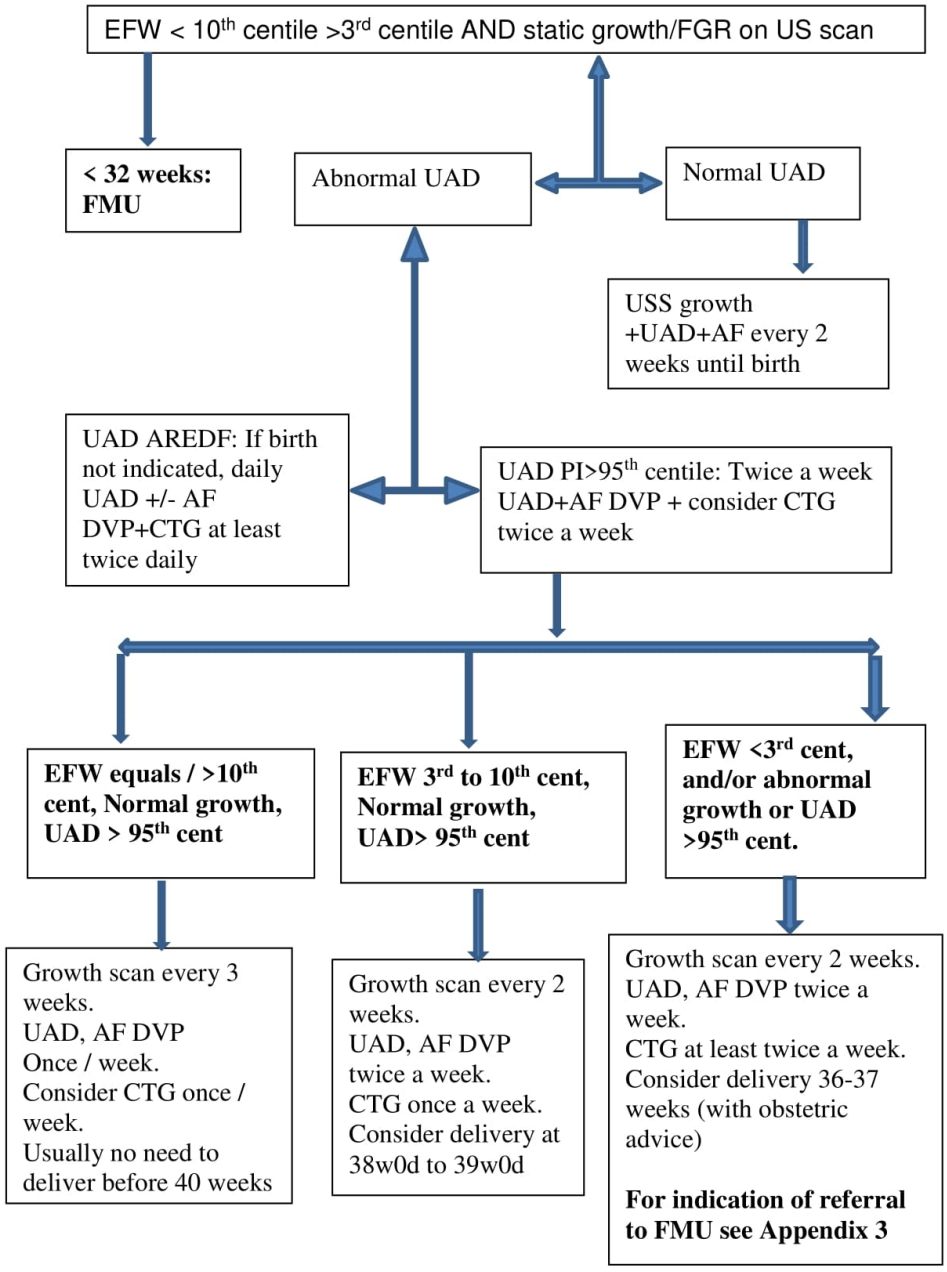
Appendix 2 C: High Risk Pregnancies and Uterine artery Doppler (In FMU or US department)

(Abbreviations: AF DVP: amniotic fluid deepest vertical pool; CTG: cardiotocography; EFW: estimated fetal weight; FMU: Fetal Medicine Unit; HT: hypertension; PET: pre-eclampsia; UAD: umbilical artery Doppler)



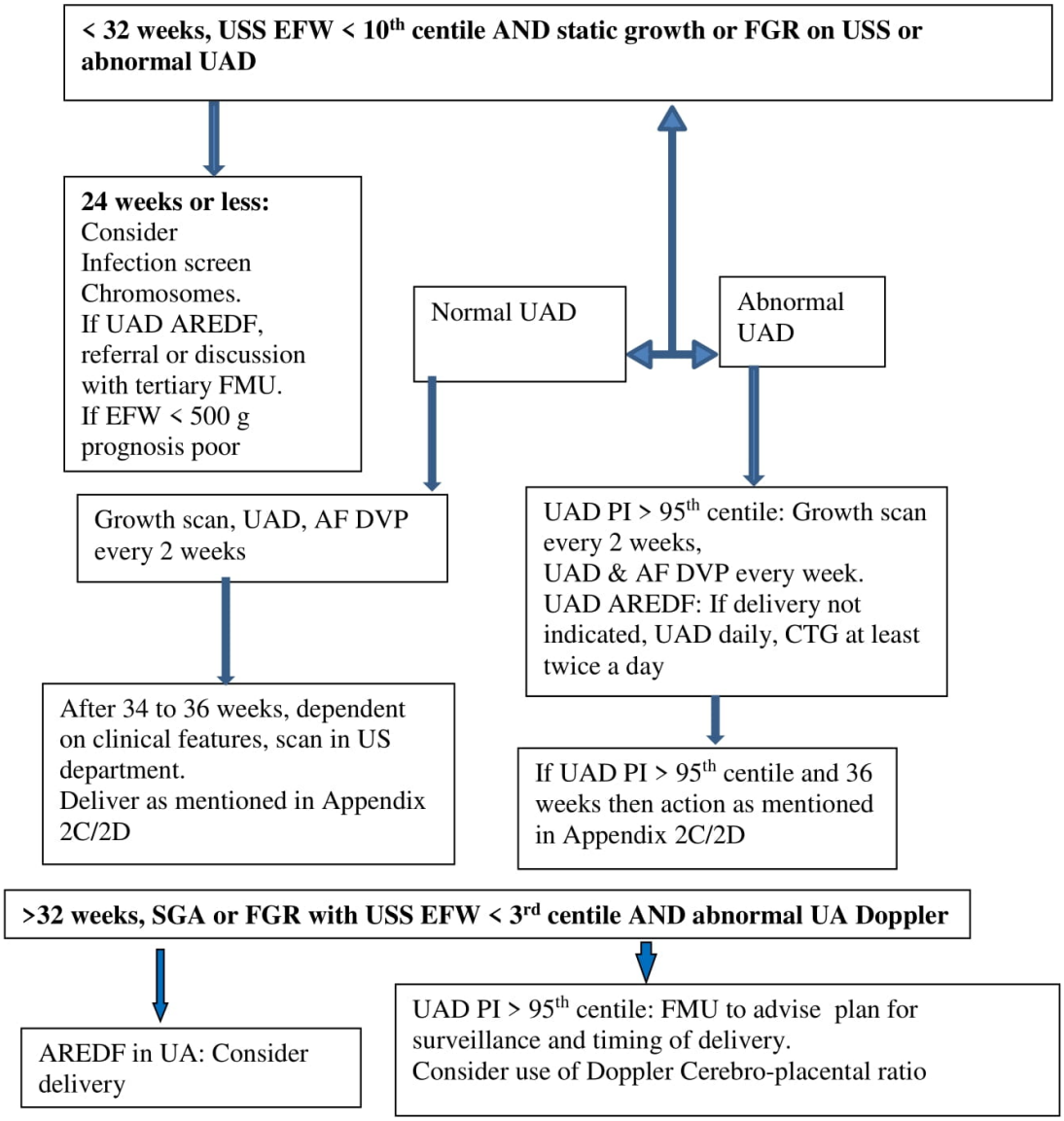
Appendix 2 D: High Risk Pregnancy
EFW < 10th centile AND static growth or FGR on US scan

(Abbreviations: AF DVP: amniotic fluid deepest vertical pool; CTG: cardiotocography; EFW: estimated fetal weight; FMU: Fetal Medicine Unit; HT: hypertension; PET: pre-eclampsia; UAD: umbilical artery Doppler)



Appendix 3: Fetal Medicine Unit or Assessment by qualified obstetrician with special interest in Fetal Medicine

(Abbreviations: AF DVP: amniotic fluid deepest vertical pool; AREDF: absent/reversed end diastolic flow; CTG: cardiotocography; EFW: estimated fetal weight; FMU: Fetal Medicine Unit; HT: hypertension; PET: pre-eclampsia; PI: pulsatility index; UAD: umbilical artery Doppler)



GIG CYMRU NHS WALES
Bwrdd Iechyd Addysgu Powys
Powys Teaching Health Board

Information for Parents:

Low Pregnancy Associated Plasma Protein A (PAPP-A)

This will be either with a midwife or with an obstetrician, depending on where you have your scan. The appointments for your scans will be sent through the post and will start at 28 weeks. They will be at least 3 weekly intervals until delivery.

In addition to these extra scans, it is important that you keep all your routine community midwife appointments, so that the health and wellbeing of you and your baby can be monitored throughout the pregnancy.

What can I do to help my baby grow well?

If you smoke, it is important that you stop smoking as smoking can affect the function of your placenta and reduce your baby's growth. Your midwife can refer you to the smoking cessation programme or you can refer yourself by calling the helpline 08081633031 or visit www.helpmequit.wales for support.

Monitoring your baby's movements is a good way to check on your baby's wellbeing. You can find more information on fetal movements here: www.tommys.org/pregnancy-information/about-tommyspregnancy-Information

If your baby's movements concern you, slow down or stop; you must contact the maternity unit immediately.

What will happen now?

You will continue to see your community midwife for your routine appointments, but they will not measure your abdomen if you are having regular scans to monitor your baby's growth and wellbeing.

Introduction

You have been sent this leaflet because your recent blood test has shown that one of the hormones (PAPP-A) measured during your combined screening test is lower than expected. This does not affect the results of the screening test that you have already been given.

This leaflet has been produced to give you general information about low PAPP-A. Most of your questions should be answered by this leaflet. It is not intended to replace the discussion between you and your midwife or doctor but may act as a starting point for discussion. If after reading it you have any concerns or require further explanation please see our contact details below.

What is PAPP-A?

Pregnancy Associated Plasma Protein-A (PAPP-A) is a hormone that is made by the placenta (afterbirth) in pregnancy. It is measured as part of the combined screening blood test.

What does Low PAPP-A mean?

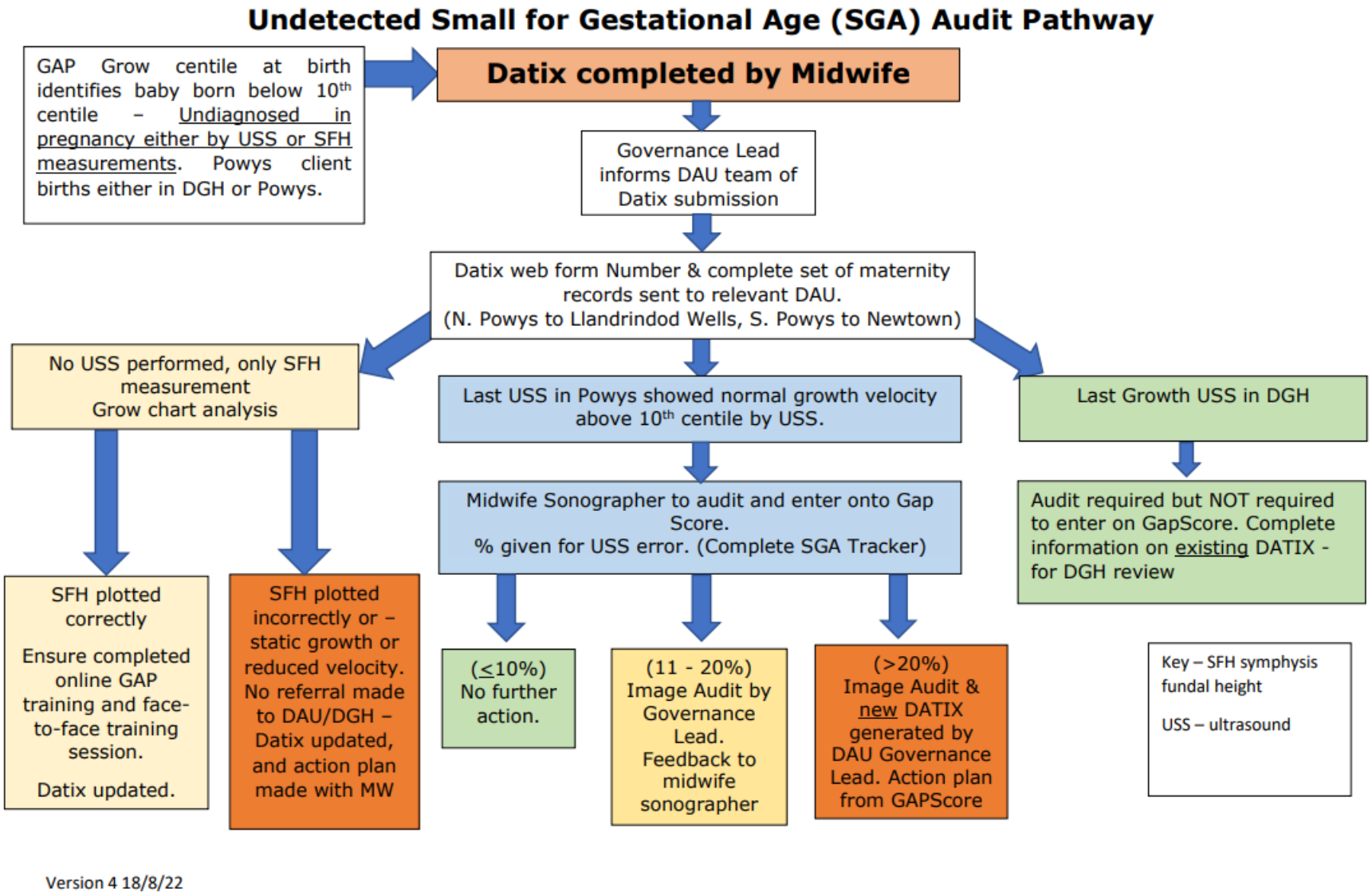
Most babies born to women with a low PAPP-A will have a normal weight at birth and be born at the expected time. Low PAPP-A is not uncommon even though you may not have heard of it before. However, low levels of PAPP-A may be associated with an increased chance of pregnancy complications including a smaller than expected(growth restricted) or earlier than expected (preterm) baby. There is also a slightly higher chance of developing pre-eclampsia.

Therefore, we would like to offer you growth scans to monitor the growth of your baby more closely. Each scan will be followed by a review, so that we can discuss the results of the scan with you.

Who can I speak with if I need further information?

Receiving the news that you have low PAPP-A levels may cause anxiety but please be assured that most babies will have normal growth and the pregnancy will progress without problem.

Please contact your named midwife if you have any further Questions or you can ring your local birth centre for information.


Undetected Small for Gestational Age (SGA) Audit Pathway
GAP Grow centile at birth identifies baby born below 10th centile – Undiagnosed in pregnancy either by USS or SFH measurements. Powys client births either in DGH or Powys.
Datix completed by Midwife
Governance Lead informs DAU team of Datix submission
Datix web form Number & complete set of maternity records sent to relevant DAU.
(N. Powys to Llandrindod Wells, S. Powys to Newtown)
No USS performed, only SFH measurement
Grow chart analysis
Last USS in Powys showed normal growth velocity above 10th centile by USS.
Last Growth USS in DGH
Midwife Sonographer to audit and enter onto Gap Score.
% given for USS error. (Complete SGA Tracker)
Audit required but NOT required to enter on GapScore. Complete information on existing DATIX - for DGH review
SFH plotted correctly
Ensure completed online GAP training and face-to-face training session.
Datix updated.
SFH plotted incorrectly or – static growth or reduced velocity. No referral made to DAU/DGH – Datix updated, and action plan made with MW
(≤10%) No further action.
(11 - 20%) Image Audit by Governance Lead. Feedback to midwife sonographer
(>20%) Image Audit & new DATIX generated by DAU Governance Lead. Action plan from GAPScore
Key – SFH symphysis fundal height
USS – ultrasound
Version 4 18/8/22