Identification of Small for Gestational Age babies in the Oxford AHSN Region

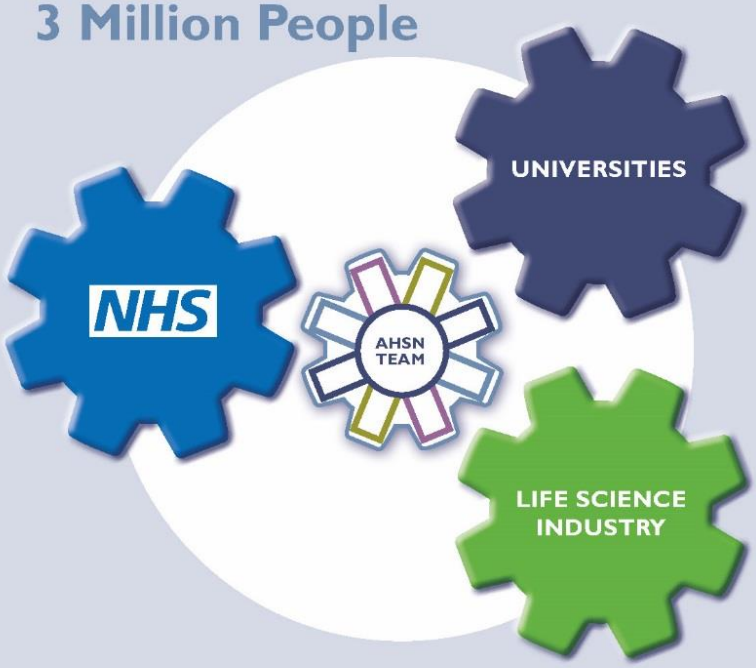
Oxford Academic Health Science Network

MATERNITY

What is the Oxford AHSN?

Oxford Academic Health Science Network is a partnership of NHS providers, commissioners, universities and life science companies to improve health and prosperity in Bedfordshire, Berkshire, Buckinghamshire, Milton Keynes and Oxfordshire. Success comes from collaborative working by the partners and stakeholders across the region.

3 Million People



Benefits of collaboration across the whole system:

- Leverage clinical and management best practice and expertise to improve outcomes
- Share clinical evidence and benchmarking
- Scale innovation adoption
- Learn from each other – clinical standards, models of care, commercial models
- Enable data sharing, operational, patients and research to improve outcomes
- Share evaluation knowledge
- Share clinical and management resources
- Improve region's attractiveness for commercial research
- Make region more attractive for inward investment and product development
- Make the region healthier

Accelerating health and economic gains by working together

Our 7 programmes and themes facilitate shared work across all partners:

- Best Care Clinical Networks
- Clinical Innovation Adoption
- Research & Development
- Wealth Creation
- Patient and Public Involvement, Engagement and Experience
- Informatics
- Patient Safety

Summary

- Unidentified fetal growth restriction, often manifest as small for gestational age (SGA), is a major risk factor for stillbirth and other perinatal morbidity. Its identification is a key goal of the NHS England 'Saving Babies Lives' care bundle.
- The region-wide (Oxford AHSN area) audit of maternity units was undertaken to establish the percentage of SGA babies who were identified during the antenatal period of the month of March 2015.
- Overall, 36.7% of SGA babies (range in different units 26.7% - 44.4% were identified antenatally.
- The Oxford AHSN Maternity Network is now undertaking an innovative pilot designed to improve SGA detection rates and identify babies at risk.

Introduction

Fetal growth restriction represents the biggest risk factor for stillbirth (Gardosi et al, 2013), with 'about one in three term, normally formed antepartum stillbirths are related to abnormalities of fetal growth' (MBRRACE, 2015) .

Therefore, antenatal detection of growth restricted babies is important in order to be able to monitor and consider the delivery of babies at the most risk. Indeed, a number of studies show that undiagnosed Small for Gestational age (SGA) babies were significantly more at risk of being stillborn and other adverse outcomes compared with SGA babies that were identified as such in the antenatal period (Stacey et al, 2011, Smith, 2015, Gardosi et al, 2013).

However, antenatal detection of SGA babies has been poor, varying greatly across trusts in England in those that calculate their rates (NHS England, 2016). Most trusts do not calculate their detection rates which are therefore unknown. However, it has been estimated that routine NHS care detects 1 in 4 (Smith, 2015).

Small for gestational age is best detected by ultrasound. However, ultrasound is not routine in the third trimester in England, is expensive and there is a shortage of sonographers. Complex algorithms, such as the RCOG Green Top Guideline (see Appendix 1 and 2) aim to use ultrasound in pregnancies deemed at high risk and to detect high risk; for lower risk pregnancies, current methods of detection of SGA babies include the routine measurement of the symphysis fundal height (the measurement of the uterus) to assess fetal growth. Measurements are plotted using either customised growth charts (such as in the GROW /GAP package developed by the Perinatal Institute), or using standard charts.

Aims

The aim of this audit was to assess detection rates of small for gestational age babies across the network area, and to determine when they were detected and by what means. The audit also set out to gather basic pregnancy and neonatal outcomes of SGA pregnancies.

The Oxford AHSN Network intend to use the findings to inform future improvement work in the area of the detection of SGA in the region.

Methods

A retrospective local and regional audit was carried out locally within each Trust providing maternity services across the Oxford AHSN region. The Trusts included were the Oxford University Hospitals NHS Foundation Trust, The Royal Berkshire NHS Foundation Trust, Milton Keynes University Hospital

NHS Foundation Trust, Frimley Health NHS Foundation Trust (Wexham Park Hospital), Buckinghamshire Healthcare NHS Trust and the Great Western NHS Foundation Trust.

All deliveries of live, normally formed singleton babies born after 33 weeks gestation in March 2015 were analysed. 33 weeks was chosen because most stillbirths occur after this time. It should be noted that maternity units within the region use a variety of different tools to define growth and small for gestational age. For the purposes of this audit a standard tool needed to be applied across all cases to enable meaningful comparison. The tool chosen and used was the INTERGROWTH-21st standards. (Villar et al, 2014, Papageorghiou et al, 2014). Those babies birthweight was less than the 10th centile using the INTERGROWTH-21st standard (Villar et, 2014) in this cohort were identified. This cohort is referred to in this report as cases of SGA.

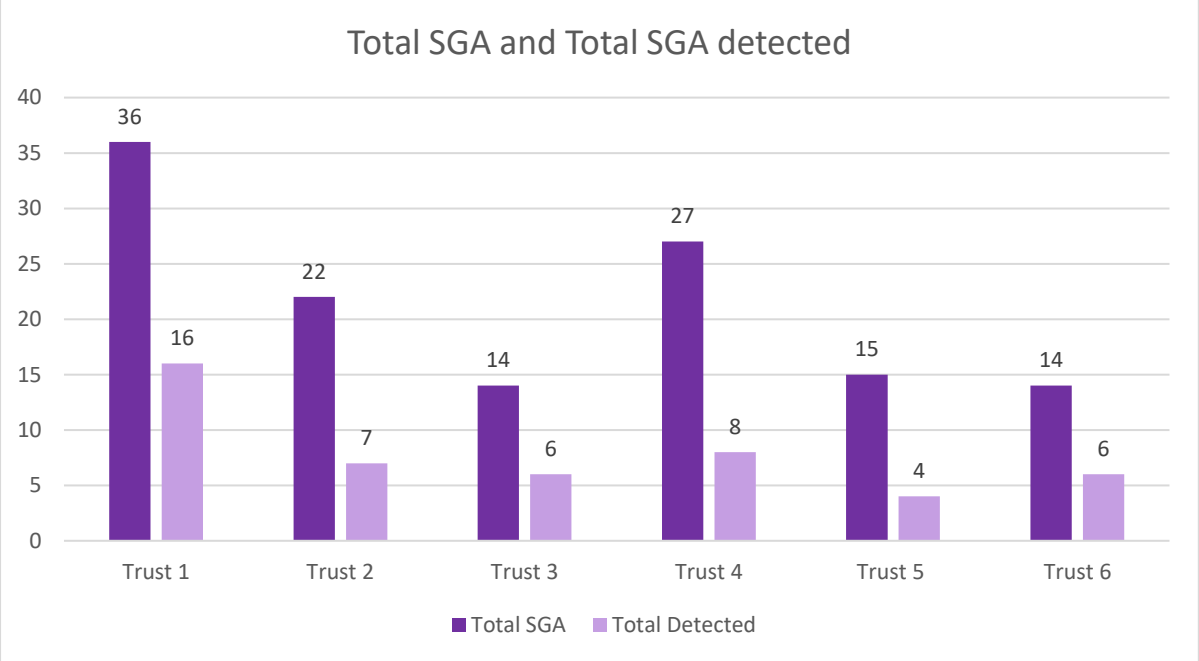
Casenote review was performed by a local clinical team to establish if the pregnancy had been detected as SGA, and if so by which method (Appendix 3).

'Detection of SGA' was defined as the presence of any antenatal ultrasound scan indicating that the estimated fetal weight was below the 10th centile on the locally employed growth chart. The Intergrowth 10th centile is known to correspond to a lower centile on the locally employed centile charts so this resulted in a strict definition of SGA.

Results

The total number of singleton deliveries at >33 weeks in the units in the month of March 2015 was 2540. Of these the number of babies delivered who were small for gestational age as defined above was 128 (5%). All such babies were below the 10th centile on locally employed centile charts.

Out of the 128 total cases, it was found that 47 cases were detected antenatally - 36.7% of the total (range 26.7% - 44.4%). The detection rates of different Trusts are given below. There were no significant differences (chi-squared against reference Trust 1) in detection rates between Trusts.



	Trust 1	Trust 2	Trust 3	Trust 4	Trust 5	Trust 6	Total
No. SGA	36	22	14	27	15	14	128
Detected no	16	7	6	8	4	6	47
Detection rate	44%	32%	43%	30%	27%	43%	37%

Methods of detection

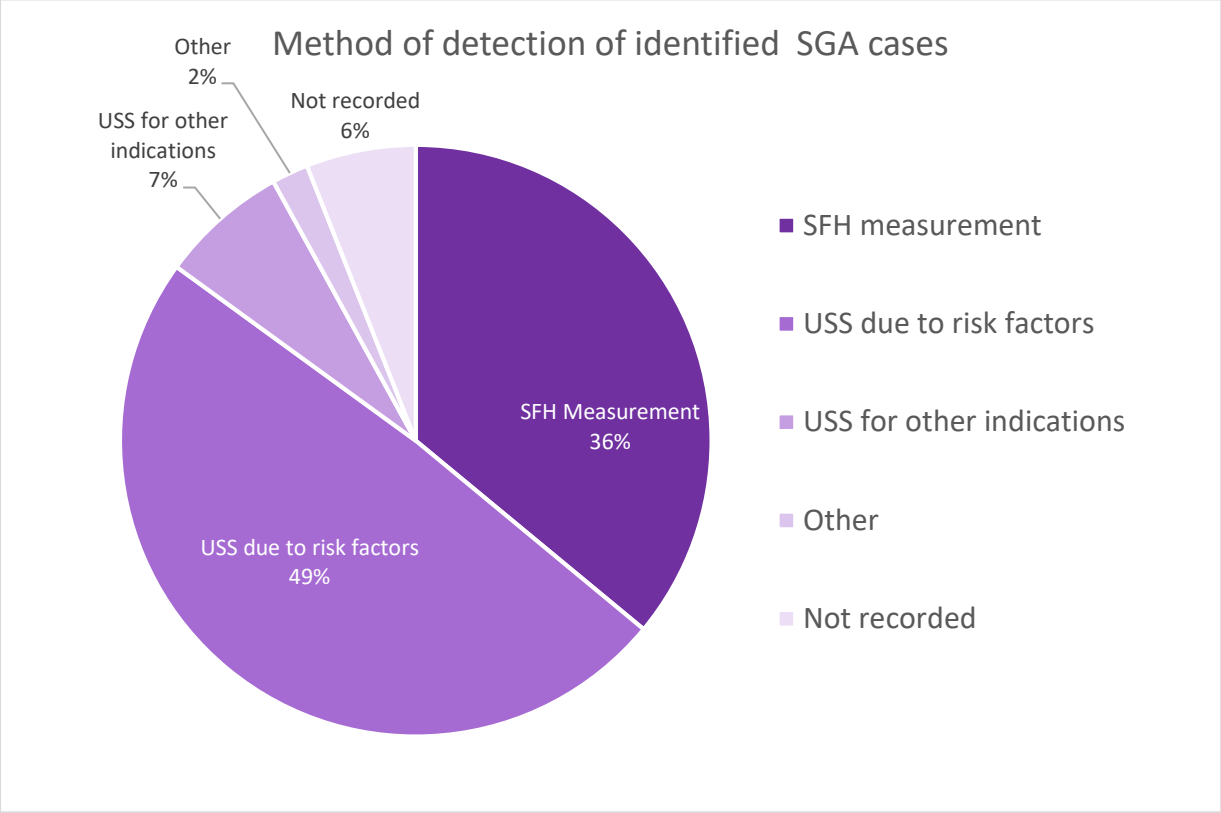
The methods of detection of the SGA cases found were 22 by planned ultrasound performed because the pregnancy was considered high risk, 17 because symphysis-fundal height measurement (either customised and non-customised) was considered abnormal, 5 'other' and 3 not recorded.

In total, the largest percentage of SGA detected was through scans booked due to identified risk factors (49%), followed by measurement of the SFH (36%). Identified risk factors included those based on woman's medical and obstetric history, and PAPP-A results.

When SFH measurement was the first detection method there were 9 detections using non-customised SFH charts, and 8 detections using customised SFH charts. In the region 3 Trusts are predominantly using customised charts and 3 non-customised.

On average an extra 3.5 scans (over and above routine 12 and 20 week scans) were performed for those that were detected in the antenatal period (range 2.75 – 4.75).

The charts below illustrate the methods of detection firstly by the total number of cases, then broken down to individual Trust level.



Method of Detection by Trust

	SFH measurement (customised)	SFH measurement (not customised)	US Scan performed as categorised 'high risk'	US Scan Other	Other	Not recorded	Total
Trust 1	N/A	2	9	2	0	3	16
Trust 2	2	1	3	1	0	0	7
Trust 3	3	N/A	3	0	0	0	6
Trust 4	N/A	3	4	0	1	0	8
Trust 5	N/A	3	1	0	0	0	4
Trust 6	3	N/A	3	0	0	0	6

Perinatal and Maternal Outcomes

Any stillbirths had been specifically excluded for consistency and because it was SGA detection, rather than specifically stillbirth that we wished to examine. There were no neonatal deaths.

Serious morbidity was rare: there were 3 babies with an Apgar Score at 5 mins ≤ 7, no babies with an umbilical cord arterial pH <7.00, and there were 19 admissions to a NNU. These numbers are too low to be used for any comparisons.

The average birthweight of all the SGA babies was 2513g (range 1200g- 3070g). The median centile was 5.4 (min 0.28, max 9.99).

Induction of labour in SGA cases that had been identified antenatally was more than double the rate in those where it had not been identified (59.6% v 25%). Caesarean section without labour was also more common in identified cases (23.4% in the identified cohort v 13.5% in the non-identified).

Spontaneous vaginal delivery rates were 13% higher in the unidentified cases. Caesarean section deliveries accounted for 40.4% of deliveries in identified cases, contrasting with 32% in unidentified.

Discussion

The rate of antenatal detection of SGA found is roughly in line with the assumed national average, indicating that the region is neither performing poorly, nor above average.

It is acknowledged that total numbers of SGA babies in this audit is small, and therefore meaningful comparisons between individual Trusts are limited. However, the audit does provide a snapshot of the rates of SGA detection within the region and provides some information on the methods of detection. No unit, including 3 (Trusts 2, 3 and 6) using the GAP programme, performed exceptionally well; of those not using the GAP programme, one had the highest rate of detection, and one the lowest. It is acknowledged that customised centiles will differ from the Intergrowth centiles, although the stricter definition of SGA with the latter ensured all babies labelled SGA locally were also SGA according to our definitions. The use of a single growth chart for definition was clearly essential.

What is clear is that with a total of over 63% of SGA babies remaining unidentified there still remains huge room for improvement, and current detection methods are currently not providing satisfactory detection rates. Strategies for better detection are lacking. Most existing protocols are very complex (such as the RCOG screening tool, see Appendix 1 and 2) and are difficult to manage or follow in a real world setting. The GAP programme (Gardosi et al, 2013) has reported only modest improvements in detection rates and relies heavily on an increased usage of ultrasound. This is very expensive and there is a national shortage of sonographers: in the UK these seriously limit its usage. Furthermore, increased ultrasound usage may generate over-intervention.

That this may be the case can be glimpsed here. Overall, obstetric intervention in SGA babies was high, but was even higher where the SGA had been identified before birth. This reflects national-level guidelines on the management of SGA babies. Identification remains important: epidemiological data has clearly linked antenatal detection with a reduced incidence of stillbirth (Gardosi et al, 2013), and SGA babies were over represented in the recent stillbirth audit of this region (Thames Valley SCN, Childrens and Maternity, 2014). To minimise the intervention evident here, the challenge is not simply to detect SGA babies, but to determine which are actually at highest risk of stillbirth. Further, if we are to meet the DoH target of a 50% reduction in stillbirth by 2030 (NHS England, 2016) even 100% detection of SGA is likely to be inadequate (Smith, 2015). The even bigger challenge is to identify babies that whilst not very small, are significantly smaller than their genetic potential meant them to be.

In response to both the poor antenatal detection of SGA, and the limitations of even perfect SGA detection, the Oxford AHSN Maternity Network have introduced an innovative pilot running at the OUHFT, a Trust which looks after around 8000 pregnant women each year.

The principles of the pilot are 1) a routine 36-week growth scan for all, 2) ultrasound scans between 20 and 36 weeks used in a simpler, structured manner based on risk factors and routine uterine artery Doppler and 3) assessment, at the 36-week scan, of parameters other than estimated fetal weight that are also associated with risk (e.g. growth trajectory, abnormal blood flow). The first pregnancies to enter the pilot did so in May 2016; the Maternity Network is monitoring and will report the outcomes. If this pilot is successful, it is intended the pathway would be rolled out to Trusts in the Oxford AHSN region.

Conclusion

This audit has shown that the Oxford AHSN region appear to be performing averagely in comparison with national detection of SGA and reiterates that current practices are not managing to detect the majority of small for gestational age babies during pregnancy. It is therefore important to continue to work towards developing better and cost effective methods of detection.

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Thank you to all who contributed to this audit:

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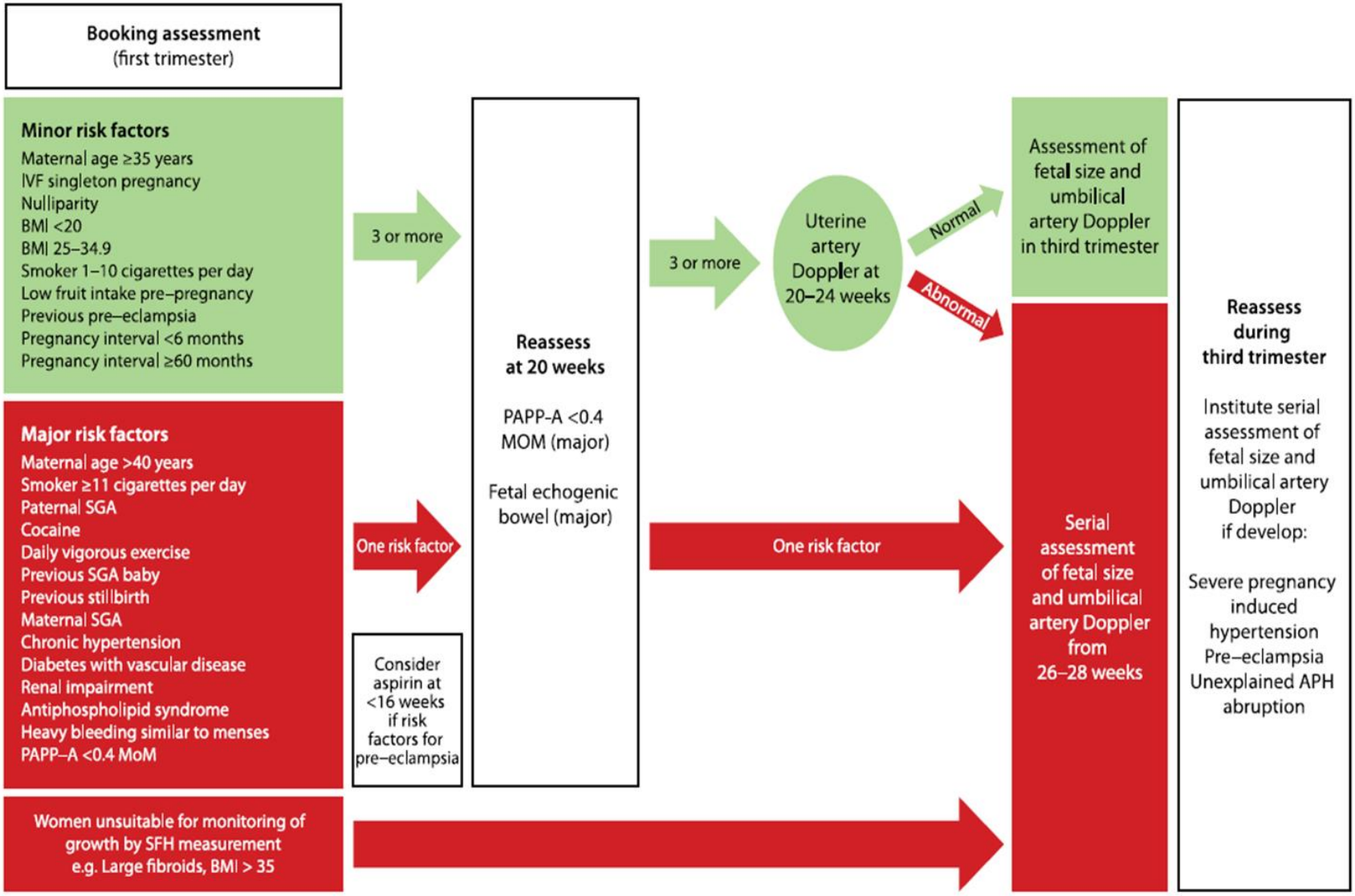
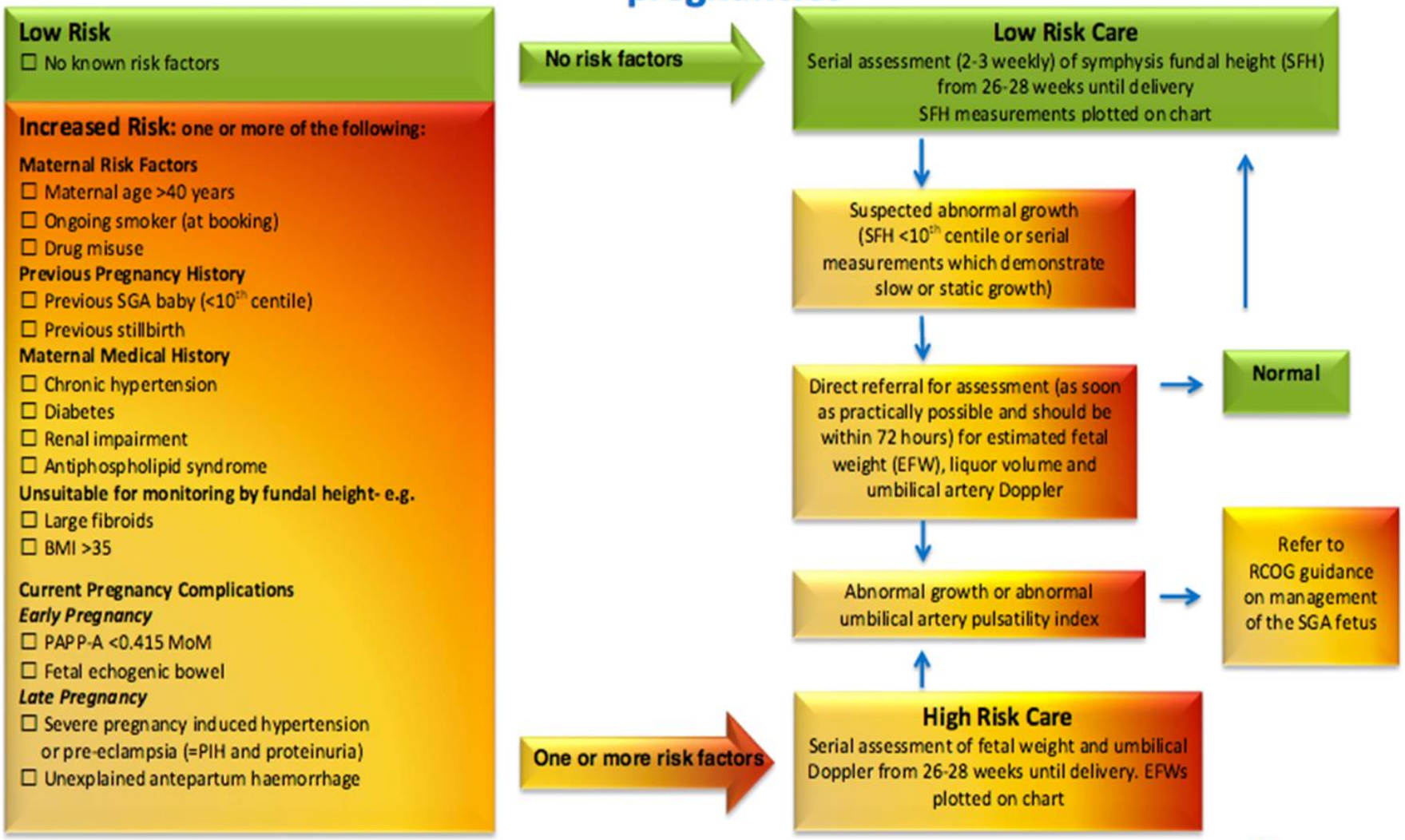
INTERGROWTH-21st APP

https://intergrowth21.tghn.org/global-perinatal-package/intergrowth-21st-comparison-application



Risk assessment must always be individualised (taking into account previous medical and obstetric history and current pregnancy history). Disease progression or institution of medical therapies may increase an individual's risk.

Algorithm and Risk Assessment Tool: Screening and Surveillance of fetal growth in singleton pregnancies



SGA Guideline risk factors

	Present	Absent	Not recorded
Minor Risk factors			
Mat age >=35			
IVF singleton			
Nulliparity			
BMI <20			
BMI 25-34.9			
Smoker 1-10/day			
Low fruit intake AN			
Prev Pre-eclampsia			
Last preg <6/12			
Last preg >60/12			
Major Risk Factors			
Mat age >40			
Smoker >=11/day			
Paternal SGA			
Cocaine			
Daily vigorous exercise			
Prev SGA baby			
Prev still birth			
Mat SGA			
Chronic HTN			
Diabetes WITH vasc disease			
Renal impairment			
APL syndrome			
Heavy bleeding (similar to menses)			
PAPP-A<0.4 (please state figure)			
Echogenic bowel			
BMI >35 or large fibroids			

	Indicated?	Performed? +ve/-ve
Serial growth scans 28\40 (>=1 major RF)		
Uterine artery Doppler 20-24/40 (>=3 minor RF)		If performed, PI/RI value

Unit

Audit number

NHS number (mother)

NHS number (baby)

Data Collection sheet for each SGA baby

Key details

Date of del (state)

Gestation at del (state)

Birthweight (state)

Centile use Intergrowth data

Gender M F

Mode del em CS el CS SVD ID Breech

Onset of labour spont IOL pre-labour cs

If IOL or ELCS, why SGA SROM PET dates other (state)

Detected antenatally Y N (if yes detected at what gestation)

How first detected SFH (customised or not?) USS as high risk USS as PET

other (state)

Neonatal Outcome

Apgars pH Admission to NNU?

Antenatal details

Age at delivery

Parity

Last scan before del (date) AC / EFW/ AFI / MCA / UA (PI and/or RI)

Number of extra USS