POSITION STATEMENT
Detection and management of women with Fetal Growth Restriction in singleton pregnancies

Endorsed by:

Please note: This is a position statement and should not replace local guidelines. It is intended to provide a consensus view and a current summary of available evidence in an area of uncertainty.

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Key messages

- Improving detection of Fetal Growth Restriction (FGR) is an important strategy to reduce stillbirths
- Risk assessment for FGR should be undertaken in early pregnancy and at each antenatal visit (see Figure 1).
- Where modifiable risk factors for FGR exist, provide advice and support to women (e.g. smoking cessation).[1]
- For low risk women, measure symphyseal fundal height (SFH) using a standardised technique. Plotting serial SFH measures on a growth chart may help to identify FGR.
- Where the SFH measures <10th centile or where static or slow growth is suspected, ultrasound assessment of fetal biometry is recommended.[2]

- In women at increased risk for FGR and/or pre-eclampsia, consider low dose aspirin (100-150mg nocte) commencing prior to 16 weeks' gestation.
- Seek obstetric opinion for ongoing management when FGR is suspected by ultrasound.[3,4]
- The following investigations are commonly used for the diagnosis and management of suspected FGR: ultrasound assessment of fetal biometry, amniotic fluid volume, umbilical artery Doppler +/- middle cerebral artery Doppler, cardiotocography.
- When planning the birth of a fetus with suspected FGR, care should be individualised taking into consideration the woman's preferences, health, gestational age, fetal condition, mode of birth, intrapartum monitoring and access to appropriate neonatal services.
- The national FGR educational program for clinicians Growth Assessment Program (GAP) in NZ) is recommended for all maternity services and maternity providers.
- Clinical audit and feedback are key drivers of practice change and should be undertaken to enhance best practice for FGR.[5]

Contents

Purpose of this statement

This position statement is part of the National 'Safer Baby Bundle', comprising five elements to reduce late-gestation stillbirths in Australia. This statement addresses the second element of care: detection and management of women with Fetal Growth Restriction in singleton pregnancies.

The purpose of this position statement is to improve perinatal outcomes through better antenatal detection and management of pregnancies with Fetal Growth Restriction (FGR). These recommendations have been derived from a literature review including reference to several international SGA/FGR guidelines.[6-11]

Definitions

FGR is best defined as a fetus that has not reached its growth potential. In practice, small for gestational age (SGA) is often used as a proxy for FGR (see Table 1). However, not all SGA fetuses are growth restricted, and some growth restricted fetuses are not SGA.[12] There are also differences between early and late FGR,[13] aspects of which are summarised in Table 2. A consensus-based definition for FGR including biometric and functional parameters was published in 2016.[14] Its clinical utility and performance has not been prospectively evaluated.

Table 1: Definitions relating to FGR

Fetal Growth Restriction (FGR)	A fetus that has not reached its growth potential. (in practice, small for gestational age (SGA) is often used as a proxy for FGR)
Small for gestational age (SGA)	Estimated fetal weight/birthweight <10th centile
Severe FGR	SGA <3rd centile is often used as a proxy for severe FGR
Early FGR	FGR diagnosed <32 weeks gestation
Late FGR	FGR diagnosed≥32 weeks gestation

Table 2: Early vs Late FGR, Adapted from Figueras et al.[13]

	Early FGR	Late FGR
Gestation	<32 weeks	≥32 weeks
Prevalence[15]	0.5 – 1%	5 – 10%
Pre-eclampsia	Strong association	Weak association
Placental pathology	Strong association	Less common
Relation to SGA	Often SGA <10th centile	Not always SGA
Umbilical artery Dopplers	Often Abnormal	Usually normal
Detection[16]	Detected more commonly	Challenging to detect
Clinical consequences[16]	Risks of prematurity, high mortality and morbidity	Associated with increased mortality and morbidity

Risk factor assessment

Risk assessment (see Figure 1) for FGR can be undertaken by healthcare providers prior to conception, in early pregnancy, and at each antenatal visit [6,17] through inquiry about:

1. maternal characteristics and medical history
2. previous obstetric history
3. risk factors that may arise in pregnancy

It is good practice to inform women about FGR [1] at each antenatal care visit (including their booking visit) and, where there is a diagnosis of FGR, ongoing communication on the management of FGR throughout the pregnancy. Where modifiable risk factors for FGR exist, provide advice and support to women (e.g. smoking and drug/alcohol cessation).[1]

Antenatal surveillance for FGR may be modified according to a woman's individual risk factors and this is detailed in the Risk Assessment Algorithm for FGR (Figure 1) at each antenatal care visit.

Women can be stratified into three groups depending on their existing or newly arising risk factors for FGR. Consider low dose aspirin (100-150mg nocte) commencing prior to 16 weeks' gestation for women at increased risk of FGR. Frequency of ultrasound surveillance for suspected FGR should be based on FGR risk factors which will associate with risk of early vs late onset FGR, prior history, and the woman's preferences. Women with risk factors at booking should be offered obstetric review according to local guidelines.

Symphyseal fundal height (SFH) measurement

Measurement of symphyseal fundal height (SFH) can be undertaken at each antenatal visit starting from 24-28 weeks gestation.[1,12] SFH measurement may not be reliable in some women with a high

body mass index, or who have uterine fibroids, in which case ultrasound can be considered for assessment of fetal size and growth.[6]

The limitations of SFH measurement in the detection of FGR are well described.[18] A standardised approach to SFH measurement may reduce inter and intra-observer error.[1,2] The United Kingdom and New Zealand have adopted standardised education for SFH measurement,[1] incorporating measuring from the fundus to the superior margin of the symphysis pubis, using a non-elastic tape measure with numbers on the tape measure facing downwards.

Serially plotting SFH measurements on a growth chart may assist in the detection of FGR. Although evidence is lacking, tracking growth utilising a graph to visually assist detection of change over time is widely used. Programs to improve detection of FGR have used this methodology and have demonstrated an increase in the antenatal detection of FGR.[2] Ultrasound assessment is recommended when a SFH measurement is <10th centile, or if there is clinical suspicion of static or slowing growth on serial SFH measurements.[2]

There are different charts available for plotting SFH e.g. customised [19] or population based.[20] Controversy exists around the most appropriate chart to use clinically. This care Bundle does not stipulate whether providers should use a customised chart or not. However, the benefits of training in the measurement of SFH and teaching correct plotting on charts to observe growth velocity are acknowledged.

Diagnosis and management of FGR

Accurate gestational age dating is important in the assessment of later fetal size.[21,22]

The following investigations are commonly used for the diagnosis and management of suspected FGR.

Table 3: Common investigations for diagnosis and management of suspected FGR

Investigation	Description	Suggestive of FGR
Fetal biometry by ultrasound	• Abdominal circumference (AC) • Head circumference (HC) • Biparietal diameter (BPD) • Femur length (FL) • Estimated fetal weight (EFW)	EFW or AC <10th centile and/or reduced growth velocity (>30 centiles[23]) of EFW or AC
Amniotic fluid volume (AFV)	Measured by the single deepest vertical pocket (DVP) of amniotic fluid	DVP <2cm
Umbilical artery Doppler (UAD)	Measures resistance to blood flow in the umbilical artery and placenta	UAD Pulsatility (PI) >95th centile, absent or reverse end diastolic flow (AREDF)
Cardiotocography (CTG)	Recording of fetal heart rate and uterine activity	Abnormal CTG trace

Seek obstetric opinion for ongoing management when FGR is suspected.[1]

Additional ultrasound investigations such as uterine artery Doppler, middle cerebral artery Doppler, cerebroplacental ratio, may be utilised to assist in the investigation and management of established FGR where appropriate expertise is available. These investigations are recommended in NZ for further evaluation in late onset FGR. Ductus venosus Dopplers, computerised CTG analysis may be used in

some situations where appropriate expertise is available, especially in early onset FGR and are also recommended in NZ. Biophysical profile may also be used in some settings.

When FGR is suspected, targeted history taking should include specific enquiry about maternal perception of fetal movements. Decreased fetal movements (strength and/or frequency) for some women may be associated with placental dysfunction, which could lead to FGR and/or stillbirth.[24]

Birth planning

When planning the birth of a baby with suspected SGA/FGR, the aim is to achieve the maximum maturity possible balanced against the risks of remaining in utero. Benefits of early birth to reduce stillbirth need to be carefully weighed against the risk of intervention for the baby at a given gestation.[25] Care should be individualised and woman-centred, based on shared decision-making. The following points should be considered and discussed:

- Woman/family preferences
- Maternal condition
- Gestational age, EFW and fetal condition (including interval growth, severity of FGR (e.g. <3rd centile, severity of any Doppler abnormalities)
- Mode of induction of labour. Mechanical cervical ripening (e.g. balloon catheter) results in higher percentage of vaginal birth.[26,27]
- Mode of birth
- Intrapartum monitoring: Women who start spontaneous labour should be advised to be admitted early in labour to enable careful fetal monitoring if there is evidence of severe SGA or abnormal Doppler indices.
- Access to appropriate neonatal services

Placenta

The major underlying cause of FGR is placental in origin.[28] Early onset FGR is often associated with maternal vascular malperfusion of the placenta resulting in poor early placentation or placental infarction.[28]

Rarer causes of placental pathology associated with FGR include: massive perivillous fibrin deposition (maternal floor infarction), chronic intervillositis and villitis of unknown etiology (inflammatory processes within the placenta) all of which have high recurrence rates in subsequent pregnancies.[28]

Compared to early onset FGR, the incidence and severity of placental pathology in late onset FGR is less common, but still occurs frequently even in pregnancies with normal umbilical artery Doppler studies.[29]

It is recommended that the placentae of suspected SGA/FGR babies be sent for histopathology, the results of which may support the clinical findings and influence care in subsequent pregnancies.[6]

Neonatal management

The clinical diagnosis of FGR in the neonate can be as challenging as it is antenatally.[13] Care of the newborn with SGA/FGR should include monitoring and maintenance of oxygenation, temperature and blood glucose levels.

Paired cord blood gases or lactate should be undertaken to assess acid base status at birth.

In the care of the preterm growth restricted neonate, consider specific issues relating to prematurity such as lung disease, increased risk of infection, neurological complications and necrotising enterocolitis.

Subsequent pregnancy care

The birth of a baby with FGR is a major risk factor for FGR in a subsequent pregnancy.[6] Where possible, the underlying cause for FGR should be investigated to assess for recurrence risk. This includes review of placental histopathology and any investigations undertaken for FGR before and after birth.[28]

Where SGA/FGR has been associated with stillbirth or severe long-term adverse outcomes, consider additional parental psychosocial support in a subsequent pregnancy.[30]

Prior to a subsequent pregnancy is an opportunity to address modifiable risk factors for FGR e.g. smoking cessation, optimising pre-existing medical conditions and weight reduction if obese.[1]

Consider low dose aspirin (100-150mg nocte) in addition to serial ultrasound assessment in a subsequent pregnancy for women who have had previous FGR.[6] Consider specialist review at booking where available. Timing of ultrasound surveillance in a subsequent pregnancy can be tailored according to gestation at birth and underlying cause of previous FGR.

Education and clinical audit

Improving the detection and management of SGA/FGR is an opportunity to improve health outcomes.[1,31]

Educational programs for maternity care providers have been shown to improve the detection of SGA/FGR and reduce stillbirth rates in the UK.[2] The 2017 Perinatal and Maternal Mortality Review Committee (PMMRC) report from New Zealand [32] has demonstrated a reduction in perinatal mortality in SGA babies after 26 weeks. This is likely associated with an ongoing education program, a SGA guideline and more recently the roll out of the Growth Assessment Protocol (GAP) education program. An Australian FGR education program (face to face workshop and eLearning program) has been developed and has recently been rolled out across the state of Victoria. The program has been well received by clinicians and is ready for national rollout.

Clinical audit and feedback are key drivers of practice change.[5] Clinical case audit of best practice recommendations for SGA/FGR enables monitoring of practice change and evaluation of the impact on health outcomes. This should include false positive and false negative findings.[31]

Benchmarking practice across services identifies variation upon which to focus to improve outcomes. In Australia, the national core maternity indicator for SGA/FGR is the proportion of babies born at or after 40 weeks gestation who weighed less than 2750g at birth.[33] In New Zealand, the national maternity indicator is proportion of small babies (under the 10th percentile for birthweight on the INTERGROWTH-21 growth charts) born at term (37 to 42 weeks) and at 40-42 weeks' gestation.[32]

Evidence gaps

Further high-quality studies are required to improve practice and health outcomes.

Current evidence gaps in FGR research include:

- Defining FGR
- Placental biomarker and ultrasound screening for FGR
- Role of routine late third trimester ultrasound to detect FGR
- Randomised control trial of population vs customised growth charts in predicting FGR morbidity and mortality
- Interventions to reduce FGR
- Optimal frequency of fetal surveillance in suspected FGR
- Screening and management using a risk factor-based approach
- Defining the degree of decline in growth velocity that is clinically important
- Systematic review of neonatal growth charts
- Growth charts and screening for neonatal hypoglycaemia

Further information and resources

Stillbirth CRE website: www.stillbirthcre.org.au

Safer Baby Bundle website and resources: https://saferbabybundle.org.au (publicly available from 15th October 2019)

Working group

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Figure 1: Risk assessment (Australia)

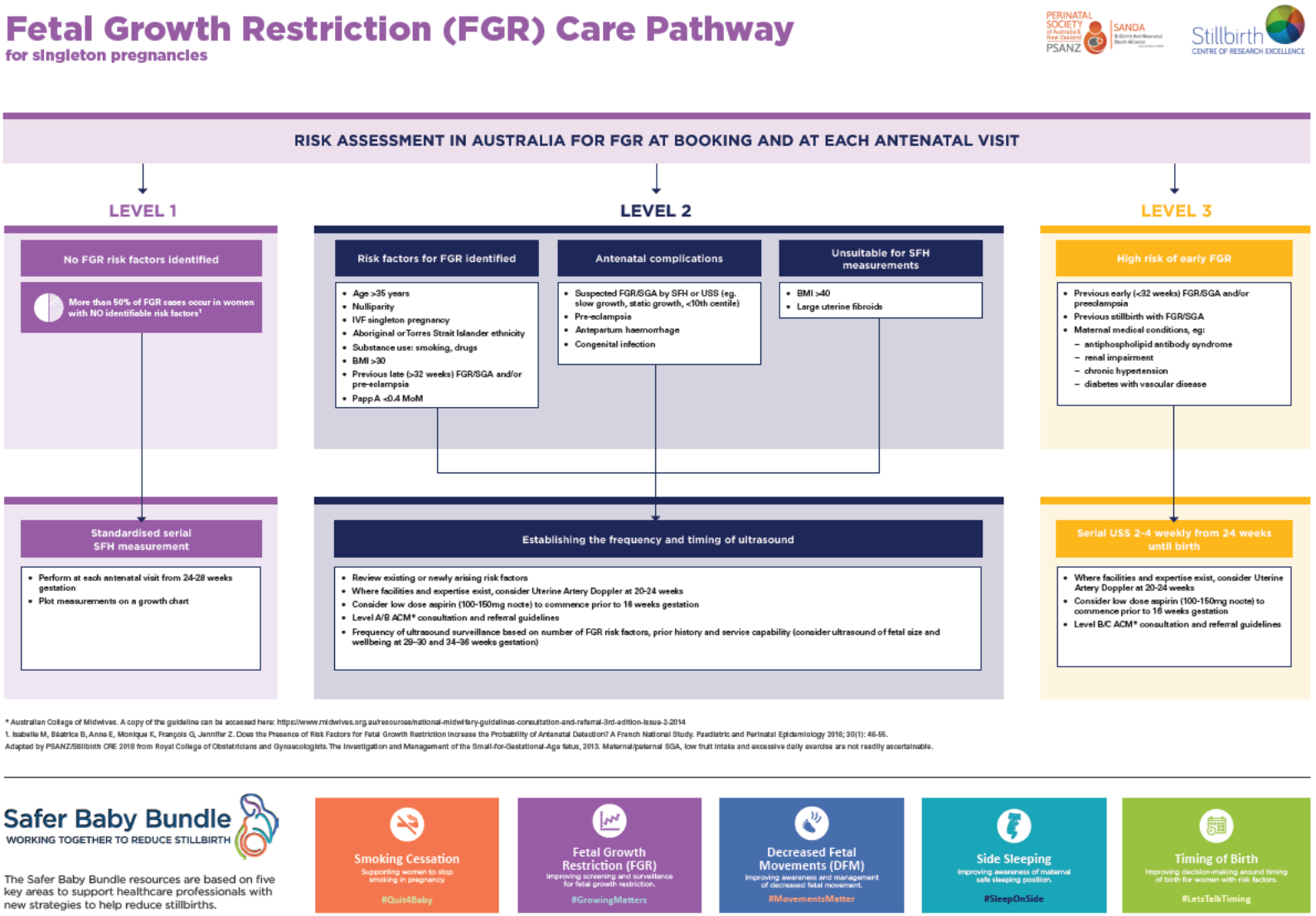
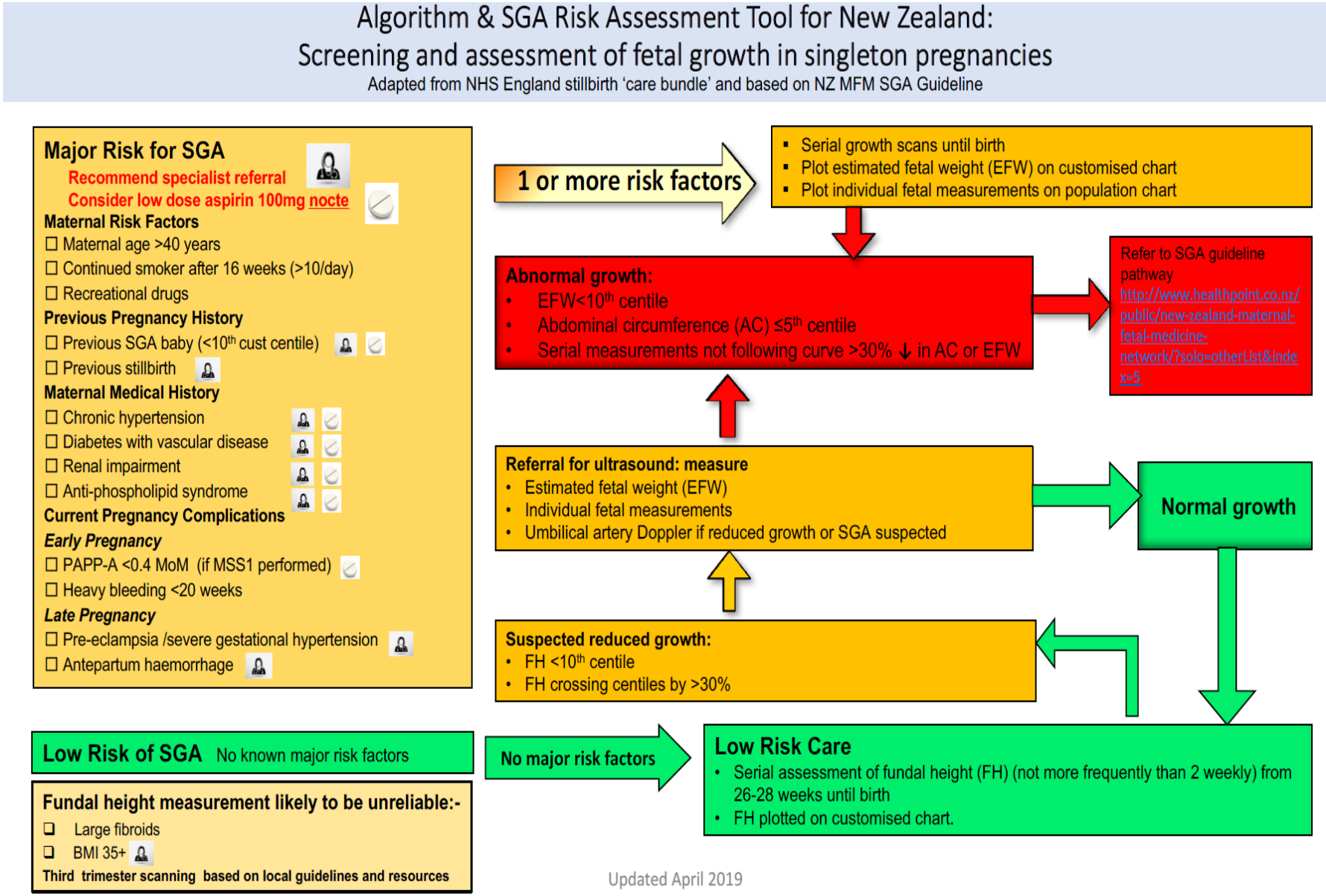


Figure 2: Risk assessment (New Zealand)



Suggested Schedule of Growth Scans Depending on Local Resources / Guidelines

High risk early onset SGA*	High risk late onset SGA *	Moderate risk late onset SGA*
e.g. severe medical, previous SGA birth <34wk or stillbirth, ↓ PAPP-A	e.g. previous SGA born ≥ 34 wk, mild chronic hypertension, age >40	e.g. smoke >10/day **or FH measurement likely to be unreliable** (BMI 35+, fibroids)
Monthly growth scans from 24 weeks' to birth Consider uterine artery Doppler at 20 or 24wks	**Monthly** growth scans from 28-30 weeks' to birth e.g. 30, 34, 38 weeks	Scan 30-32 & 36-38 weeks'

SGA or poor interval growth

EFW<10th centile

Abdominal circumference (AC) ≤ 5th centile

Serial measurements (AC or EFW) cross centiles by > 30%

Fortnightly scans until birth. Plot individual measurements and estimated fetal weight (EFW) on customised chart.

Manage as per NZMFM SGA Guideline

http://www.healthpoint.co.nz/public/new-zealand-maternal-fetal-medicine-network/?solo=otherList&index=5

* Early onset SGA=SGA baby born <34 weeks, late onset SGA = SGA baby born ≥34 weeks

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