

## Care of women with suspected or confirmed Fetal Growth Restriction

**Summary** This guideline applies to all NSW Health maternity services and refers to the care planning for pregnant women with suspected or confirmed fetal growth restriction (FGR). It provides evidence based guidance for screening, management, and escalation of FGR during pregnancy. This guidance further support the FGR element of care for the Safer Baby Bundle.

**Document type** Guideline

**Document number** GL2023\_004

**Publication date** 24 February 2023

**Author branch** Clinical Excellence Commission

**Branch contact** (02) 9269 5500

**Review date** 24 February 2026

**Policy manual** Patient Matters Manual for Public Health Organisations

**File number** CEC 22/315#08

**Status** Active

**Functional group** Clinical/Patient Services - Imaging - diagnostic and interventional, Maternity, Medical Treatment, Nursing and Midwifery

**Applies to** Local Health Districts, Government Medical Officers, NSW Ambulance Service, Public Hospitals

**Distributed to** Public Health System, Divisions of General Practice, Government Medical Officers, NSW Ambulance Service, Private Hospitals and Day Procedure Centres, Tertiary Education Institutes

**Audience** Maternity Services;Maternity Clinicians;Maternity and Neonatal Clinical Staff;Sonographers

## Care of women with suspected or confirmed Fetal Growth Restriction

### GUIDELINE SUMMARY

Fetal growth restriction is a common complication in pregnancy that is associated with adverse perinatal and neurodevelopmental outcomes including stillbirth, neonatal mortality and short- and long-term morbidity. This Guideline provides evidence-based guidance to support maternity services in the care planning for pregnant women with suspected or confirmed fetal growth restriction, ensuring women and their families are fully informed of risks, potential outcomes and their options of care.

This Guideline applies to all NSW Health maternity services.

### KEY PRINCIPLES

This Guideline reflects evidence based clinical practice for the screening, management, and escalation of Fetal Growth Restriction (FGR) during pregnancy. Women with confirmed FGR require as a minimum, a multidisciplinary collaborative care plan in line with the Tiered Perinatal Networks.

Throughout all pregnancy and perinatal care, women and their families must be fully informed of risks, potential outcomes and their options of care. Women and their support person(s) are always included in care planning and decision making, and consent for healthcare treatment must be established.

Throughout the antenatal period, all women must be assessed for risk factors associated FGR in line with the [NSW Fetal Safety Risk Assessment Pathway](#) and an appropriate care plan developed in collaboration with the woman.

FGR is associated with adverse perinatal outcome including stillbirth. Aboriginal and Torres Strait Islander women experience higher rates of stillbirth. Risk factor identification is vital to support perinatal risk reduction and reduce adverse outcomes for Aboriginal and Torres Strait Islander women.

Serial plotting of symphysis fundal height (SFH) measurements on the NSW Health [International Symphysis-Fundal Height Standards](#) chart are to be conducted as part of routine antenatal care starting from 24 to 28 weeks gestation, to monitor for potential FGR.

Women who are unsuitable for symphysis fundal height measurements or have FGR risk factors as per the *NSW Fetal Safety Risk Assessment Pathway* will require growth ultrasound assessments.

Where FGR is identified, consultation and referral for specialist obstetric care must be offered and arranged as appropriate.

In the presence of FGR, decisions for planning birth should include consideration of the gestational age and be balanced against the benefits of ongoing pregnancy, in collaboration with the woman.

Optimal care planning includes ensuring the availability of multidisciplinary team members including the neonatal team, to support stabilisation and potential admission of the baby to a neonatal unit.

For future pregnancies, women with a history of FGR require as a minimum, multidisciplinary collaborative care planning involving midwifery and medical consultation.

All women should be provided the opportunity to debrief with clinicians about their pregnancy and birth experience and appropriate follow up support be made available. This should include psychosocial support where indicated with appropriate wellbeing support made available.

### REVISION HISTORY

Version	Approved By	Amendment Notes
GL2023_004 February-2023	Deputy Secretary, Health System Strategy and Planning	New Guideline

**CONTENTS**

<b>1. BACKGROUND</b>	<b>3</b>
1.1. About this document	3
1.2. Key definitions	4
1.3. Relevant NSW Health Policies and Guidelines	5
<b>2. DEFINITION OF FETAL GROWTH RESTRICTION</b>	<b>5</b>
2.1. Fetal Growth Restriction	6
2.1.1. Early Fetal Growth Restriction	6
2.1.2. Late Fetal Growth Restriction	6
<b>3. PREVENTION OF FETAL GROWTH RESTRICTION</b>	<b>7</b>
3.1. Risk assessment	7
3.2. Smoking cessation	7
3.3. Aspirin use	7
3.4. Other modifiable risk factors	7
<b>4. SCREENING FOR FETAL GROWTH RESTRICTION</b>	<b>8</b>
4.1. Risk assessment	8
4.2. Symphysial fundal height measurement	8
4.2.1. Thresholds for escalation	8
4.3. Growth ultrasound assessments	8
4.4. Antenatal complications	9
<b>5. SURVEILLANCE AND ESCALATION OF FETAL GROWTH RESTRICTION</b>	<b>9</b>
5.1. Ultrasound surveillance	9
5.2. The role of antenatal cardiotocography	10
5.3. Escalation and referral of women	10
<b>6. BIRTH PLANNING</b>	<b>11</b>
6.1. Birth planning and service capability	11
6.2. Timing of birth	11
6.2.1. Ultrasound indicators for birth planning	12
<b>7. INTRAPARTUM AND PERINATAL CARE PLANNING</b>	<b>12</b>
7.1. Fetal heart rate monitoring	12
7.2. Birth planning with the neonatal team	13
7.3. Newborn feeding considerations	13
7.4. Postnatal care	13
<b>8. CARE PLANNING FOR FUTURE PREGNANCY</b>	<b>14</b>
8.1. Pre-conception care	14

8.2. Care in future pregnancies .....14

**9. REFERENCES.....15**

## 1. BACKGROUND

Maternity care is coordinated across NSW and the ACT through formalised arrangements of Tiered Perinatal Networks (TPNs), local endorsed Operational Plans and escalation pathways in line with the NSW Health Policy Directive *Tiered Networking Arrangements for Perinatal Care in NSW* ([PD2020\\_014](#)) and the NSW Health Guideline *NSW Maternity and Neonatal Service Capability* ([GL2022\\_002](#)). These elements ensure safe care is provided at a facility with designated service capability for the woman's gestation, clinical needs and clinical complexity as close as possible to her home and her support network.

Fetal growth restriction (FGR) is a common complication in pregnancy that is associated with adverse perinatal and neurodevelopmental outcomes including, stillbirth, neonatal mortality, and short- and long-term morbidity.<sup>[1,2]</sup> It is known that Aboriginal and Torres Strait Islander women experience higher rates of stillbirth than non-indigenous women. Extra consideration is required when risk factors such as physical health, smoking and access to care for Aboriginal and Torres Strait Islander women are identified. Aboriginal staff including midwives, health practitioners and liaison officers may be able to provide further advice and support.<sup>[3]</sup>

Women who have suspected or confirmed FGR may require a higher level of care. A multidisciplinary approach is required to optimise outcomes for women and their babies. Women and their families are to be provided with information and resources to guide shared decision making. Where possible, provision of continuity of maternity care is recommended.

To further support maternal and fetal wellbeing, care is to include a systematic A to G assessment and the development of a comprehensive management plan which is documented in line with the NSW Health Policy Directive *Health Care Records - Documentation and Management* ([PD2012\\_069](#)). This management plan is to include an appropriate response to any identified deterioration of the woman or fetus in line with the NSW Health Policy Directive *Recognition and management of patients who are deteriorating* ([PD2020\\_018](#)).

### 1.1. About this document

This Guideline applies to all NSW Health maternity services and refers to the care planning for pregnant women with suspected or confirmed FGR.

There are currently no proven treatments for FGR. Maternity care must focus on risk assessment, preventative care strategies and the early identification of modifiable risk factors. The care of women with specific pregnancy risk factors identified during care including concerns about fetal movements, hypertensive disease and diabetes, may require additional surveillance and care planning.

Informing women about their treatment options, and the risks and benefits must be part of shared decision making. Consent from the woman must be established and clinicians are to refer to the NSW Health *Consent to Medical and Healthcare Treatment Manual* ([Consent Manual](#)).

Women with confirmed FGR require as a minimum, a multidisciplinary collaborative care plan involving midwifery and medical consultation in line with the TPN and the NSW Health Guideline *NSW Maternity and Neonatal Service Capability* ([GL2022\\_002](#)).

**1.2. Key definitions**

<b>Abdominal Circumference (AC)</b>	Abdominal circumference (AC) is a measurement taken during a pregnancy ultrasound in order to gauge the circumference of the fetal abdomen. The AC gives an indication of whether the fetus is growing normally inside the uterus in relation to size and weight.
<b>Decreased fetal movements (DFM)</b>	Women’s concerns about fetal movements override any traditional definition of decreased fetal movement. Women’s concern may include decreased frequency of movements, changed quality of movements or absent movements.
<b>Estimated Fetal Weight (EFW)</b>	An estimate of the weight of a fetus based on ultrasonographic measurement and the use of standard reference tables incorporating fetal growth parameters including biparietal diameter, circumference of the head, femur length and circumference of the abdomen.
<b>Fetal growth restriction (FGR)</b>  <b>Also known as intrauterine growth restriction (IUGR)</b>	Fetal growth restriction (FGR) describes when a fetus does not reach its full growth potential in-utero.  For the International Society of Ultrasound in Obstetrics and Gynecology (ISUOG) FGR diagnostic definition <sup>[1]</sup> see Section 2.
<b>Live birth</b>	The birth of a baby after 20 or more completed weeks of gestation, or of 400 grams or more of birthweight (where the gestational age is not known) who, after being born, breathes or shows any evidence of life such as a heartbeat.
<b>Multidisciplinary care</b>	Multidisciplinary care is comprised of at least one patient and multiple health professionals from several different disciplines and/or organisations. Health professionals who participate in multidisciplinary care work together to deliver comprehensive patient care through collaboration, communication and team care planning.
<b>Neonatal death</b>	The death of a live-born baby within 28 days of birth.
<b>Perinatal death</b>	A stillbirth or neonatal death.
<b>Periviable gestations</b>	Earliest stage of fetal maturity where there is a chance, although not a high likelihood, of extrauterine survival. This period is generally between 22 and 25 <sup>+6</sup> weeks gestation.
<b>Persistent cerebroplacental ratio (PCR)</b>	A Doppler measurement calculated by dividing the Doppler indices of the middle cerebral artery by those of the umbilical artery.

<b>Small for gestational age (SGA)</b>	A baby with antenatal ultrasound biometry less than 10 <sup>th</sup> percentile for gestational age according to National birthweight percentiles.  Note: growth restricted babies are frequently but not always SGA.
<b>Stillbirth</b>	A stillbirth is defined as the birth of a baby who has died any time from 20 weeks into the pregnancy through to the due date of birth. When the length of gestation (pregnancy) is not known, the birth will be considered a stillbirth if the baby weighs 400 grams or more.
<b>Symphysial fundal height (SFH)</b>	The distance (in centimetres) on the longitudinal axis of the abdomen from the top of the fundus to the superior margin of the symphysis pubis.
<b>Umbilical artery pulsatility index (UA-PI)</b>	A Doppler measurement of the umbilical artery.
<b>Uterine artery pulsatility index (UtA-PI)</b>	A Doppler measurement of the uterine artery.

### 1.3. Relevant NSW Health Policies and Guidelines

This Guideline should be read in conjunction with the following documents.

**Table 1: Related NSW Health Policy Documents**

Document Number	Document Title
<a href="#">Consent Manual</a>	Consent to Medical and Healthcare Treatment Manual
<a href="#">GL2021_007</a>	NSW Emergency Surgery Guidelines and Principles for Improvement
<a href="#">GL2022_002</a>	Maternity and Neonatal Service Capability
<a href="#">PD2012_069</a>	Health Care Records - Documentation and Management
<a href="#">PD2014_028</a>	Open Disclosure Policy
<a href="#">PD2020_008</a>	Maternity - National Midwifery Guidelines for Consultation and Referral
<a href="#">PD2020_014</a>	Tiered Networking Arrangements for Perinatal Care in NSW
<a href="#">PD2020_018</a>	Recognition and management of patients who are deteriorating
<a href="#">PD2020_047</a>	Incident Management
<a href="#">PD2022_050</a>	Reducing the effects of smoking and vaping on pregnancy and newborn outcomes

## 2. DEFINITION OF FETAL GROWTH RESTRICTION

Fetal Growth Restriction (FGR) is defined as when a fetus does not reach its growth potential in-utero due to a pathological factor, most commonly placental insufficiency. It may be



identified in the early or late antenatal period, or it can be revealed after birth.<sup>[3, 4]</sup> FGR may be caused by fetal issues such as chromosomal anomalies, genetic syndromes, and fetal infection. It may also be caused by maternal disease, environmental toxins including cigarette smoking and the most common cause, uteroplacental insufficiency.<sup>[5]</sup>

## 2.1. Fetal Growth Restriction

All women must be assessed throughout the antenatal period for risk factors associated with FGR.

A clear plan is to be developed in consultation with women, that includes the identified risk factors, and the strategies to be used to mitigate or monitor the identified risk(s) in line with the [NSW Fetal Safety Risk Assessment Pathway](#).

The care of women who have risk factors for FGR must be undertaken within a maternity service with the appropriate service capability in line with the NSW Health Guideline *NSW Maternity and Neonatal Service Capability* ([GL2022\\_002](#)) and the NSW Health Manual [Guide to the Role Delineation of Clinical Services](#).<sup>[6]</sup>

Consideration is to be given to care planning for women with an identified small for gestational age (SGA) fetus, to ensure appropriate screening, assessment and follow-up is planned.<sup>[2]</sup>

### 2.1.1. Early Fetal Growth Restriction

Early onset FGR is identified prior to 32 weeks gestational age, in the absence of congenital anomalies.

Diagnosis is based on the following criteria<sup>[1]</sup>:

- Abdominal circumference (AC) or estimated fetal weight (EFW) <3<sup>rd</sup> centile **or** Umbilical artery (UA) absent/reversed end-diastolic flow

**OR**

- AC or EFW <10<sup>th</sup> centile **combined with** Uterine artery pulsatility index (UtA-PI) >95<sup>th</sup> centile, **and/or** Umbilical artery pulsatility index (UA-PI) >95<sup>th</sup> centile.

### 2.1.2. Late Fetal Growth Restriction

Late onset FGR is identified at 32 weeks gestational or greater, in the absence of congenital anomalies.

Diagnosis is based on the following criteria<sup>[1]</sup>:

- AC or EFW <3<sup>rd</sup> centile

**OR at least two out of three of the following:**

- AC or EFW <10<sup>th</sup> centile
- AC or EFW crossing centiles of >two quartiles (50%) on consecutive growth ultrasounds
- Persistent cerebroplacental ratio (PCR) <5<sup>th</sup> centile **or** UA-PI >95<sup>th</sup> centile.

Note: These criteria reflect diagnosis of FGR and are not indicators for monitoring, care or imminent birth care planning.

### 3. PREVENTION OF FETAL GROWTH RESTRICTION

There are currently no proven treatments for Fetal Growth Restriction (FGR) that improve fetal growth.

Maternity care therefore must focus on risk assessment, preventative care strategies and the early identification of modifiable risk factors.

#### 3.1. Risk assessment

Risk assessment for FGR must be undertaken by clinicians in early pregnancy, and at each antenatal visit, including consideration of:

- Maternal characteristics and medical history
- Previous obstetric history
- Risk factors that may arise in pregnancy.<sup>[3, 4]</sup>

Clinicians are to refer to the [NSW Fetal Safety Risk Assessment Pathway](#).

#### 3.2. Smoking cessation

The earlier smoking and nicotine cessation is achieved in pregnancy, the more impact there is in preventing FGR. Exposure to passive smoking must also be explored with women. Clinicians are to refer to the [Smoking cessation care pathway](#) and the NSW Health Policy Directive *Reducing the effects of smoking and vaping on pregnancy and newborn outcomes* (PD2022\_050).

#### 3.3. Aspirin use

Recommendations for care of women at increased risk for FGR, as outlined in the [NSW Fetal Safety Risk Assessment Pathway](#) include low dose aspirin commencing prior to 16 weeks' gestation and continuing until 36<sup>+0</sup> weeks' gestation.<sup>[4]</sup>

#### 3.4. Other modifiable risk factors

Provide supportive referral pathways where women are using alcohol or other illicit drugs.

Women with prior occurrence of FGR have nearly a 20% risk of recurrence.<sup>[3]</sup> Planning the next pregnancy with adequate spacing may be useful and is based on the woman's individual needs. This period can be used to manage co-morbidities, for example hypertension and obesity, to reduce the risk of FGR in subsequent pregnancies.

## 4. SCREENING FOR FETAL GROWTH RESTRICTION

### 4.1. Risk assessment

Pregnancy care planning must involve a risk assessment for maternal or obstetric characteristics which may be associated with Fetal Growth Restriction (FGR).<sup>[3]</sup> Risk assessments are to be guided by the [NSW Fetal Safety Risk Assessment Pathway](#).

### 4.2. Symphysial fundal height measurement

Symphysis fundal height (SFH) measurements are taken during the antenatal period primarily to assist in the detection of FGR. Unless there is a plan for serial ultrasound, SFH measurement must be undertaken at each antenatal visit starting from 24 to 28 weeks gestation.

SFH measurement may not be reliable for all women including those with a high body mass index (BMI)  $>40\text{kg/m}^2$ , or who have large uterine fibroids  $>10\text{cm}$ , in which case ultrasound assessment of fetal size and growth is required.

Recommendations for SFH measurement include:

- Serial plotting of SFH measurement must be undertaken using the NSW Health [International Symphysis-Fundal Height Standards](#) chart.
- A standardised process for SFH measurement must be employed, including measuring the longitudinal axis of the abdomen from the top of the fundus to the superior margin of the symphysis pubis, using a non-elastic tape measure with numbers on the tape measure facing downwards.<sup>[3]</sup>
- Performed by the same clinician where feasible to reduce the likelihood of variation.

#### 4.2.1. Thresholds for escalation

Serial plotting of SFH measurement will support clinicians in identifying variances in fundal height measurement, which may assist in the detection of FGR. Criteria for review includes:

- **Static growth:** Same measurement at least one week apart in the absence of descent of the fetus into the maternal pelvis.
- **Reduced growth:** Equal to or more than 3cm **below** the expected fundal height for the estimated gestational age.
- **Escalated growth:** Equal to or more than 3cm **above** the expected fundal height for the estimated gestational age.

Where criteria for review have been identified, consultation, care planning and referral for ultrasound must occur. Local referral processes must be in place to support escalation of care.

### 4.3. Growth ultrasound assessments

Growth ultrasound assessments are required from 24 to 28 weeks gestation, and (as a minimum) repeated after six weeks, where women:

- Have three or more Level 2 FGR risk criteria outlined in [NSW Fetal Safety Risk Assessment Pathway](#).
- Are unsuitable for SFH measurements (e.g., body mass index (BMI) >40 kg/m<sup>2</sup>, large uterine fibroids >10cm).

**Serial growth ultrasound assessment is required at two to four weekly intervals from 24 weeks gestation, until birth, where women:**

- Have any Level 3 FGR risk criteria.

All growth ultrasound assessments require plotting of all measurements on the [NSW Health Fetal Biometry Ultrasound Growth Scan Chart](#).

#### 4.4. Antenatal complications

Serial growth ultrasound assessment is required at two to four weekly intervals from 24 weeks gestation where women have antenatal complications that arise during the pregnancy as outlined in the [NSW Fetal Safety Risk Assessment Pathway](#) with plotting of all measurements on the [NSW Health Fetal Biometry Ultrasound Growth Scan Chart](#).

## 5. SURVEILLANCE AND ESCALATION OF FETAL GROWTH RESTRICTION

Diagnosis of Fetal Growth Restriction (FGR) must prompt monitoring for associated hypertensive disorders of pregnancy with review of blood pressure and urinalysis at each clinical visit.

Women must be educated regarding the importance of fetal movements and advised to present promptly if they notice any change in fetal movement pattern.

Ongoing surveillance must include comprehensive assessment and monitoring, including ultrasounds.

### 5.1. Ultrasound surveillance

Once FGR is diagnosed the umbilical artery (UA) Doppler is to be performed every one to two weeks as appropriate.

The umbilical artery Doppler frequency is increased to at least once per week in the setting of FGR or if the umbilical artery pulsatility index (UA-PI) is >95<sup>th</sup> centile.<sup>[7,8,9]</sup>

Amniotic fluid needs to be measured at least once per week and surveillance increased if the deepest vertical pocket (DVP) is <2cm or if there are other identified risk factors.<sup>[1,2,10]</sup>

Serial growth ultrasound must be performed every two weeks following the diagnosis of FGR. Increased frequency of growth ultrasound measurements at greater than a two weekly interval is associated with lower sensitivity and therefore not recommended.<sup>[2,11]</sup>

The middle cerebral artery pulsatility index (MCA-PI) is to be assessed in the setting of one or more diagnostic criteria for FGR:

- Abdominal circumference (AC) or estimated fetal weight (EFW) <10<sup>th</sup> centile

- Abdominal circumference or estimated fetal weight crossing centiles of >two quartiles (50%) on serial growth ultrasounds
- Umbilical artery pulsatility index >95<sup>th</sup> centile.

In the setting of middle cerebral artery pulsatility index <5<sup>th</sup> or cerebroplacental ratio (CPR) <1 in an FGR fetus, then at least weekly umbilical artery Doppler and amniotic fluid volume assessment is recommended.<sup>[1,2,12]</sup>

Whilst middle cerebral artery pulsatility index can help guide surveillance, it is not currently used as a trigger for birth planning.<sup>[1]</sup>

## 5.2. The role of antenatal cardiotocography

Routine antenatal cardiotocography (CTG) monitoring is not recommended.<sup>[13]</sup>

In maternity settings where computerized CTG is available then the short-term variation (STV) values on CTG may be used in conjunction with ductus venosus (DV) Doppler findings to assist in birth planning decision making.<sup>[14]</sup> Local processes are to be in place for the use of computerized CTG.

For women with small for gestational age (SGA) or FGR presenting with maternal comorbidities (e.g., hypertension, antepartum haemorrhage) or fetal concerns (e.g., concerns about fetal movements) CTG monitoring is recommended as per NSW Health Guideline *Maternity - Fetal heart rate monitoring* ([GL2018\\_025](#)).

## 5.3. Escalation and referral of women

Where a fetus is identified as growth restricted by early or late onset definition, consultation and referral for specialist obstetric care must be offered and arranged as appropriate.<sup>[6]</sup> Maternity and neonatal service capability levels are outlined in the NSW Health Guideline *NSW Maternity and Neonatal Service Capability* ([GL2022\\_002](#)).

FGR with concerning features e.g., oligohydramnios, abnormal UA Doppler requires referral to an obstetric specialist for ongoing care.

FGR identified at less than 32 weeks or with significant comorbidities or suspected abnormalities requires consultation with a Level 6 tertiary maternity service where Maternal-Fetal Medicine (MFM) expertise is available.

FGR identified at greater than 32 weeks requires increased surveillance and coordination of care involving a Level 4 facility or higher.

When an Aboriginal woman or woman pregnant with an Aboriginal baby, if known, needs to be transferred to another facility for assessment and or care, she may require additional support. Consider referral to Aboriginal health professionals such as Aboriginal liaison officers, Aboriginal health practitioners or other professionals (if not already provided) who can provide culturally safe care. Ensuring women are fully informed along the process is essential to cultural safety.

It is important that all women and families receive psychosocial support where indicated, and that appropriate wellbeing support is made available e.g., social work referral, cultural and diversity supports.

## 6. BIRTH PLANNING

### 6.1. Birth planning and service capability

Refer to the NSW Health Policy Directive *Tiered Networking Arrangements for Perinatal Care in NSW* ([PD2020\\_014](#)) and local operational plans for the local Tiered Perinatal Network (TPN).

Individualise care through multidisciplinary consultation and shared decision making with the woman, her support person/s and carers, obstetrician, midwife and paediatrician. Liaise with the Maternal-Fetal Medicine (MFM) specialist and neonatal team at the Level 6 hospital if needed.

Undertake suitable risk assessments to consider location of birth, timing of birth and mode of birth to support optimal outcomes.<sup>[6,15]</sup>

All women are to have a known nominated lead maternity care provider, ensuring continuity of care where possible. Women and their support person/s are to be always included in care planning and decision making.

#### **Additional considerations for 35 weeks gestation and under include:**

Optimise preparation for birth in line with the NSW Health Guideline *Management of Threatened Preterm Labour* ([GL2022\\_006](#)) and local guidelines for administration of antenatal steroids for fetal lung maturity and magnesium sulphate (MgSO<sub>4</sub>) for neurodevelopmental protection (where appropriate).<sup>[1]</sup>

Services are to ensure that women and their babies have appropriate access to higher levels of neonatal care when risk factors are identified beyond the designated service capability of the local health facility.<sup>[1,6,15]</sup>

Women and their families must be fully informed of risks, potential outcomes and their options of care at perivable gestations. In circumstances where birth is imminent, appropriate counselling must occur with women and their families. Decision making at these gestations requires multidisciplinary conversations between the lead maternity care provider and tertiary maternity and neonatal services in line with the NSW Health Guideline *NSW Maternity and Neonatal Service Capability* ([GL2022\\_002](#)) and the NSW Health Policy Directive *Tiered Networking Arrangements for Perinatal Care in NSW* ([PD2020\\_014](#)).

### 6.2. Timing of birth

Timing of birth planning recommendations need to be based on a combination of:

- **Maternal assessment**, including:
  - Maternal risk factors
  - Systematic A to G assessment
- **Fetal assessment**, including:
  - Antenatal cardiotocography (CTG) [where appropriate]
  - Ultrasound indicators for birth planning



- Gestational age (balanced against the benefits of ongoing pregnancy)
- Biophysical profile (where this is undertaken)<sup>[1,2,10,13]</sup>

**6.2.1 Ultrasound indicators for birth planning**

**Early onset FGR birth planning** must be in consultation with an MFM consultant.

**Late onset FGR birth planning** must be in consultation with a senior obstetrician, or an MFM consultant.

*Table 2: Fetal Growth Restriction (FGR) – Ultrasound indicators for birth planning*

Gestation	Ultrasound indicators for birth planning
23 <sup>+0</sup> - 29 <sup>+6</sup> weeks	Ductus Venosus A wave at or below the baseline Note: birth planning needs to be individualised with multidisciplinary team input, including MFM and neonatal teams and be aligned with the woman, and her family or support person/s preferences
30 <sup>+0</sup> - 31 <sup>+6</sup> weeks	Plan birth if umbilical artery end diastolic flow is reversed
32 <sup>+0</sup> - 35 <sup>+6</sup> weeks	Plan birth if umbilical artery end diastolic flow is absent
36 <sup>+0</sup> - 37 <sup>+6</sup> weeks	Plan birth if UA-PI is >95 <sup>th</sup> centile, or if EFW <3 <sup>rd</sup> centile, or if AC <3 <sup>rd</sup> centile
38 <sup>+0</sup> - 39 <sup>+0</sup> weeks	Plan birth for FGR which has not met criteria for earlier birth

**7. INTRAPARTUM AND PERINATAL CARE PLANNING**

**7.1. Fetal heart rate monitoring**

A fetus with Fetal Growth Restriction (FGR) will have limited placental reserves and is therefore likely to decompensate more rapidly when subjected to hypoxic stress during labour and birth.

Assessment of fetal wellbeing must be undertaken from the first contact in labour as per NSW Health Guideline *Maternity - Fetal heart rate monitoring* ([GL2018\\_025](#)).

When the woman is first assessed prior to or during early labour, it is essential to ensure that the appropriate antenatal fetal heart rate (FHR) assessment tool is used to assist in accurate interpretation of the cardiotocography (CTG) recording.

If any abnormal features are present including the absence of reactivity, then a senior obstetric review is required to determine suitability for labour.

Continuous FHR monitoring must be recommended to the woman during labour.

Once labour is established or Syntocinon is commenced, the intrapartum FHR monitoring tools must be used as per NSW Health Guideline *Maternity - Fetal heart rate monitoring* ([GL2018\\_025](#)).

Consideration is to be given regarding the use of Altered Calling Criteria to prompt earlier recognition of fetal deterioration.

## 7.2. Birth planning with the neonatal team

Where maternity services have determined the need for imminent birth of a baby with FGR, communication with the neonatal team is required. Always ensure that the appropriate clinical handover has occurred, including but not limited to:

- Gestational age
- Estimated fetal weight (EFW)
- Any maternal and pregnancy factors
- Fetal investigations e.g., microarray, infection persistent cerebroplacental ratio (PCR), ultrasound or MRI findings, fetal echocardiogram (where available)
- Condition of the fetus
- Planned method of birth
- Antenatal corticosteroids and Magnesium Sulphate (MgSO<sub>4</sub>) administration, where appropriate, including the gestational age of administration.

Optimal care planning includes the location of birth and the availability of multidisciplinary team members to support stabilisation and potential admission to a neonatal unit.<sup>[1]</sup>

Where birth occurs without appropriate neonatal services, early escalation within the Tiered Perinatal Network (TPN) and early communication with the NSW Newborn and paediatric Emergency Transport Service (NETS) is required.<sup>[6,15]</sup>

## 7.3. Newborn feeding considerations

All women are to receive consistent, impartial, evidence-based information to support safe feeding for their baby.

There is no clear evidence to support routine antenatal breast expressing prior to 36 weeks gestation.<sup>[16,17]</sup>

Antenatal breast expressing may be useful in maximising access to breastmilk for a growth restricted baby and expressing close to the day of planned birth may offer support of lactogenesis and availability of expressed breast milk (EBM) for the baby.

Any contraindications for the woman and fetus must be determined prior to any antenatal breastmilk expressing plans being made. Consultation with the lead maternity care provider is required.

Local Health Districts must refer to the NSW Health Policy Directive *Breastfeeding in NSW - Promotion, Protection and Support* ([PD2018\\_034](#)) and the NSW Health Policy Directive *Maternity – Breast Milk: Safe Management* ([PD 2010\\_019](#)).

## 7.4. Postnatal care

In the postnatal period, it is recommended the woman is provided the opportunity to debrief with clinicians about her experience and discuss her postnatal care plan. This includes any complications arising and any clinical outcomes or investigations completed relating to both her and her baby. Inclusion of her family members or support person/s in the debriefing



process must be offered. It is important that the woman is offered psychosocial support where indicated, and that appropriate follow-up care is made available.

A formal histological examination of the placenta may provide valuable explanation for FGR, as well as information relevant to the care of the baby and/or subsequent pregnancies. Refer to the NSW Health Guideline *Maternity – Indications for Placental Histological Examination* ([GL2014\\_006](#)).

## 8. CARE PLANNING FOR FUTURE PREGNANCY

Women with a history of Fetal Growth Restriction (FGR) require as a minimum, multidisciplinary collaborative care planning involving midwifery and medical consultation.

### 8.1. Pre-conception care

Pre-conception care recommendations include:

- Optimisation of maternal medical conditions e.g., diabetes, chronic hypertension
- Promotion of healthy lifestyle choices and referral to appropriate support services (where indicated) e.g., healthy weight optimisation, cessation of alcohol or other recreational/illicit drugs, smoking and nicotine cessation
- Adequate spacing of pregnancies, including contraceptive needs, based on the woman's individual needs.<sup>[3]</sup>

### 8.2. Care in future pregnancies

Care in future pregnancy recommendations include:

- Early referral for obstetric care when viability confirmed
- Determine accurate dating; review menstrual and invitro fertilisation (IVF) history and dating by first trimester ultrasound
- Commence aspirin therapy prior to 16 weeks
- Screen at first antenatal care visit with the [NSW Fetal Safety Risk Assessment Pathway](#)
- Comprehensive multidisciplinary early pregnancy assessment to discuss:
  - History of FGR
  - Other identified risk factors
  - Early pregnancy screening options, including for pre-eclampsia.

## 9. REFERENCES

1. Lees, C. C., Stampalija, T., Baschat, A., da Silva Costa, F., Ferrazzi, E., Figueras, F., Hecher, K., Kingdom, J., Poon, L. C., Salomon, L. J., & Unterscheider, J. (2020). ISUOG Practice Guidelines: diagnosis and management of small-for-gestational-age fetus and fetal growth restriction. *Ultrasound in obstetrics & gynecology: the official journal of the International Society of Ultrasound in Obstetrics and Gynecology*, 56(2), 298–312. <https://doi.org/10.1002/uog.22134>
2. Melamed, N., Baschat, A., Yinon, Y., Athanasiadis, A., Mecacci, F., Figueras, F., Berghella, V., Nazareth, A., Tahlak, M., McIntyre, H. D., Da Silva Costa, F., Kihara, A. B., Hadar, E., McAuliffe, F., Hanson, M., Ma, R. C., Gooden, R., Sheiner, E., Kapur, A., Divakar, H., ... Hod, M. (2021). FIGO (international Federation of Gynecology and obstetrics) initiative on fetal growth: best practice advice for screening, diagnosis, and management of fetal growth restriction. *International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics*, 152 Suppl 1(Suppl 1), 3–57. <https://doi.org/10.1002/ijgo.13522>
3. Department of Health. (2020). *Clinical Practice Guidelines: Pregnancy Care*. Canberra: Australian Government Department of Health. <https://www.health.gov.au/resources/pregnancy-care-guidelines>
4. Perinatal society of Australia and New Zealand and Stillbirth Centre of Research Excellence. (2019). *Position Statement: Detection and management of fetal growth restriction in singleton pregnancies*. Centre of Research Excellence in Stillbirth. Brisbane, Australia. [https://www.cec.health.nsw.gov.au/\\_data/assets/pdf\\_file/0008/617372/Fetal-Growth-Restriction-Position-Statement.pdf](https://www.cec.health.nsw.gov.au/_data/assets/pdf_file/0008/617372/Fetal-Growth-Restriction-Position-Statement.pdf)
5. Groom, K. M., & David, A. L. (2018). The role of aspirin, heparin, and other interventions in the prevention and treatment of fetal growth restriction. *American journal of obstetrics and gynecology*, 218(2S), S829–S840. <https://doi.org/10.1016/j.ajog.2017.11.565>
6. NSW Health. (2021). *Guide to the Role Delineation of Clinical Services*, NSW Ministry of Health, Sydney, Australia. <https://www.health.nsw.gov.au/services/Pages/role-delineation-of-clinical-services.aspx>
7. Baschat A. A. (2018). Planning management and delivery of the growth-restricted fetus. *Best practice & research. Clinical obstetrics & gynaecology*, 49, 53–65. <https://doi.org/10.1016/j.bpobgyn.2018.02.009>
8. Figueras, F., & Gratacos, E. (2014). Stage-based approach to the management of fetal growth restriction. *Prenatal diagnosis*, 34(7), 655–659. <https://doi.org/10.1002/pd.4412>
9. Monash Health. (2021). *Small for gestational age (SGA) and fetal growth restriction (FGR) management: Clinical Guideline*. Victoria, Australia.
10. Royal College of Obstetricians and Gynaecologists (RCOG). (2013). Green top guideline No. 31; *The Investigation and Management of the Small-for-Gestational-Age Fetus*. 2<sup>nd</sup> Edition, Minor Revisions January 2014. <https://www.rcog.org.uk/guidance/browse-all-guidance/green-top-guidelines/small-for-gestational-age-fetus-investigation-and-management-green-top-guideline-no-31/>

11. New Zealand Maternal Fetal Medicine Network (NZMFMN). (2015). *New Zealand Obstetric Doppler Guideline*. Revised October 2015. <https://www.health.govt.nz/our-work/life-stages/maternity-services/new-zealand-obstetric-ultrasound-guidelines/doppler>
12. Vollgraff Heidweiller-Schreurs, C. A., van Osch, I. R., Heymans, M. W., Ganzevoort, W., Schoonmade, L. J., Bax, C. J., Mol, B., de Groot, C., Bossuyt, P., de Boer, M. A., & CPR IPD Study Group (2021). Cerebroplacental ratio in predicting adverse perinatal outcome: a meta-analysis of individual participant data. *BJOG : an international journal of obstetrics and gynaecology*, 128(2), 226–235. <https://doi.org/10.1111/1471-0528.16287>
13. Society for Maternal-Fetal Medicine (SMFM). Martins, J. G., Biggio, J. R., & Abuhamad, A. (2020). Society for Maternal-Fetal Medicine Consult Series #52: Diagnosis and management of fetal growth restriction: (Replaces Clinical Guideline Number 3, April 2012). *American journal of obstetrics and gynecology*, 223(4), B2–B17. <https://doi.org/10.1016/j.ajog.2020.05.010>
14. Lees, C. C., Marlow, N., van Wassenaer-Leemhuis, A., Arabin, B., Bilardo, C. M., Brezinka, C., Calvert, S., Derks, J. B., Diemert, A., Duvetkot, J. J., Ferrazzi, E., Frusca, T., Ganzevoort, W., Hecher, K., Martinelli, P., Ostermayer, E., Papageorghiou, A. T., Schlembach, D., Schneider, K. T., Thilaganathan, B., Todros, T., Valcamonico, A., Visser, G., Wolf, H., TRUFFLE study group (2015). 2 year neurodevelopmental and intermediate perinatal outcomes in infants with very preterm fetal growth restriction (TRUFFLE): a randomised trial. *Lancet (London, England)*, 385(9983), 2162–2172. [https://doi.org/10.1016/S0140-6736\(14\)62049-3](https://doi.org/10.1016/S0140-6736(14)62049-3)
15. NSW Health. (2022) *Maternity and Neonatal Service Capability*, NSW Ministry of Health, Sydney, Australia. [https://www1.health.nsw.gov.au/pds/Pages/doc.aspx?dn=GL2022\\_002](https://www1.health.nsw.gov.au/pds/Pages/doc.aspx?dn=GL2022_002)
16. Forster, D. A., Moorhead, A. M., Jacobs, S. E., Davis, P. G., Walker, S. P., McEgan, K. M., Opie, G. F., Donath, S. M., Gold, L., McNamara, C., Aylward, A., East, C., Ford, R., & Amir, L. H. (2017). Advising women with diabetes in pregnancy to express breastmilk in late pregnancy (Diabetes and Antenatal Milk Expressing [DAME]): a multicentre, unblinded, randomised controlled trial. *Lancet (London, England)*, 389(10085), 2204–2213. [https://doi.org/10.1016/S0140-6736\(17\)31373-9](https://doi.org/10.1016/S0140-6736(17)31373-9)
17. Foudil-Bey, I., Murphy, M. S., Dunn, S., Keely, E. J. & El-Charr, D. (2021) Evaluating antenatal breastmilk expression outcomes: a scoping review. *International Breastfeeding Journal*. 16(1): 25. <https://doi.org/10.1186/s13006-021-00371>