Queensland Clinical Guideline: Term small for gestational age baby

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- Providing care within the context of locally available resources, expertise, and scope of practice
- Supporting consumer rights and informed decision making in partnership with healthcare practitioners including the right to decline intervention or ongoing management
- Advising consumers of their choices in an environment that is culturally appropriate and which enables comfortable and confidential discussion. This includes the use of interpreter services where necessary
- Ensuring informed consent is obtained prior to delivering care
- Meeting all legislative requirements and professional standards
- Applying standard precautions, and additional precautions as necessary, when delivering care
- Documenting all care in accordance with mandatory and local requirements

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Flow Chart: Term small for gestational age baby

**Initial care at birth:**
- Resuscitate and stabilise as required:
  - Perinatal asphyxia, meconium aspiration, PPHN
  - Maintain normothermia:
    - Warm draft free environment
    - Skin-to-skin contact
    - Feed within 30–60 minutes of birth

**Newborn assessment:**
- Distinguish the healthy small baby from the FGR baby
  - Obtain a detailed history
  - Perform a physical examination
  - Examine the placenta

**Growth assessment:**
- Estimate gestation: US (earlier dating is the most accurate), LMP, Ballard examination
- Physical examination:
  - Constitutionally small: healthy
  - Growth restricted: at increased risk of morbidity and mortality
  - Plot weight, head circumference and length on percentile chart

**Parental considerations:**
- Involve parents in shared decision making
- Facilitate parent involvement in their baby’s care
- Ensure parents understand importance of:
  - Maintaining the baby’s temperature and feeding regularly to avoid hypoglycaemia
  - Providing additional feeding support as required
  - Observing for jaundice
  - Explain tests and procedures, comfort measures, equipment
  - Refer to local support services where required (e.g. social work)
  - Provide written parent information

**Discharge planning:**
- Baby healthy and physiologically stable
- Feeding progressing well
- A steady weight gain (e.g. ≥ 30 grams/day)
- Discharge plan is in place
- Follow-up as per baby and family requirements (e.g. multidisciplinary/paediatric for baby < 2000 g)

**Potential associated morbidity:**
- Hypoglycaemia
- Hyperthermia
- Polycythaemia/hyperviscosity
- Immunodeficiency/Thrombocytopenia
- Infections: TORCH
- Hyperglycaemia
- Congenital anomalies
- Rarely necrotising enterocolitis

**Potential investigations:**
- Placental histopathology, chromosomal analysis, cord blood gases
- FBC, Hct, platelet count
- Suspected congenital TORCH infection:
  - Refer to ASID guidelines Management of perinatal infections
  - Dysmorphic features:
    - Dysmorphology assessment
    - Chromosome studies
  - Refer to clinical geneticist

**Associated QCG guidelines:**
- Routine newborn assessment
- Neonatal resuscitation
- Neonatal respiratory distress including CPAP
- Neonatal stabilisation for retrieval
- Neonatal hypoglycaemia
- Normal birth
- Hypoxic-ischaemic encephalopathy (HIE)
- Perinatal substance use
- Neonatal jaundice

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ASID Australasian Society for Infectious Diseases; BGL Blood glucose level; CPAP Continuous positive airway pressure; FBC Full blood count; FGR Fetal growth restriction; Hct Haematocrit; LMP Last menstrual period; PPHN pulmonary hypertension of the newborn; QCG Queensland Clinical Guidelines(s); SGA Small for gestational age; TORCH: Toxoplasmosis, Other (e.g. syphilis, varicella zoster, Human immunodeficiency virus), Rubella, Cytomegalovirus, Herpes simplex); US Ultrasonography; < less than; ≥ greater than or equal to

Refer to online version, destroy printed copies after use
## Abbreviations

<table>
<thead>
<tr>
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<th>Definition</th>
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<tbody>
<tr>
<td>AGA</td>
<td>Appropriate for gestational age</td>
</tr>
<tr>
<td>BGL</td>
<td>Blood glucose level</td>
</tr>
<tr>
<td>BoBs</td>
<td>Bacterial artificial chromosomes (BACs) on Beads</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence interval</td>
</tr>
<tr>
<td>CMV</td>
<td>Cytomegalovirus</td>
</tr>
<tr>
<td>FBC</td>
<td>Full blood count</td>
</tr>
<tr>
<td>FGR</td>
<td>Fetal growth restriction</td>
</tr>
<tr>
<td>GP</td>
<td>General Practitioner</td>
</tr>
<tr>
<td>Hct</td>
<td>Haematocrit</td>
</tr>
<tr>
<td>HIE</td>
<td>Hypoxic-ischaemic encephalopathy</td>
</tr>
<tr>
<td>HIV</td>
<td>Human immunodeficiency virus</td>
</tr>
<tr>
<td>IUGR</td>
<td>Intra-uterine growth restriction</td>
</tr>
<tr>
<td>IV</td>
<td>Intravenous</td>
</tr>
<tr>
<td>LBW</td>
<td>Low birth weight</td>
</tr>
<tr>
<td>QCG</td>
<td>Queensland Clinical Guideline(s)</td>
</tr>
<tr>
<td>SD</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>SGA</td>
<td>Small for gestational age</td>
</tr>
<tr>
<td>UA</td>
<td>Umbilical artery</td>
</tr>
<tr>
<td>US</td>
<td>Ultrasound</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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## Definition of terms

### Appropriate for gestation age (AGA)
- Birth weight appropriate for gestational age\(^1\)
- Birth weight between the 10–90th percentile on a standardised growth chart\(^1\)

### Fetal growth restriction (FGR)
- The preferred term when referring to the size of a baby caused by a pathophysiological process occurring in-utero that inhibits fetal growth
- Estimation of fetal weight at obstetric ultrasound assessment below the 10th percentile of a antenatal population range, with additional evidence of a pathophysiological process\(^2,3\), typically Doppler abnormality
- Also known as intrauterine growth restriction (IUGR)
- FGR and SGA are related but not synonymous.\(^2,3\) FGR is included within the SGA definition
- Severe FGR • Fetal growth restriction below the third percentile

### Low birth weight (LBW)
- Birth weight less than 2500 g regardless of gestational age\(^4\)

### Shared decision making
- Definition adapted for the newborn and family:
  - Shared decision making involves the integration of a family’s values, goals and concerns with the best available evidence about benefits, risks and uncertainties of treatment, in order to achieve appropriate health care decisions for the baby. It involves clinicians and parents (and carers) making decisions about the baby’s management together.
  - In partnership with their clinician, parents (and carers) are encouraged to consider available screening, treatment, or management options and the likely benefits and harms of each, to communicate their preferences, and help select the course of action that best fits\(^5\)

### Small for gestational age (SGA)
- For the purpose of this guideline: birth weight below the 10th percentile of a population-specific birth weight versus gestational age plot\(^1\)
- Other guidelines may use the statistical definition of greater than two standard deviations below the mean birth weight for gestational age\(^1\)
- Antenatally, at obstetric ultrasound assessment, it is the estimated fetal weight below the 10\(^{th}\) percentile
- The antenatal and postnatal umbrella term, with FGR referring to cases secondary to pathology
- The preferred term when referring to the small size of a newborn baby relative to gestational age\(^3\)
- SGA is also used when the aetiology of small size is unknown
- Does not necessarily imply that fetal growth was abnormal as the baby may be constitutionally small\(^3\)
- Severe SGA • Birth weight below the third percentile\(^6\)

### Term
- Greater than or equal to 37 weeks gestation and before 42 weeks gestation
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1 Introduction
The term ‘small for gestational age’ (SGA) refers to the small size of the baby at birth, that is, when the birth weight is below the 10th percentile. Babies who are SGA may be:

- Constitutionally small and at no greater risk than appropriate weight for gestational age (AGA) babies, or
- Small due to fetal/intrauterine growth restriction (FGR), a pathophysiological process occurring in-utero

Differentiating between FGR and SGA remains an obstetric challenge:
- Babies born SGA may not have FGR
- Babies born AGA may have been affected by growth restriction and this may not have been detected antenatally
- FGR may not be detected clinically before birth
- Babies who are SGA due to FGR are more likely to have problems during the newborn period and require specialised care, than SGA babies without FGR
- A SGA baby at term may not have a low birth weight (LBW) (i.e. less than 2500 g)

This guideline focuses on the term (greater than or equal to 37 weeks and less than 42 weeks gestation) SGA baby. SGA babies as a group are at greater risk for perinatal morbidity and mortality than the population of AGA babies and will include babies with undiagnosed FGR.

1.1 Incidence
An Australian study reported perinatal mortality in term SGA babies was significantly higher than in term AGA babies. Perinatal mortality for SGA babies, which included more stillbirths than neonatal deaths, was reported at:

- 3.5/1000 births at the 5th to less than 10th percentile, rising to 17.8/1000 births at less than the 1st percentile
- 0.89/1000 births at 37 weeks rising to 4.82/1000 births at 41 weeks

Within Queensland, the incidence of term SGA in 2015 was:

- 5.8% within the general population, and
- 22.4% within the Aboriginal and Torres Strait Islander population
  - Aboriginal and Torres Strait Islander SGA and LBW babies are disproportionately represented and this extends to the number of associated admissions to neonatal units

1.2 Factors associated with fetal growth
Birth weight is one of the key measurements used to reflect the intrauterine environment to which the fetus was exposed. Several maternal and fetal factors both physiological and pathological may influence fetal growth.

FGR is increasingly seen as a fetal adaptive process to a compromised intrauterine environment which may assist the fetus to survive but may result in adverse sequelae for the baby and potentially for the adult if prolonged. The diagnosis of reduced fetal growth rate is important. Once detected, further obstetric assessment is required to determine the cause and guide pregnancy management. Small size may be constitutional and reflect a normal physiological variance, however, reduced growth rate may occur secondary to maternal, placental and/or fetal factors.
1.2.1 Risk factors associated with term moderate and/or severe SGA

Research has generally not distinguished between preterm and term SGA risk factors, nor the severity of the SGA. Refer to Table 1. Factors associated with term gestation moderate and severe SGA. For other risk factors less robustly associated with term SGA babies refer to Appendix A: Factors associated with term SGA babies.

Table 1. Factors associated with term gestation moderate and severe SGA

<table>
<thead>
<tr>
<th>Variable</th>
<th>Moderate SGA [95% CI]</th>
<th>Severe SGA [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primiparity</td>
<td>1.7 [1.1, 2.5]</td>
<td>1.9 [1.0, 3.7]</td>
</tr>
<tr>
<td>Short maternal stature</td>
<td>2.9 [1.9, 4.3]</td>
<td>2.2 [1.1, 4.6]</td>
</tr>
<tr>
<td>Antenatal smoking</td>
<td>1.8 [1.1, 3.1]</td>
<td>4.0 [1.9, 8.1]</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>0.3 [0.0, 2.2]</td>
<td>7.3 [3.1, 17.3]</td>
</tr>
<tr>
<td>Threatened preterm labour</td>
<td>0.9 [0.3, 2.6]</td>
<td>4.7 [1.9, 11.6]</td>
</tr>
<tr>
<td>Low placental weight</td>
<td>16.4 [10.4, 26.0]</td>
<td>22.0 [11.0, 44.3]</td>
</tr>
</tbody>
</table>

* Univariable associations with severe and moderate term SGA: results of multinomial logistic regression analysis

1.3 Parental considerations

Parents of babies with SGA will require additional support, even if the baby does not have FGR:

- Involve parents in shared decision making by having regular discussions regarding their baby’s progress
  - Include investigations for the underlying cause of SGA, as these may assist with prognosis and recurrence risk in a future pregnancy
- Facilitate and ensure parental understanding of the importance of:
  - Being involved in their baby’s care
  - Maintaining their baby’s temperature and feeding regularly to avoid hypoglycaemia
    - Encourage skin to skin contact if the mother and baby’s condition permits
  - Observing for jaundice [refer to Queensland Clinical Guideline (QCG): Neonatal jaundice]
- Explain tests and procedures, comfort measures, equipment
- Explain criteria for discharge (e.g. established feeding and gaining weight)
- Document discussions in the baby’s medical record
- Refer to local support services where required (e.g. social work, child health clinics)
- Provide written parent information on caring for SGA babies [refer to QCG parent information: Small for gestational age baby]
# 2 Initial newborn assessment and care

## Table 2. Initial newborn assessment and care: first 2 hours post birth

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Consideration</th>
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</thead>
</table>
| **Resuscitation** | • Uterine contractions increase hypoxic stress in the FGR baby therefore perinatal asphyxia is a common morbidity  
• Refer to QCG: *Neonatal resuscitation*[^17] |
| **Temperature** | • The SGA baby is at greater risk of hypothermia than an AGA baby[^1]  
• Maintain normothermia (36.5–37.5 °C), including when resuscitation is required[^18]  
• Provide a warm draft free environment[^19]  
• Dry the baby after birth with pre-warmed towels, apply a pre-warmed hat[^18]  
• If the baby is stable: skin to skin contact (covered with a warm blanket[^18])  
• Overhead radiant warmer, if required[^18]:  
  o Unwrap blankets to enable radiant warmth to reach the baby |
| **Routine care** | • For routine care considerations, within the first two hours of birth, refer to QCG: *Normal birth* [Fourth stage]^[^20] including information on:  
  o Initial assessment and care  
  o Skin to skin contact and breastfeeding  
  o Risk of hypoglycaemia, feed within 30–60 minutes of birth[^21]  
  o Observations  
  o Non-urgent care  
  o Indications for additional newborn care  
  o Documentation  
• Most term SGA babies are well as long as normothermia and normoglycaemia are maintained  
• Refer to Section 2.1 Rooming-in considerations |
| **Indications for additional care** | • Common morbidities associated with FGR that may require admission to a neonatal unit for management include:  
  o Perinatal asphyxia[^22]  
  o Hypothermia[^22]  
  o Hypoglycaemia[^23] requiring intravenous (IV) therapy  
  o Hyperglycaemia  
  o Hypocalcaemia[^22]  
  o Polycythemia/hyperviscosity[^22,23]  
  o Congenital anomalies[^1]  
  o Infection (TORCH and acquired)[^24]  
• Other associated FGR morbidities that may also require admission to a neonatal unit include[^22]:  
  o Persistent pulmonary hypertension, meconium aspiration, pulmonary haemorrhage  
  o Thrombocytopenia, neutropenia, coagulopathy, lowered immunoglobulin G (IgG) levels  
  o Necrotising enterocolitis (NEC): increased risk with absent or reversed umbilical artery (UA) end diastolic flow on antenatal Doppler studies, sepsis[^25,26], congenital heart disease[^26], hypoxic-ischaemic encephalopathy (HIE)^[^26], formula feeding[^27] |
| **Associated Queensland Clinical Guidelines (QCG)** | • As required refer to QCGs [https://www.health.qld.gov.au/qcg/]:  
  o Routine newborn assessment[^28]  
  o Neonatal resuscitation[^29]  
  o Establishing breastfeeding[^30]  
  o Neonatal respiratory distress including CPAP[^31]  
  o Neonatal stabilisation for retrieval[^32]  
  o Newborn hypoglycaemia[^21]  
  o Hypoxic-ischaemic encephalopathy[^33]  
  o Perinatal substance use: neonatal[^34]  
  o Neonatal jaundice[^15] |
| **Placental investigations** | • Examine the placenta and prepare for histopathology [refer to Section 3.3 Investigations] |
| **Inter-hospital transfer and consultation** | • If advice on management and/or transfer is required, discuss with a paediatrician or neonatologist:  
  o Call Retrieval Services Queensland (RSQ) on 1300 799 127 |
2.1 Rooming-in considerations

Table 3. Rooming-in considerations

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Consideration</th>
</tr>
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</table>
| Rooming-in   | - SGA or LBW on its own is not a reason for neonatal unit admission  
- Most babies greater than 2000 g can room-in and breastfeed if appropriate staffing, monitoring and parental support is available  
- May facilitate skin to skin contact, enhance successful breastfeeding and promote mother-baby attachment  
- Babies less than 2000 g may be able to room-in following consultation with neonatologist/paediatrician  
- Consider the additional care required for establishing breastfeeding, blood glucose level (BGL) monitoring, potential for occasional gavage feed, prevention of hypothermia and the potential increased length of stay compared to AGA babies |

3 Newborn assessment and care

Table 4. Newborn assessment

<table>
<thead>
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<th>Consideration</th>
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| Newborn assessment       | - It is important to distinguish the healthy small baby (who may require no/minimal support) from the growth restricted baby (who may require investigation, ongoing management and follow-up)  
- Obtain a detailed history (including pregnancy and family)  
- Perform a physical examination of the baby [refer to row: Physical examination]  
- Continue assessment of both mother and baby postpartum to determine, where possible, cause or contributing factors for small size  
- Individualise clinical management of the baby based on clinical presentation and underlying diagnosis |
| Confirmation of gestational age | - Confirm gestational age by checking the antenatal ultrasound (US) and/or last menstrual period  
- Antenatal US dating is usually much more accurate than menstrual dating which is associated with overestimation of gestational age:  
  o The earlier US dating occurs (preferably before 12 weeks), the more accurate the prediction of gestational age  
  o Up to 23 weeks gestation US dating remains more accurate than a reliable last menstrual period  
- Some dates, for instance those based on assisted reproduction technology and/or in vitro fertilisation (IVF) procedures, may be relied upon as they are clinically more accurate  
- In the absence of menstrual or US dating or if there is doubt, the Ballard Score may be performed to estimate gestational age |
| Physical examination     | - Refer to QCG: Routine newborn assessment  
- FGR may be associated with chromosomal syndromes, perinatal substance use, and viral infections:  
  o Include a thorough assessment for associated congenital anomalies including dysmorphic features and signs of intrauterine infection (e.g. hepatosplenomegaly, purpuric rash)  
- Uterine and UA Doppler studies may provide antenatal evidence of uteroplacental insufficiency as a cause of FGR  
- Determining whether FGR is symmetrical or asymmetrical [refer to Table 5] is of less clinical importance than the results of the Doppler studies  
- FGR with normal UA Doppler studies:  
  o Adverse perinatal morbidity (i.e. intraventricular haemorrhage, periventricular leukomalacia, HIE, necrotising enterocolitis, bronchopulmonary dysplasia, sepsis) and mortality have been found to be uncommon |
3.1 Symmetrical and asymmetrical FGR

Table 5. Symmetrical and asymmetrical FGR

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Consideration</th>
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</table>
| **Symmetrical FGR**<sup>38</sup> | • Usually occurs early in gestation with a proportionate decrease in length, weight and head circumference for gestational age, with all parameters less than the 10th percentile on the growth chart<sup>1</sup>  
  • More severe form typically detected in the second trimester ultrasound and associated with chromosomal abnormalities, congenital malformations and intrauterine congenital infection, fetal alcohol syndrome, and low social-economic status<sup>1,22</sup> |
| **Asymmetrical FGR** | • Also known as ‘head sparing’ FGR  
  • Disproportionate decrease in length and weight compared to the head circumference<sup>1</sup>:  
  - The head circumference remains appropriate for gestational age  
  - Weight and length are decreased (often less than 10th percentile on the growth chart for gestational age)  
  • Associated with uteroplacental insufficiency and extrinsic factors occurring late in pregnancy<sup>38</sup> (e.g. maternal hypertensive conditions, long standing maternal diabetes, renal disease, smoking and living at a high altitude)  
  • May include the appearance of the following features<sup>38</sup>:  
    - Head disproportionately large for trunk  
    - Extremities appear wasted, muscle mass may be decreased especially in the buttocks and thighs<sup>1</sup>  
    - Facial appearance of an ‘old man’  
    - Large anterior fontanelle with wide or overlapping cranial sutures  
    - Thin umbilical cord with diminished Wharton's jelly  
    - Scaphoid abdomen  
    - Skin may be loose, thin, dry, flaky and with decreased subcutaneous fat  
    - Tone and alertness:  
      - Hyperalert, jittery, hypertonic with mild to moderate FGR  
      - Hypotonic with severe FGR |

3.2 Growth standards

Table 6. Growth charts

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Consideration</th>
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</table>
| **Growth charts** | • Measure and plot birth weight, head circumference and length relative to gestational age<sup>36</sup>  
  • The Fenton growth charts for preterm infants<sup>39</sup>:  
    - May be used for determination of SGA  
    - Considered the gold standard for 22–50 weeks gestation  
    - Blend into the World Health Organization (WHO) growth charts used in the Queensland Health Personal Health Record  
    - Refer Appendix B: Growth charts  
  • There is inconsistent evidence on customised growth charts (e.g. for maternal height, weight, ethnicity and parity variables) offering more accurate identification of SGA babies compared to population specific charts of the SGA baby<sup>40,41,42,43</sup>  
  • Comparison of head circumference to weight and length may help to identify symmetrical or asymmetrical FGR |
3.3 Investigations
The majority of term SGA babies are well and require normal baby care, with a focus on being kept warm and fed, as well as the additional care of monitoring their blood sugars. Investigations to consider to either evaluate for evidence of clinical compromise arising from growth restriction or to determine a reason for SGA are referenced in Table 7.

Table 7. Investigations

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Consideration</th>
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</table>
| Placental | • Investigations to be considered at the time of birth  
• To exclude uteroplacental insufficiency, infection and confined placental mosaicism:  
  o Histopathology  
  o Chromosomal analysis (G-banded karyotype)  
  o Cord gases as indicated |
| Baby | • FBC including Hct and platelet count  
  (to exclude polycythaemia and thrombocytopenia respectively)  
• Suspected congenital infection:  
  o Refer to Australasian Society of Infectious Diseases guidelines Management of perinatal infections for investigations related to toxoplasmosis, rubella, cytomegalovirus (CMV), human immunodeficiency virus (HIV), varicella zoster, syphilis  
• Dysmorphic features:  
  o Dysmorphology assessment  
  o Referral to a clinical geneticist  
  o SNP array (single nucleotide polymorphism) plus consider FISH (fluorescence in situ hybridization) if clinical suspicion of specific conditions (e.g. trisomy 21,13 or 18) |
| Maternal | • If uteroplacental insufficiency is confirmed, consider arranging testing for antiphospholipid syndrome in the mother to guide future pregnancy management |

3.4 Thermoregulation

Table 8. Thermoregulation

<table>
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<th>Aspect</th>
<th>Consideration</th>
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</table>
| Thermoregulation | • Maintain normothermia (36.5–37.5 °C):  
  o Dress and cover baby appropriately for the environment  
  o Skin to skin contact  
• Monitor baby’s temperature at frequent intervals:  
  o Within the first hour of birth  
  o Every 3–4 hours at feed times for 24 hours:  
    ▪ If less than 24 hours old  
    ▪ When transferred to the postnatal floor or rooming-in from the neonatal unit  
  o Pre-interventions (e.g. physical examination)  
  o 30–60 minutes after interventions (e.g. addition of warm wraps, commencement of overhead radiant warmer, change of incubator temperature):  
    ▪ Then hourly until stable  
• If hypothermia develops consider the use of pre-warmed clothing, an incubator, radiant warmer (unwrap blankets to enable radiant warmth to reach the baby) or a commercial heated water bed as required  
• When baby is rooming-in with parents, apply SIDS guidelines (i.e. no hat)  
• Avoid hyperthermia by not over dressing the baby, monitoring equipment (e.g. incubator) and the baby’s temperature  
• Document baby and equipment temperature, as well as interventions |
### 3.5 Hypoglycaemia, feeding and polycythaemia

#### Table 9. Hypoglycaemia, feeding and polycythaemia

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Consideration</th>
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<tbody>
<tr>
<td><strong>Hypoglycaemia</strong></td>
<td>• SGA babies are at increased risk of hypoglycaemia due to deficient hepatic and cardiac muscle glycogen stores(^9), a limited capacity for gluconeogenesis(^9), increased insulin sensitivity and polycythaemia&lt;br&gt;• If the baby is well, monitor the BGL(^{18}):&lt;br&gt;  o Prior to the second feed or within 3 hours of birth if the baby has fed effectively&lt;br&gt;  o At 2 hours of age if the baby has not fed effectively&lt;br&gt;  o Every 4–6 hours pre-feeds until monitoring ceases&lt;br&gt;  o If feeding is ineffective, recheck BGL&lt;br&gt;• For management of hypoglycaemia: refer to QCG <em>Newborn hypoglycaemia</em>(^{18})</td>
</tr>
<tr>
<td><strong>Feeding</strong></td>
<td>• Promote and support breastfeeding&lt;br&gt;• Refer to QCG: <em>Establishing breastfeeding</em>(^{30})&lt;br&gt;• In the absence of perinatal compromise:&lt;br&gt;  o Support the baby’s mother in developing a feeding plan&lt;br&gt;  o Establishment of breastfeeding may necessitate additional support for mother and/or baby&lt;br&gt;  o Feed in response to feeding cues&lt;br&gt;  o Offer a feed if the baby has not fed for 3 hours&lt;br&gt;  o A maximum handling time of 45 minutes per feed is suggested as these babies may tire easily&lt;br&gt;  o Compared to formula fed babies, breastfed babies may take less breast milk more often&lt;br&gt;  o Midwifery support and monitoring of feeding is vital (e.g. observe and encourage regular feeding)&lt;br&gt;• Observe and document the baby’s urinary output and bowel motions (frequency and type)</td>
</tr>
<tr>
<td>When further assistance is required</td>
<td>• If unsure of baby’s progress, consult a lactation consultant and/or the paediatric team as required&lt;br&gt;• With ineffective feeding:&lt;br&gt;  o Express after each feed&lt;br&gt;  o Supplementary feeds may be required:&lt;br&gt;    ▪ Expressed breast milk is preferred&lt;br&gt;  o Skin to skin contact may promote breastfeeding behaviours(^{30})&lt;br&gt;• If the baby does not feed within a 4 hour period, reassess with a view to paediatric consultation&lt;br&gt;• If no evidence of milk transfer (i.e. with non-nutritive sucking), a feeding volume guide is 60 mL/kg/day on Day 1, with subsequent daily stepwise increments of 30 mL/kg/day&lt;br&gt;• Consider insertion of an enteral tube to administer feeds in the event of continued ineffective feeding: discuss with the mother prior to the intervention&lt;br&gt;• If enteral feeding is not possible, commence IV 10% Glucose IV at 60 mL/kg/day&lt;br&gt;• When commencing feeds in babies who have had absent or reversed UA end diastolic flow on antenatal Doppler studies:&lt;br&gt;  o Monitor for signs of feed intolerance (vomiting, increasing/large residual gastric aspirate if tube feeding)&lt;br&gt;• For babies less than 2000 g, ensure a low tolerance for commencing IV fluids whilst waiting for colostrum or breast milk to become available(^{15})</td>
</tr>
<tr>
<td><strong>Polycythaemia</strong></td>
<td>• Increased risk of neonatal jaundice and hypoglycaemia&lt;br&gt;• If the Hct is greater than 70% and the baby has symptoms of polycythaemia, discuss management with a tertiary neonatologist&lt;br&gt;• Refer to QCG: <em>Neonatal jaundice</em>(^{15})</td>
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## 4 Prognosis

### Table 10. Term SGA prognosis

<table>
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<tr>
<th>Aspect</th>
<th>Consideration</th>
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| **Prognosis** | • Although there is conflicting evidence on the impact of being born SGA at term (including in babies who had normal Doppler studies), most term SGA babies are at low risk for serious long term outcomes:45-48  
  o Prognosis related to FGR can principally be determined by1:  
    ▪ The cause of aberrant growth  
    ▪ Timing and duration of growth restriction17  
    ▪ Severity and symmetry of growth restriction17  
    ▪ Presence and degree of perinatal asphyxia and its complications33  
    ▪ Postnatal course  
    ▪ Socioeconomic status of the baby’s family  
  • Long term morbidity  
    ▪ Neurodevelopmental outcomes (from systematic reviews):  
      ▪ Noted weak but significant association with childhood learning difficulties45  
      ▪ Children between 1 month and 12 years of age showed those born SGA at 36–41 weeks gestation scored on average 0.5 standard deviation (SD) lower than AGA children across a range of composite neurodevelopmental domains (cognitive, behavioural, language, motor, hearing, vision or sleep outcomes)17:  
      ▪ Individually, the domains of cognitive (0.52 SD) and behavioural (0.47 SD) development predominantly scored lower  
      ▪ Children with evidence of fetal circulatory redistribution (preferential perfusion of the brain) have more associated neurodevelopmental impairments than babies born AGA or SGA without US evidence of FGR17  
    ▪ Whilst an increased prognosis of metabolic syndrome has been associated with FGR irrespective of gestation49, composite outcome analysis for conditions associated with metabolic syndrome (obesity, hypertension, hypercholesterolaemia, coronary heart disease, and type 2 diabetes) has shown a non-significant association with term SGA45  
    ▪ When individual morbidities are considered, there is45:  
      ▪ An association with:  
        ▪ Adult obesity [OR: 1.98 (95% CI: 1.23, 3.20)]  
        ▪ End stage renal disease (childhood/adulthood) [OR: 1.95 (95% CI: 1.46, 2.61)]  
      ▪ For term birth weight less than 2500 g a weak association with adult outcomes of:  
        ▪ Hypertension [OR: 1.38 (95% CI: 1.14, 1.69)]  
        ▪ Diabetes mellitus or impaired glucose tolerance [OR: 1.93 (95% CI: 1.06, 3.53)]  
        ▪ Cardiovascular mortality [OR: 1.53 (95% CI: 1.03, 2.29)]  
      ▪ A non-significant association with childhood:  
        ▪ Obesity  
        ▪ Hypertension  
      ▪ Conflicting evidence on the association with childhood asthma45,50,51  
  | **Long term morbidity** | • Remain smaller and relatively underweight throughout life  
  • Have a higher risk of adverse neurological outcome which may include36:  
    ▪ Learning deficits  
    ▪ Behavioural problems  
  • Asymmetrical FGR  
    ▪ Usually have an accelerated velocity of growth (‘catch up growth’) in the first six months particularly if growth restriction is due to maternal factors1 and normal development:  
      ▪ Increased linear growth and lean body mass is preferred to increased fat mass, central adiposity and insulin resistance52 |
## 5 Discharge planning

### Table 11. Discharge planning

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Consideration</th>
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| **Criteria for discharge** | • Evaluate each mother and baby individually to determine the optimal time for discharge\(^5\)  
• Discussion of discharge plans with the parents and multidisciplinary team, including the Lactation Consultant in a timely manner prior to discharge  
• Weight is not the only criterion for discharge\(^3\) although there needs to be caution in babies weighing less than 2000 g  
• For babies less than 2000 g, discharge may be considered providing\(^3\):  
  o Baby is healthy  
  o Physiologically stability (temperature maintained in open cot)  
  o Feeding is progressing well  
  o Parents are able to sufficiently care for baby  
  o A steady weight gain (i.e. greater than or equal to 30 g/day)  
  o An appropriate follow-up plan is in place |
| **Parents**            | • Prior to discharge provide parent(s) with education and information regarding\(^1\):  
  o Nutritional/feeding requirements  
  o Baby’s expected growth and development (regular assessment of growth and development by Child Health services or the General Practitioner (GP) is recommended during the first year)  
• Consider/offer rooming-in as required |
| **Follow-up**          | • Babies who are SGA have a higher risk of readmission after discharge  
• Close follow-up and coordination of post discharge care help to reduce readmission  
• Include a hard copy of the full discharge summary and plan, highlighting the type and timing of follow-up care, within the Personal Health Record  
• Refer to:  
  o GP: provide a hard or soft copy of discharge summary  
  o Child Health Service:  
    ▪ Early feeding and support drop-in clinics  
  o Aboriginal and Torres Strait Islander Health services, where applicable  
  o Specialist Lactation Service where concerns persist and/or monitoring is required (e.g. if needing supplementary feeds)  
  o Specialised multidisciplinary clinic or paediatrician for babies who were less than 2000 g or with co-existing medical conditions  
  o Other community support services as required e.g. Australian Breastfeeding Association |
References


Appendix A: Factors associated with term SGA babies

The table below includes published factors associated with SGA babies at term. More robust factors can be found in Section 1.2.1 Risk factors associated with term moderate and/or severe SGA.

<table>
<thead>
<tr>
<th>Factors associated with term SGA babies</th>
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<tbody>
<tr>
<td><strong>Maternal</strong></td>
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<tr>
<td></td>
<td>Greater than or less than 35 years(^6)</td>
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<td></td>
<td>Primiparity(^5,54)</td>
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<td></td>
<td>Spacing less than 36 months(^55)</td>
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<td></td>
<td>Short maternal stature(^6,55) (less than or equal to 157 cm(^6))</td>
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<td></td>
<td>Weight:</td>
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<tr>
<td></td>
<td>Underweight pre-pregnancy BMI(^6) / weight less than or equal to 55kg pre-pregnancy(^55)</td>
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<td></td>
<td>Obesity(^6), particularly with weight loss in pregnancy(^56)</td>
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<td></td>
<td>Inadequate weight gain(^54) / weight gain less than 6kg(^52)</td>
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<td></td>
<td>Greater severity of intimate partner violence in low income women(^57)</td>
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<td></td>
<td>Less than 4 antenatal visits(^54) / inadequate or late commencement of antenatal care(^55,59,60)</td>
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<td></td>
<td>Previous SGA baby</td>
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<td></td>
<td>Multiple pregnancy</td>
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<td></td>
<td>Smoking(^5,58,61,55)</td>
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<td></td>
<td>Peridontal disease(^6,63)</td>
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<td></td>
<td>Hypertensive disorders of pregnancy (e.g. preeclampsia)(^6,58)</td>
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<td></td>
<td>Chronic hypertension(^58)</td>
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<td>Threatened preterm labour(^6):</td>
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<td>Possibly due to an early intrauterine insult(^6) (e.g. central nervous system(^64))</td>
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<td></td>
<td>Previous preterm birth(^59)</td>
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<td></td>
<td>Anaemia(^55)</td>
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<td>Pollutant exposures (e.g. proximity to power plants)(^65)</td>
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<tr>
<td><strong>Fetal</strong></td>
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<td></td>
<td>Infection: CMV(^66)</td>
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<td></td>
<td>Female gender(^57)</td>
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<td></td>
<td>Congenital anomaly(^60)</td>
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<tr>
<td><strong>Placental</strong></td>
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<td>Low placental weight(^5)</td>
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<td></td>
<td>Insufficient placental perfusion(^66):</td>
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<td>Doppler assessment 37–41 weeks in low risk pregnancies: UA PI greater than 1.2 and uterine artery RI greater than 0.5(^56)</td>
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<td></td>
<td>Placental infarction(^54)</td>
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<td>Chronic villitis(^54)</td>
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<tr>
<td><strong>Conflicting evidence</strong></td>
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<td></td>
<td>Lower social-economic status(^55) / family income(^6)</td>
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<td></td>
<td>Illicit perinatal substance dependency or abuse(^60), alcohol consumption(^6)</td>
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<td></td>
<td>Gestational hypertension(^6,54,55,60)</td>
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<td></td>
<td>Infection (e.g. HIV(^70,71))</td>
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<tr>
<td><strong>Insufficient evidence</strong></td>
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<td></td>
<td>Education less than high school(^6)</td>
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<tr>
<td></td>
<td>Diabetes(^6), gestational diabetes(^6)</td>
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<td>Social support(^6)</td>
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<td>Maternal anxiety(^6)</td>
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<td>Maternal depressive symptoms(^6)</td>
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<td>High exercise(^6)</td>
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<td>Micronutrient deficiency(^6)</td>
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<td></td>
<td>Low dietary energy (calorie) intake(^6)</td>
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</tbody>
</table>

Abbreviations: BMI Body mass index; PI Pulsatility index; RI Resistive index
Appendix B: Growth charts

Growth chart for girls

Curves equal the WHO Growth Standard at 50 weeks.
Sources: Intrauterine growth - Germany (Wright 2010), United States (Klein 2010), Australia (Roberts 1995), Canada (Kramer 2001), Scotland (Bonneille 2008), and Italy (Berlino 2010). Post term section - the World Health Organization Growth Standard, 2005.

www.ucalgary.ca/fenton
Growth chart for boys
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