Clinical Guideline

South Australian Perinatal Practice Guidelines – neonatal sepsis (including maternal group B streptococcal colonisation)

Policy developed by: SA Maternal & Neonatal Clinical Network
Approved SA Health Safety & Quality Strategic Governance Committee on: 10 June 2014
Next review due: 30 June 2017

Summary
Clinical practice guideline for the management of neonatal sepsis.

Keywords
GBS, neonatal sepsis, chorioamnionitis, benzylpenicillin, clindamycin, antibiotic prophylaxis, PROM, prolonged rupture of the membranes, preterm rupture of the membranes, erythromycin, Perinatal Practice Guidelines, maternal group B streptococcal colonisation, clinical guideline

Policy history
Is this a new policy? N
Does this policy amend or update an existing policy? Y
Does this policy replace an existing policy? Y
If so, which policies?
Neonatal sepsis

Applies to
All SA Health Portfolio
All Department for Health and Ageing Divisions
All Health Networks
CALHN, SALHN, NALHN, CHSALHN, WCHN, SAAS
Other

Staff impact
N/A, All Staff, Management, Admin, Students, Volunteers
All Clinical, Medical, Nursing, Allied Health, Emergency, Dental, Mental Health, Pathology

PDS reference
CG045

Version control and change history

<table>
<thead>
<tr>
<th>Version</th>
<th>Date from</th>
<th>Date to</th>
<th>Amendment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>04 Aug 2004</td>
<td>30 Apr 2007</td>
<td>Original version</td>
</tr>
<tr>
<td>2.0</td>
<td>30 Apr 2007</td>
<td>20 Oct 2009</td>
<td>Reviewed</td>
</tr>
<tr>
<td>3.0</td>
<td>20 Oct 2009</td>
<td>24 Nov 2009</td>
<td>Reviewed</td>
</tr>
<tr>
<td>4.0</td>
<td>24 Nov 2009</td>
<td>25 Jan 2010</td>
<td>Reviewed</td>
</tr>
<tr>
<td>5.0</td>
<td>25 Jan 2010</td>
<td>24 May 2010</td>
<td>Reviewed</td>
</tr>
<tr>
<td>6.0</td>
<td>24 May 2010</td>
<td>18 Sep 2012</td>
<td>Reviewed</td>
</tr>
<tr>
<td>7.0</td>
<td>18 Sep 2012</td>
<td>17 June 2014</td>
<td>Reviewed</td>
</tr>
<tr>
<td>8.0</td>
<td>17 June 2014</td>
<td>Current</td>
<td></td>
</tr>
</tbody>
</table>
South Australian Perinatal Practice Guidelines

neonatal sepsis
(Including maternal group B streptococcal colonisation)

© Department of Health, Government of South Australia. All rights reserved.

Note

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

SA Health does not accept responsibility for the quality or accuracy of material on websites linked from this site and does not sponsor, approve or endorse materials on such links.

Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient’s medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

• The use of interpreter services where necessary,
• Advising consumers of their choice and ensuring informed consent is obtained,
• Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
• Documenting all care in accordance with mandatory and local requirements.
Obstetric management for treatment of chorioamnionitis and prevention of early onset neonatal sepsis

**Suspected chorioamnionitis**

- IV antibiotic treatment (ampicillin, gentamicin and metronidazole)
- Expedite delivery

**Term**

- GBS positive
  - PROM >18 to 24 hours, irrespective of GBS status
  - IV benzyl penicillin prophylaxis

- Low and high vaginal swabs
  - IV benzyl penicillin GBS prophylaxis for threatened or actual preterm labour
    - Routine broad-spectrum antibiotics not required
  - Intrapartum GBS prophylaxis or treatment of amnionitis may be necessary when labour recurs; additional antibiotic prophylaxis may be indicated, based on swab results

- Low and high vaginal swabs
  - IV benzyl penicillin GBS prophylaxis for 48 hours
  - And oral erythromycin for 10 days
  - Intrapartum GBS prophylaxis or treatment of amnionitis may be necessary when labour recurs; additional antibiotic prophylaxis may be indicated, based on swab results

  If signs of chorioamnionitis, administer IV ampicillin, gentamicin and metronidazole

**Preterm labour with intact membranes**

- IV benzyl penicillin GBS prophylaxis for threatened or actual preterm labour

**Preterm rupture of membranes, with or without labour**

No routine antibiotic prophylaxis required if GBS negative or unknown and ROM < 18 hours

**NOTE:** GBS positive = positive swab or bacteriuria this pregnancy, or previous infant with early onset GBS sepsis
Neonatal management for prevention and treatment of early onset sepsis

**Symptomatic baby** – the following symptoms in any baby born after labour or membrane rupture:

- Respiratory distress (RR > 60, chest recession, grunting) or oxygen requirement not resolving at 4 hours of age
- Need for ventilatory support
- Apnoea, mottled skin, or not feeding 8 hours after birth with no other explanation
- **Note:** sepsis can occur in babies in the absence of risk factors or a positive GBS swab, and with a normal CBP

**Suspected chorioamnionitis in mother**
- Maternal temperature >38°C, maternal pulse > 100/min, fetal heart rate > 160/min, uterine tenderness, rising CRP or white blood cell count, unless there is another obvious cause

**Term (≥ 37³/₀ wks GA), asymptomatic baby** born after labour or membrane rupture; no clinical suspicion of chorioamnionitis

- Mother GBS positive OR PROM >18 hours regardless of GBS status
  - **Inadequate** intrapartum antibiotic prophylaxis for GBS

- Mother GBS positive OR PROM >18 hours regardless of GBS status
  - **Adequate** intrapartum antibiotic prophylaxis for GBS

- Mother GBS negative or unknown and ROM < 18 hours
  - (Maternal preventative antibiotics are not routine in this scenario)

**Preterm (< 37³/₀ wks GA), asymptomatic baby** born after labour or membrane rupture; no clinical suspicion of chorioamnionitis

- **Inadequate** maternal antibiotic prophylaxis for ruptured membranes or premature labour

- **Adequate** maternal prophylaxis for PPROM or premature labour

**CBP**
- **Observe** - remain in hospital for 24 hours with 4 hourly respiratory rate and temperature
- If CBP is abnormal and baby well, take a blood culture and treat with IV benzyl penicillin and gentamicin. Stop antibiotics at 24 hrs if baby remains asymptomatic, blood cultures are negative and a CBP at 24 hours is normal
- Babies with symptoms are managed as for the **Symptomatic baby** pathway

**Investigate** – CBP, blood cultures

**Term (≥ 37³/₀ wks GA), asymptomatic baby** born after labour or membrane rupture; no clinical suspicion of choriovamnionitis

- Mother GBS positive OR PROM >18 hours regardless of GBS status
  - **Inadequate** intrapartum antibiotic prophylaxis for GBS

- Mother GBS negative or unknown and ROM < 18 hours
  - (Maternal preventative antibiotics are not routine in this scenario)

**Preterm (< 37³/₀ wks GA), asymptomatic baby** born after labour or membrane rupture; no clinical suspicion of chorioamnionitis

- **Inadequate** maternal antibiotic prophylaxis for ruptured membranes or premature labour

- **Adequate** maternal prophylaxis for PPROM or premature labour

**CBP**
- **Observe** – minimum observation period including respiratory rate and temperature is 4 to 6 hours after birth
- Babies with symptoms are managed as for the **Symptomatic baby** pathway

**Investigate** – CBP, blood cultures

**Term (≥ 37³/₀ wks GA), asymptomatic baby** born after labour or membrane rupture; no clinical suspicion of chorioamnionitis

- Mother GBS positive OR PROM >18 hours regardless of GBS status
  - **Inadequate** intrapartum antibiotic prophylaxis for GBS

- Mother GBS negative or unknown and ROM < 18 hours
  - (Maternal preventative antibiotics are not routine in this scenario)

- Preterm (< 37³/₀ wks GA), asymptomatic baby born after labour or membrane rupture; no clinical suspicion of chorioamnionitis

- **Inadequate** maternal antibiotic prophylaxis for ruptured membranes or premature labour

- **Adequate** maternal prophylaxis for PPROM or premature labour

**Investigate** – CBP, blood cultures

**Term (≥ 37³/₀ wks GA), asymptomatic baby** born after labour or membrane rupture; no clinical suspicion of chorioamnionitis

- Mother GBS positive OR PROM >18 hours regardless of GBS status
  - **Inadequate** intrapartum antibiotic prophylaxis for GBS

- Mother GBS negative or unknown and ROM < 18 hours
  - (Maternal preventative antibiotics are not routine in this scenario)

- Preterm (< 37³/₀ wks GA), asymptomatic baby born after labour or membrane rupture; no clinical suspicion of chorioamnionitis

- **Inadequate** maternal antibiotic prophylaxis for ruptured membranes or premature labour

- **Adequate** maternal prophylaxis for PPROM or premature labour

**Investigate** – CBP, blood cultures

**Term (≥ 37³/₀ wks GA), asymptomatic baby** born after labour or membrane rupture; no clinical suspicion of chorioamnionitis

- Mother GBS positive OR PROM >18 hours regardless of GBS status
  - **Inadequate** intrapartum antibiotic prophylaxis for GBS

- Mother GBS negative or unknown and ROM < 18 hours
  - (Maternal preventative antibiotics are not routine in this scenario)

- Preterm (< 37³/₀ wks GA), asymptomatic baby born after labour or membrane rupture; no clinical suspicion of chorioamnionitis

- **Inadequate** maternal antibiotic prophylaxis for ruptured membranes or premature labour

- **Adequate** maternal prophylaxis for PPROM or premature labour

**Investigate** – CBP, blood cultures

**Term (≥ 37³/₀ wks GA), asymptomatic baby** born after labour or membrane rupture; no clinical suspicion of chorioamnionitis

- Mother GBS positive OR PROM >18 hours regardless of GBS status
  - **Inadequate** intrapartum antibiotic prophylaxis for GBS

- Mother GBS negative or unknown and ROM < 18 hours
  - (Maternal preventative antibiotics are not routine in this scenario)

- Preterm (< 37³/₀ wks GA), asymptomatic baby born after labour or membrane rupture; no clinical suspicion of chorioamnionitis

- **Inadequate** maternal antibiotic prophylaxis for ruptured membranes or premature labour

- **Adequate** maternal prophylaxis for PPROM or premature labour

**Investigate** – CBP, blood cultures

**Note:** GBS positive = positive swab or bacteriuria this pregnancy, or previous infant with early onset GBS sepsis

**ISBN number:** 978-1-74243-464-3
**Endorsed by:** South Australian Maternal & Neonatal Clinical Network
**Last Revised:** 17/6/14
**Contact:** cywhs.perinatalprotocol@health.sa.gov.au

Government of South Australia
SA Health
Page 3 of 13
Important points

> The following guidelines represent a combination of
  > Established consensus guidelines for the prevention of neonatal Group B Streptococcal (GBS) infection using antenatal screening and intrapartum antibiotic prophylaxis
  > Evidence derived from trials of antibiotics in various prenatal scenarios
  > Suggested management strategy for chorioamnionitis
  > Suggested guidelines for the management of the newborn

> Early onset neonatal bacterial sepsis is associated with significant morbidity and mortality. The vast majority of infections are due to Group B Streptococcus (GBS) or Escherichia coli, with other organisms seen less frequently. Other micro-organisms that may be constituents of the normal vaginal flora are potential neonatal pathogens. These include Streptococcus pneumoniae, Haemophilus influenza, Staphylococcus aureus, Clostridia sp., and other Enterobacteriaceae such as Klebsiella.

> In 2002 the CDC published detailed consensus guidelines that form the basis for the management of GBS prophylaxis.¹ No published consensus guidelines or evidence based recommendations exist for intrapartum prophylaxis against the other pathogens listed above.

> Antibiotic prophylaxis during labour for women with risk factors for GBS has been shown to be effective in preventing GBS transmission to the neonate, and to reduce early onset GBS sepsis.¹ Antibiotic prophylaxis during labour has no effect on late onset neonatal sepsis due to GBS or other organisms.¹

> A policy of screening for GBS and giving intrapartum antibiotic prophylaxis to carrier mothers is the most effective means of preventing early onset GBS.² Prospective surveillance for cases of early onset GBS has shown a reduction from 0.47 cases/1,000 livebirths to 0.34 cases/1,000 livebirths following the publication of the 2002 CDC guidelines and widespread implementation of universal GBS screening and intrapartum chemoprophylaxis.³

> A retrospective cohort study evaluating universal GBS screening has shown that for 116/189 (61.4 %) term infants with early onset GBS the antenatal screen, as a guide to GBS status at birth, was falsely negative.⁴ This emphasises the importance of not relying solely on a negative maternal swab. Thus maternal antibiotic prophylaxis should be provided in the context of preterm labour and prolonged rupture of membranes even if maternal GBS status is negative. The treatment of symptomatic babies with antibiotics is also emphasised regardless of maternal GBS status.

> Antibiotic prophylaxis for GBS should be given as soon as possible in labour. Adequate GBS prophylaxis is considered to have been achieved if at least 1 dose of antibiotics is given 4 hours before birth.¹ However, antibiotic prophylaxis should still be given even if predicted time to delivery is short. GBS colonisation of the newborn is reduced where antibiotics are given at least 1 hour before birth.⁵ Where fetal infection is established maternal antibiotics will pass quickly into the fetal blood-stream and commence early treatment of sepsis.

> Benzylpenicillin IV is the drug of choice for GBS prophylaxis.¹ Ampicillin (or amoxycillin) is an acceptable alternative but may result in higher levels of antibiotic resistance due to its broader spectrum of activity. If the mother is known to be allergic to penicillin, then
clindamycin, lincomycin, azithromycin or erythromycin are alternative antibiotics

> Erythromycin oral has been shown to be of benefit in preterm prelabour rupture of membranes without evidence of clinical chorioamnionitis. Amoxycillin / clavulanic acid should be avoided because of an association with neonatal necrotising enterocolitis.

Systematic reviews of antibiotic prophylaxis for preterm prelabour rupture of the membranes and preterm labour with intact membranes do not address intrapartum GBS prophylaxis

> For prolonged preterm prelabour rupture of the membranes, serial cultures may help to define vaginal colonisation; this information may help to rationalise subsequent intrapartum antibiotic therapy or treatment of chorioamnionitis, but treatment of colonisation in the absence of labour or signs of chorioamnionitis is not advised

> There are few data on the safety of maternal gentamicin for the fetus. Ototoxicity and nephrotoxicity are described. Gentamicin should therefore be reserved for cases where there is proven or suspected chorioamnionitis

> The recognition of symptoms of neonatal sepsis and treatment on clinical grounds is critical. Respiratory distress due to congenital pneumonia is the most common presentation of early onset sepsis. Any respiratory distress in a preterm infant, or respiratory distress not settling by 4 hours of age in a term infant should be investigated and treated as possible sepsis, unless the baby has been delivered from a sterile uterus by elective caesarean section. Other clinical findings that should raise suspicion of sepsis include apnoea, poor skin perfusion and abnormal feeding behaviour (not interested in feeding for 8 hours after birth or the last feed) where another cause is not immediately apparent. Neonatologist or paediatrician consultation and transfer/retrieval to a Level 5 or 6 neonatal service (previously Level 3) are necessary where symptomatic early onset sepsis is suspected

> For a baby with respiratory distress there is a narrow window for withholding antibiotics based on clinical judgment, restricted to babies born by caesarean section without labour or membrane rupture and where respiratory distress is improving with time. Neonatal practitioners should pay careful regard to all risk factors and the clinical condition of babies before withholding antibiotics

> Reported normal ranges for neonatal CBPs vary with population, gestation and postnatal age. The immature:total neutrophil ratio is the most sensitive indicator of sepsis. An I:T ratio of > 0.2 is a suggested cut-off for abnormality

> The CBP can be normal if taken early after birth in a colonised baby who subsequently becomes unwell. Sensitivity is higher at 4-6 hours after birth. Where symptoms of sepsis develop the baby should be treated regardless of the CBP result

> The CBP has a high false positive rate in asymptomatic term babies at risk of sepsis. Asymptomatic term at-risk babies who are treated with antibiotics based on a CBP and who remain well at 24 hours can reasonably have antibiotics ceased at 24 hours where blood cultures are also negative and the CBP has normalised

Antenatal screening

Antenatal screening for GBS at 36 weeks:

> The CDC and RANZCOG recommend that a combined low vaginal swab and rectal swab be taken for GBS culture in all women at 36 weeks’ gestation, unless GBS bacteriuria has been demonstrated in the current pregnancy or the mother has had a previous infant infected with GBS in which case screening is unnecessary. The rate of detection of GBS colonisation can be increased from 22 % to 27 % by sampling the lower vagina and...
neonatal sepsis
(Including maternal group B streptococcal colonisation)

rather than only the lower vagina

> Discuss the benefits of performing both low vaginal and rectum sampling with the woman. If the woman declines rectal sampling, advise low vaginal sampling only and document this on the pathology form

> If the woman agrees to both low vaginal and rectal sampling, offer to collect the swab or advise her she may collect her own swab by inserting a single swab firstly into the vaginal introitus and then the same swab through the anal sphincter

> The swab must be cultured using a GBS selective medium (Stuart’s or Amies). Results are valid for a period of 5 weeks

> It is unnecessary to give prophylactic antibiotics for GBS in the case of elective caesarean section. Women planning elective caesarean birth still need screening at 36 weeks in case of labour or membrane rupture

> If recent antibiotic treatment, swabs should be postponed and taken at least one week after the cessation of antibiotics

> If mother is allergic to penicillins, request susceptibility testing of the isolate on the pathology form when requesting GBS screen to guide intrapartum antibiotic use of macrolides (azithromycin, erythromycin) or clindamycin if found to be GBS positive

**NB:** All women with spontaneous preterm labour, or preterm prelabour rupture of membranes should have a low vaginal swab sent for GBS and high vaginal swab for other pathogens at the time of initial assessment

Risk factors for neonatal sepsis

An infant is considered at risk for early onset neonatal sepsis (GBS or other organisms) if any of the following apply

> Evidence of maternal chorioamnionitis. Assume chorioamnionitis if maternal temperature above 38°C, maternal pulse > 100 / min, fetal heart rate > 160 bpm, uterine tenderness, rising CRP or white blood cell count, unless there is another obvious cause

> Preterm labour at less than 37+0 weeks gestation

> Preterm prelabour rupture of membranes

> Prolonged rupture of membranes greater than 18 hours at term (greater than 36 completed weeks gestation) with or without labour, irrespective of GBS status

> Mother is GBS positive, defined as:

  > Maternal GBS vaginal colonisation during this pregnancy based on a swab taken less than 5 weeks before labour

  > Maternal GBS bacteriuria in the current pregnancy

  > Early onset neonatal GBS sepsis in a previous pregnancy

Management of intrapartum antibiotic prophylaxis and treatment

1. **Women in labour where there is evidence of chorioamnionitis**

   > Perform a low and high vaginal swab for culture

   > Treat mother with IV antibiotics [ampicillin [or amoxycillin] 2 g IV every 6 hours, ger
neonatal sepsis
(Including maternal group B streptococcal colonisation)

5 mg / kg IV as a single daily dose, metronidazole 500 mg IV every 12 hours
> If allergic to penicillin, clindamycin 450 mg IV every 8 hours AND gentamicin 5 mg / kg IV daily
> Delivery should be expedited

2. Women at term who are GBS positive, in labour or with pre-labour rupture of membranes
> Give IV benzylpenicillin 3 g loading dose as soon as possible, then 1.2 g IV every 4 hours until delivery
  > If allergic to penicillin, clindamycin 450 mg IV in 50 – 100 mL over at least 20 minutes every 8 hours, OR azithromycin 500 mg IV once daily are alternatives, as determined by lab sensitivity testing of isolate on screening swabs
  > Consider advising induction / augmentation of labour for women with pre-labour rupture of membranes and involve the woman and her partner in the decision making process

3. Women at term with prolonged rupture of membranes > 18 hours, irrespective of GBS status
> Give IV benzylpenicillin 3 g loading dose as soon as possible, then 1.2 g IV every 4 hours until delivery
  > If allergic to penicillin, clindamycin 450 mg IV in 50 – 100 mL over at least 20 minutes every 8 hours, OR azithromycin 500 mg IV once daily are alternatives, as determined by lab sensitivity testing of isolate on screening swabs
  > There is insufficient data to make a recommendation regarding the use of broad spectrum antibiotics in cases of PROM > 18 hours
  > Consider advising induction / augmentation of labour and involve the woman and her partner in the decision making process

4. Women at term who are GBS negative or unknown, and with pre-labour rupture of membranes less than 18 hours
> Consider advising induction / augmentation of labour and involve the woman and her partner in the decision making process

5. Preterm labour with intact membranes
> Perform a low and a high vaginal swab for culture
> Give IV benzylpenicillin 3 g loading dose as soon as possible, then 1.2 g IV every 4 hours for threatened or actual preterm labour, unless GBS status is documented to be negative at presentation
> If delivery does not occur, further benzylpenicillin prophylaxis is indicated when labour recurs if the mother is GBS positive
  > If allergic to penicillin, clindamycin 450 mg IV in 50 – 100 mL over at least 20 minutes every 8 hours, OR azithromycin 500 mg IV once daily are alternatives
  > If other potentially significant pathogens are found on the high vaginal swab, consult a neonatologist to discuss antibiotic prophylaxis/treatment of the mother in labour and the postnatal management of the infant

6. Preterm rupture of membranes, with or without labour

Endorsed by: South Australian Maternal & Neonatal Clinical Network
Last Revised: 17/6/14
Contact: cywhs.perinatalprotocol@health.sa.gov.au
neonatal sepsis
(Including maternal group B streptococcal colonisation)

> Perform a low and a high vaginal swab for culture
> Give IV benzylpenicillin 3 g loading dose as soon as possible, then 1.2 g IV every 4 hours for 48 hours or until delivery if this occurs before 48 hours
  > If allergic to penicillin, alternatives are to give clindamycin 450 mg IV in 50 – 100 mL over at least 20 minutes every 8 hours, OR azithromycin 500 mg IV once daily for 48 hours or until delivery if this occurs earlier
> Commence oral erythromycin as soon as possible 250 mg 4 times a day for 10 days or until delivery if this occurs before 10 days
> If delivery does not occur, further benzylpenicillin prophylaxis is indicated when labour recurs, unless chorioamnionitis supervenes in which case manage as per 1. above
> Repeat high vaginal swab at weekly intervals; results may guide use of antibiotics in any subsequent labour
> As with point 5, consult a neonatologist if other potentially significant pathogens are found on the high vaginal swab

Postnatal maternal antibiotics

Intravenous
> If chorioamnionitis, consider treatment with continued ampicillin [or amoxycillin] 2g IV every 6 hours, gentamicin IV 5 mg / kg as a single daily dose and metronidazole 500 mg IV every 12 hours for 5 days
  > If allergic to penicillin, alternatives are to give clindamycin 450 mg IV in 50 – 100 mL over at least 20 minutes every 8 hours, AND gentamicin 5 mg / kg daily

Oral
> May change to oral antibiotics once the woman is afebrile and tolerating oral medication e.g. amoxycillin 500 mg every 8 hours and metronidazole 400 mg every 12 hours OR amoxycillin/ clavulanic acid (Augmentin Duo Forte x 1 every 12 hours) for the rest of the 5 days
  > If allergic to penicillin, give metronidazole 400 mg orally every 12 hours for the rest of the 5 days AND azithromycin 1 g as a single dose, repeated after 7 days

Management of the neonate in the postnatal period

1. Baby with symptoms possibly due to early onset sepsis, or born after suspected chorioamnionitis
> Routine investigations are a blood culture, and complete blood picture with immature / total neutrophil ratio
> Benzylpenicillin: 60 mg (100,000 units) / kg IV every 12 hours plus Gentamicin
> Gentamicin is given according to the following regimen:

For Neonates < 33 weeks Corrected Age

The dosing schedule for gentamicin in neonates < 33 weeks corrected age depends upon the type of monitoring that is available at your institution. Both schedules provide the dose over a 48-hour period
**Dosing Schedule A** applies if your institution measures gentamicin by performing a single **trough level** (i.e. prior to the next dose)

**Dosing Schedule B** applies if your institution measures gentamicin by performing two post dose levels and estimates the **Area-Under-The-Curve** (AUC) for gentamicin.

<table>
<thead>
<tr>
<th>Corrected Age (weeks) [Gestational Age PLUS Postnatal Age]</th>
<th>Dosing Schedule A (trough levels)</th>
<th>Dosing Schedule B (AUC estimation)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dose (mg/kg)</td>
<td>Dosing Frequency</td>
</tr>
<tr>
<td>&lt; 33 weeks</td>
<td>3mg/kg</td>
<td>every 24 hours</td>
</tr>
</tbody>
</table>

For Neonates ≥33 weeks Corrected Age

<table>
<thead>
<tr>
<th>Corrected Age (weeks) [Gestational Age PLUS Postnatal Age]</th>
<th>Dose (mg/kg)</th>
<th>Dosing Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>33 to 35 weeks</td>
<td>4.5mg/kg</td>
<td>every 24 hours</td>
</tr>
<tr>
<td>36 to 41 weeks</td>
<td>5mg/kg</td>
<td>every 24 hours</td>
</tr>
<tr>
<td>42 to 44 weeks</td>
<td>7.5mg/kg</td>
<td>every 24 hours</td>
</tr>
</tbody>
</table>

- Duration of treatment depends on clinical circumstances but is at least 48 hours
- If maternal gentamicin is given < 12 hours before delivery, consider neonatal gentamicin serum levels to determine timing of first dose
- Admit / transfer to level 5 or 6 neonatal service
- There should be a low threshold for lumbar puncture in symptomatic babies. However, a lumbar puncture should never delay initiation of antibiotics, nor cardio-respiratory stabilisation where this is required. A lumbar puncture is always required where there are neurological symptoms or if a blood culture returns positive after commencement of antibiotics
- An endotracheal aspirate for culture should be taken if intubated
- Gastric aspirate or surface swabs (e.g. ear) may be useful to determine colonising flora if taken soon after birth, but have a poor correlation with invasive sepsis
- The urine latex test for GBS is no longer recommended as a screening test for the evaluation of suspected sepsis in babies

2. **Term** baby, asymptomatic, mother GBS positive, or ROM > 18 hours and GBS negative or unknown; mother received **inadequate** intrapartum antibiotic prophylaxis

- Investigate with a complete blood picture
- Observe closely (usually postnatal ward respiratory rate and temperature 4 hourly for 24 hours)
3. **Term** baby, asymptomatic, mother GBS positive, or ROM > 18 hours and GBS negative or unknown; mother received *adequate* intrapartum antibiotic prophylaxis
   - No investigations
   - Observe closely (minimum period of observations including respiratory rate and temperature is 4 to 6 hours after birth)

4. **Term** baby, asymptomatic, mother GBS negative or unknown with ROM < 18 hours
   - No investigations
   - Observe closely (minimum period of observations including respiratory rate and temperature is 4 to 6 hours after birth)

5. **Preterm** baby, asymptomatic, mother received *inadequate* intrapartum antibiotics
   - Investigate as for 1. and treat with penicillin and gentamicin (or other antibiotics based on results of preterm cultures)

6. **Preterm** baby, asymptomatic, mother received *adequate* intrapartum antibiotics
   - Investigate as for 1., observe closely, consider selective antibiotics (e.g. based on results of preterm cultures or degree of prematurity)

**Management of early discharge home (< 48 hours after birth) of the term asymptomatic infant with risk factors**

- Term, asymptomatic infants at risk for sepsis and with inadequate intrapartum antibiotic prophylaxis and a normal CBP should be observed in hospital for at least 24 hours. Clinical circumstances may indicate a longer period of observation.
- Term asymptomatic babies at risk for sepsis but with adequate intrapartum antibiotic prophylaxis, and those where mother is GBS unknown but with no other risk factors, may be discharged after a minimum observation period of 4-6 hours. If discharged, parents should be advised to seek immediate medical attention if their baby develops breathing difficulty or poor feeding over the following 24 hours.
References


Useful web sites

Courts Administration Authority South Australia

South Australia Coroners findings for 2009
South Australia Coroner’s findings 2012

Centers for Disease Control and Prevention (CDC). Patient information leaflet on Group B Streptococcus. Available from URL:

Royal Women’s Hospital Victoria: Instructions for the collection of a genital swab for Group B Streptococcus. Available from URL:
neonatal sepsis
(Including maternal group B streptococcal colonisation)

Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUC</td>
<td>Area under the curve</td>
</tr>
<tr>
<td>bpm</td>
<td>Beats per minute</td>
</tr>
<tr>
<td>CBP</td>
<td>Complete blood picture</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>CRP</td>
<td>C-reactive protein</td>
</tr>
<tr>
<td>GA</td>
<td>Gestational age</td>
</tr>
<tr>
<td>g</td>
<td>Gram(s)</td>
</tr>
<tr>
<td>≥</td>
<td>Greater than or equal to</td>
</tr>
<tr>
<td>GBS</td>
<td>Group B streptococcus</td>
</tr>
<tr>
<td>I:T ratio</td>
<td>Immature:total neutrophil ratio</td>
</tr>
<tr>
<td>IV</td>
<td>Intravenous</td>
</tr>
<tr>
<td>≤</td>
<td>Less than or equal to</td>
</tr>
<tr>
<td>%</td>
<td>Percentage</td>
</tr>
<tr>
<td>mg</td>
<td>Milligram(s)</td>
</tr>
<tr>
<td>PROM</td>
<td>Pre-labour rupture of the membranes</td>
</tr>
<tr>
<td>PPROM</td>
<td>Premature pre-labour rupture of the membranes</td>
</tr>
<tr>
<td>RANZCOG</td>
<td>Royal Australian and New Zealand College of Obstetrics and Gynaecology</td>
</tr>
<tr>
<td>RR</td>
<td>Respiratory rate</td>
</tr>
<tr>
<td>ROM</td>
<td>Rupture of membranes</td>
</tr>
</tbody>
</table>

Version control and change history

**PDS reference:** OCE use only

<table>
<thead>
<tr>
<th>Version</th>
<th>Date from</th>
<th>Date to</th>
<th>Amendment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>04 Aug 2004</td>
<td>30 Apr 2007</td>
<td>Original version</td>
</tr>
<tr>
<td>2.0</td>
<td>30 Apr 2007</td>
<td>20 Oct 2009</td>
<td>Reviewed</td>
</tr>
<tr>
<td>3.0</td>
<td>20 Oct 2009</td>
<td>24 Nov 2009</td>
<td>Reviewed</td>
</tr>
<tr>
<td>4.0</td>
<td>24 Nov 2009</td>
<td>25 Jan 2010</td>
<td>Reviewed</td>
</tr>
<tr>
<td>5.0</td>
<td>25 Jan 2010</td>
<td>24 May 2010</td>
<td>Reviewed</td>
</tr>
<tr>
<td>6.0</td>
<td>24 May 2010</td>
<td>18 Sep 2012</td>
<td>Reviewed</td>
</tr>
<tr>
<td>7.0</td>
<td>18 Sep 2012</td>
<td>17 June 2014</td>
<td>Reviewed</td>
</tr>
<tr>
<td>8.0</td>
<td>17 June 2014</td>
<td>Current</td>
<td></td>
</tr>
</tbody>
</table>