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# The prevention of early-onset neonatal group B streptococcus infection: New Zealand Consensus Guidelines 2014

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## ABSTRACT

**AIMS:** Group B streptococcal (GBS) disease is the leading cause of early-onset neonatal sepsis in New Zealand. Disease follows vertical transmission of GBS from the mother, which can largely be prevented by intravenous intrapartum antibiotics. A 2004 New Zealand guideline recommended using clinical risk factors to identify mothers who would qualify for intrapartum antibiotics. An expert multidisciplinary group met to reconsider these guidelines in the light of a two year survey of the incidence of early onset GBS neonatal sepsis.

**METHODS:** Representatives from the New Zealand College of Midwives, the Fetus and Newborn Committee of the Paediatric Society of New Zealand, the Royal New Zealand College of General Practitioners, the New Zealand Committee of the Royal Australian and New Zealand College of Obstetricians and Gynaecologists, the New Zealand sub-Committee of the Australasian Society of Infectious Diseases, and the Canterbury Home Birth Association met to review the literature and the most recent New Zealand data.

**RESULTS:** The multidisciplinary group noted that the estimated incidence of early-onset GBS sepsis had halved over a 10-year period to be 0.26 per 1,000 live births in 2009–11 and that there were missed opportunities for preventing GBS infection. Consensus was reached that adoption of a national guideline on prevention and management of early onset GBS neonatal sepsis by all practitioners and District Health Boards would have the greatest potential to further reduce the incidence.

**CONCLUSION:** A risk-based GBS prevention strategy continues to be recommended as being the most clinically and cost effective for the New Zealand context. Universal routine antenatal GBS screening is not recommended.

Early-onset neonatal group B streptococcus (EOGBS) infection is acquired by the baby by vertical transmission from the birth canal around the time of birth and is an important and largely preventable public health problem. Two strategies for identifying women at increased risk of giving birth to an affected baby have been used; one based on universal antenatal screening and the other on clinical risk factors. In both strategies, mothers identified as at risk are offered appropriate intravenous antibiotics from when labour is established. This intrapar-

tum antibiotic prophylaxis (IAP) has been shown to be effective in preventing vertical transmission of GBS.<sup>1</sup>

In 2004, an expert multidisciplinary group reviewed the evidence on IAP and the results of a national two year surveillance study of EOGBS in New Zealand (1998–9).<sup>2</sup> The group agreed a set of guidelines appropriate for New Zealand, which recommended a risk factor-based prevention strategy.<sup>3</sup>

A repeat, national, two-year study of EOGBS infection was completed in 2011 through the New Zealand Paediatric Surveillance Unit.<sup>4</sup> This showed that the incidence

of EOGBS had halved in the 10 years since the first survey, when it was 0.5 per 1,000 live births,<sup>2</sup> and was estimated as 0.26 per 1,000 (95% CI 0.18–0.37) live births.<sup>4</sup> The study also found there were missed opportunities for preventing GBS infection.<sup>4</sup>

In late 2012, the multidisciplinary group was reconvened to review the current literature and the New Zealand data. The group comprised representatives from the New Zealand College of Midwives, the Fetus and Newborn Committee of the Paediatric Society of New Zealand, the Royal New Zealand College of General Practitioners, the New Zealand Committee of the Royal Australian and New Zealand College of Obstetricians and Gynaecologists, the New Zealand sub-Committee of the Australasian Society of Infectious Diseases, and the Canterbury Home Birth Association. The group considered that the adoption of a national guideline by all practitioners and District Health Boards (DHBs) would have the potential to improve prevention of EOGBS infection.

The group noted that the most recent recommendation from North America<sup>1</sup> was for universal screening, whilst that from the UK<sup>5</sup> was for a risk-based approach. Neither will prevent all cases of EOGBS and factors such as the practicalities and cost-effectiveness need to be considered. Screening has to be carried out at the right time (35–37 weeks) with the correct technique (vaginal and anorectal swab), reach the laboratory where selective media and enrichment broth are required, and the results need to be available and acted upon. A recent study<sup>6</sup> has shown that 10% of women with negative screening were actually positive for GBS when in labour, whilst 50% of women with a positive screen result were negative for GBS when in labour. The screening approach is more expensive and exposes more women to antibiotics than the risk-based approach. Lastly, it is likely that the approach to GBS prevention will need to be reviewed again and potentially significantly altered as rapid diagnostic testing in labour and maternal immunisation are developed and become cost-effective.<sup>4</sup>

The following guidelines on the prevention and management of EOGBS infection represent the consensus statement from this group.

## Recommendations

1. A risk-based EOGBS prevention strategy continues to be recommended, as it is the most clinically and cost effective for the New Zealand context. Universal routine antenatal GBS screening is not recommended.

### Risk factors

The risk-based approach recommends that all women with one or more of the following factors be offered intravenous intrapartum antibiotic prophylaxis (IAP):

- a. a previous GBS-infected baby
  - b. GBS bacteriuria of any count during the current pregnancy
  - c. preterm (<37 weeks) labour and imminent birth
  - d. intrapartum fever  $\geq 38^{\circ}\text{C}$
  - e. membrane rupture  $\geq 18$  hours
2. Women who have had an incidental finding of GBS on a vaginal swab earlier in pregnancy need to have this repeated between 35–37 weeks. If this has not occurred, then this should be considered a risk factor and she should be offered IAP.<sup>5</sup>
  3. All maternity providers need be updated about these current GBS recommendations, to improve practice and outcomes, and achieve national equity.
  4. All hospitals should have an accessible and agreed protocol, based on the current recommendations and which should be followed by all practitioners.
  5. GBS information needs to be developed for pregnant women and their whānau/family, using both written and web-based material. Accurate and appropriate information will help decision making.

## Practical Applications

### 1. Antenatal management of group b streptococcus (GBS)

#### i. Incidental finding of GBS on vaginal swab

An incidental finding of vaginal and/or rectal GBS colonisation during pregnancy does not require treatment with antibiotics antenatally, as GBS cannot be eliminated from its reservoir in the large bowel.

An incidental finding of GBS in pregnancy greater than 5 weeks before labour is unreliable<sup>1,7</sup> and may result in unnecessary intervention in labour.

**If the woman has had a previous GBS-infected baby or GBS bacteriuria in the current pregnancy she should be offered intrapartum antibiotic prophylaxis (IAP).**

**In other cases, it is recommended the woman is re-swabbed at 35–37 weeks' gestation if an incidental finding has occurred, using the following technique:**

- **Low vaginal and rectal swab** (use same swab for both; clinician or patient collected)
- **The request form must clearly state “GBS screen” and “use selective broth process”.**

This result informs labour management. If this swab returns positive the woman should be offered IAP. If the swab returns with no evidence of GBS colonisation, IAP is not required.<sup>1</sup> (However, if intrapartum fever occurs there should be an assessment for chorioamnionitis).

If the woman has had an incidental vaginal GBS positive swab early in the current pregnancy and has **not** been re-swabbed at 35–37 weeks, this should be considered a risk factor and she should be offered IAP.<sup>5</sup>

#### ii. GBS bacteriuria or GBS urine infection during pregnancy

GBS bacteriuria of any count and at any stage in pregnancy is a risk-factor for early onset GBS infection. Most experts will only treat the bacteriuria with appropriate antibiotics when the colony count is  $>10^5$  colony forming units.ml.<sup>1,8</sup>

**There is no need to take or repeat a GBS vaginal swab when GBS bacteriuria has been diagnosed—this is a sufficient risk-factor in itself.**

**IAP is recommended even when GBS bacteriuria has been successfully treated.** (The only exception to this is if caesarean delivery is performed before the onset of labour in a woman with intact membranes).

### 2. Principles of GBS management in labour

All women with risk factors for early onset neonatal GBS infection (listed above) should be offered treatment, when labour commences, with IAP. **Oral antibiotics are ineffective in this context.**

Women with clinical signs of chorioamnionitis require immediate treatment with intravenous broad-spectrum antibiotic therapy, instead of the prophylaxis regimen.

IAP is intended to have a narrow spectrum, to reduce the risk of antibiotic resistance and unwanted side effects.

Penicillin allergy may be significant in this context. Penicillin allergy may occur in 0.7%–4% (usually a maculopapular rash), but the risk of anaphylaxis is estimated to be in the range of 4/10,000 to 4/100,000.<sup>1</sup> Documentation of details of any previous, immediate (within 24 hours), hypersensitivity reactions (eg, anaphylaxis, angioedema, laryngospasm, bronchospasm or urticaria) is an important part of antenatal assessment.

### 3. Timing of IAP for EOGBS in active labour

IAP is recommended for all women with GBS risk factors **in active/established labour, or at the commencement of intervention (eg, oxytocin induction or augmentation)**, whether or not they have ruptured membranes.

The evidence suggests that IAP may still be effective if there is likely to be at least one hour before the birth.<sup>9-11</sup>

It is recommended that IAP be continued until the baby is born.

#### 4. Pre-labour caesarean section

Women with risk factors for GBS, other than those with signs of infection, and who have intact membranes and require **pre-labour** elective or emergency caesarean section **do not require** IAP for EOGBS infection.<sup>12</sup>

#### 5. Pre-term labour

As preterm babies are at increased risk of GBS sepsis, IAP for GBS is recommended for all women who are in established progressive preterm labour, with or without ruptured membranes.

If preterm labour is established, continue IAP.

If preterm labour does not establish and membranes are intact, discontinue IAP.

If preterm labour is not established but there are prolonged premature ruptured membranes, consider appropriate antibiotics are recommended to prolong pregnancy (as per local DHB guidelines).<sup>13</sup>

#### 6. Pre-labour rupture of membranes (ROM) at term—with no GBS risk factors

A comprehensive assessment of all women with pre-labour ROM at term, to check maternal and fetal wellbeing is recommended.

Women with signs of infection or chorioamnionitis should have immediate treatment with intravenous broad spectrum antibiotics and appropriate intervention.

Women who are well, and the fetus is healthy, with pre labour ruptured membranes and no risk factors for GBS **do not require** IAP.

- Women who go into spontaneous labour and give birth before 18 hours has elapsed since ROM **do not require** IAP.
- Women who go into spontaneous labour but do not give birth within 18 hours of rupturing their membranes have developed a risk factor for EOGBS infection and **IAP is recommended**.
- Women who do not go into spontaneous labour within 18 hours of rupturing their membranes have developed a risk factor for EOGBS infection.<sup>5</sup> **The offer of an induction of labour, and then for IAP** once labour is established, is recommended.
- Women with signs of infection in association with pre-labour rupture of membranes at term require careful assessment and the **immediate consideration of intravenous broad spectrum antibiotic therapy**. If vaginal birth is appropriate it is recommended that they are offered an induction of labour as soon as possible.

#### 7. Pre-labour rupture of membranes at term—with GBS risk factors

Women with **risk factors** (see previous section for these) for EOGBS infection, who are well and have pre-labour rupture of membranes (ROM) at term, are at higher risk of having a baby affected by EOGBS infection. It is recommended that they are offered an induction of labour as soon as practicable, with **IAP at commencement of the induction**.

#### 8. Maternal fever and suspected chorioamnionitis

Maternal fever is a special risk category which requires consideration of broad spectrum antibiotic therapy and additional monitoring, including fetal monitoring. Ruptured membranes are not necessary for the diagnosis of chorioamnionitis. Women with a fever or signs of chorioamnionitis require immediate treatment and intervention.

Clinical signs of chorioamnionitis include maternal fever ( $\geq 38.0^{\circ}\text{C}$ ) with  $\geq 2$  of the following:

- abdominal tenderness
- fetal tachycardia
- maternal tachycardia
- vaginal discharge
- offensive liquor

Where there are clinical signs of infection, appropriate specimens including blood cultures are required before commencing empirical broad spectrum antibiotic treatment.

## Recommended antibiotic regimes for intrapartum antibiotic prophylaxis (IAP)

### 1. Maternal GBS risk factors with no clinical signs of infection—standard IAP<sup>#</sup>

Intravenous benzyl penicillin.

Initial dose **1.2g** and then **0.6g, 4 hourly** until birth.

(If iv benzyl penicillin is unavailable, amoxycillin is an acceptable alternative. **2g** initially and then **1g, 4 hourly** until birth)

Allergy to penicillin—YES (*Low risk of anaphylaxis—Women who **do not** have history of anaphylaxis, angioedema, respiratory distress or urticaria after penicillin or a cephalosporin*)

cephazolin 2g iv initially, then 1g 8 hourly until birth

Allergy to penicillin—YES (*High risk of anaphylaxis—Women who **do** have a history of anaphylaxis, angioedema, respiratory distress or urticaria after penicillin or a cephalosporin*)

vancomycin 1g iv and repeat 12 hourly until birth

(*Erythromycin and clindamycin not recommended because of increasing resistance patterns*)

<sup>#</sup>When the risk factor is established labour <37 weeks, some DHB's will use more broad spectrum antibiotics including coverage for GBS

### 2. Maternal GBS risk factors with clinical signs of chorioamnionitis (see above)

**Broad spectrum antibiotic treatment** for chorioamnionitis, including coverage for GBS, as per local DHB guidelines.

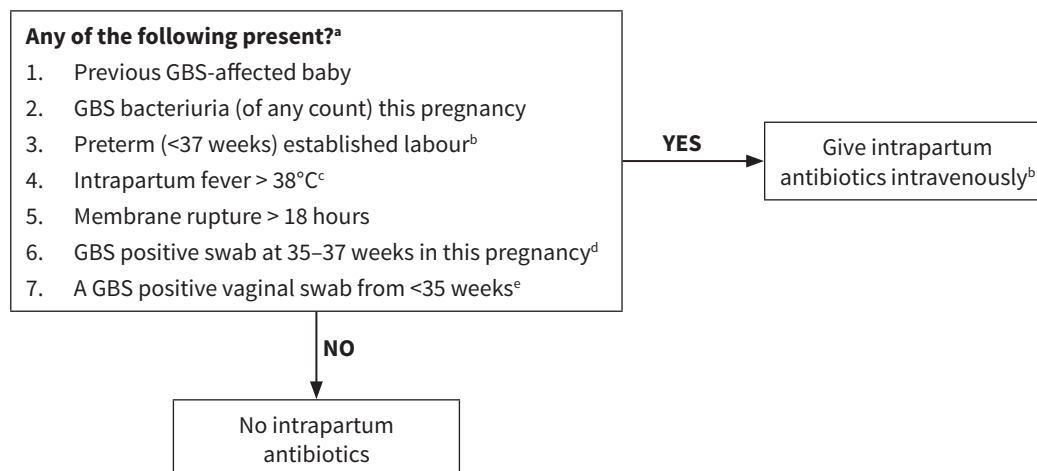
## Newborn babies guidelines

- All newborn babies should be observed as outlined in the Ministry of Health Guideline *Observation of mother and baby in the immediate postnatal period: consensus statements guiding practice*.<sup>14</sup>
- Newborns of mothers who have risk factors, regardless of whether the mother has received intrapartum antibiotic prophylaxis (IAP), also require close observation for signs of sepsis, particularly during the first 24 hours. Women and their families need to understand this so they also know what signs to look for in their baby.
- Signs of sepsis in the newborn may be non-specific and include respiratory distress, apnoea, temperature instability, tachycardia, lethargy, poor feeding, shock or “unwell”.
- If the baby is showing signs of sepsis immediate evaluation is required (at least a full blood count and blood cultures) and they should receive empiric therapy for at least 48 hours while culture results are awaited. The antibiotics are usually a penicillin and an aminoglycoside as this combination is active against common neonatal pathogens, including GBS and *E. coli*.
- When feasible a lumbar puncture should be performed on all septic newborn babies and especially when blood cultures are positive or when, because of clinical instability or other evidence of sepsis, therapy is continued beyond 48 hours since up to one-third of neonates with meningitis will have sterile blood cultures.<sup>15</sup>
- Maternal chorioamnionitis is associated with an increased risk of invasive disease, even if intrapartum antibiotics have been given. Some authorities recommend that all babies of women with chorioamnionitis should receive immediate evaluation and empiric antibiotic therapy. However, as the risk of an asymptomatic baby having sepsis is still very low no additional recommendation has been made.<sup>16</sup>

## Management of asymptomatic newborns when a woman is identified as needing GBS prophylaxis in labour

- If mother **has received appropriate** intrapartum GBS prophylaxis (> 4 hours of appropriate antibiotic before delivery) the infant should be observed for at least 48 hours. This does not require admission to a neonatal unit. Some infants may be able to be considered for discharge at 24 hours after delivery with good parental understanding of the situation.
- If mother **did not receive** GBS prophylaxis at all or did not receive it for at least 4 hours prior to birth:
  - If 37 weeks gestation or more, ideally the baby needs close observation (TPR) for 24 hours in a maternity facility.
  - If < 37 weeks then a full blood count, blood cultures and CRP is recommended and the baby needs close observation (TPR) for 48 hours in a maternity facility. Antibiotics are not required unless other risk factors are present or as guided by the laboratory results.
  - If signs and symptoms of sepsis develop a full diagnostic evaluation is required with initiation of appropriate antibiotics—usually amoxicillin or penicillin and gentamicin + cefotaxime (if meningitis suspected).<sup>17</sup>

**Figure 1:** Risk-based group B streptococcus (GBS) strategy



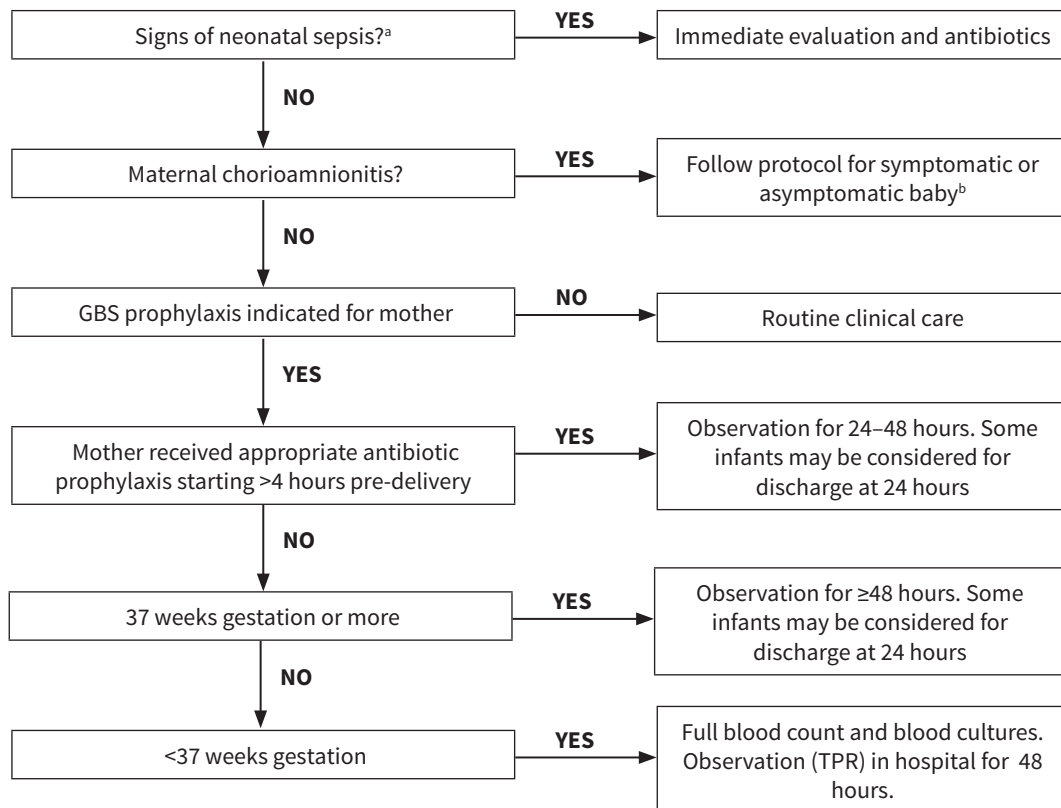
<sup>a</sup> Except in women with intact membranes undergoing pre-labour elective caesarean section and have no fever.

<sup>b</sup> Some local protocols advise more broad spectrum antibiotic regimens for preterm births.

<sup>c</sup> If chorioamnionitis is suspected, GBS chemoprophylaxis is insufficient and aggressive treatment with broad-spectrum antibiotics is required.

<sup>d</sup> A GBS screen includes a low vaginal and rectal swab and must state "GBS screen" so that the laboratory use the appropriate culture technique. If a correctly taken swab at 35–37 weeks is negative in a woman who then goes on to have preterm labour or ruptured membranes >18 hours, intrapartum antibiotics are not indicated.

<sup>e</sup> When there is an incidental finding of GBS on a vaginal swab from early in pregnancy the recommendation is that the swab is repeated at 35–37 weeks as above. If that has not been done at the time of labour, the woman should be considered to have a risk factor for EOGBS and IAP should be offered.

**Figure 2: Management of newborn babies**

<sup>a</sup> Signs of sepsis are often non-specific and can include tachypnoea, apnoea, fever or temperature instability, lethargy, or “unwell”.

<sup>b</sup> Some authorities recommend that all babies of women with chorioamnionitis should receive immediate evaluation and empiric antibiotic therapy. However, as the risk of an asymptomatic baby having sepsis is still very low no additional recommendation has been made.

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