Maternal Group B Streptococcus in pregnancy: screening and management

Objectives: To provide health professionals and care facilities providing maternity care with information and recommendation regarding the screening and management of maternal Group B Streptococcus in pregnancy.

Target audience: Health professionals providing maternity care, and patients.

Values: The evidence was reviewed by the Women’s Health Committee (RANZCOG), and applied to local factors relating to Australia and New Zealand.

Validation: This statement was compared with ACOG, SOGC and RCOG guidance on this topic.

Background: This statement was first developed by Women’s Health Committee in July 2003 and reviewed in March 2016.

Funding: The development and review of this statement was funded by RANZCOG.

This statement has been developed and reviewed by the Women’s Health Committee and approved by the RANZCOG Board and Council.

A list of Women’s Health Committee Members can be found in Appendix A.

Disclosure statements have been received from all members of this committee.

Disclaimer: This information is intended to provide general advice to practitioners. This information should not be relied on as a substitute for proper assessment with respect to the particular circumstances of each case and the needs of any patient. This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The document has been prepared having regard to general circumstances.

First endorsed by RANZCOG: July 2003
Current: March 2016
Review due: March 2019
# Table of contents

1. Patient summary ........................................................................................................... 3
2. Summary of recommendations and good practice points ............................................ 3
3. Introduction ..................................................................................................................... 4
4. Discussion and recommendations .................................................................................. 4
   4.1 Prevention of EOGBS disease ..................................................................................... 4
   4.2 Culture-based screening for maternal GBS colonization ............................................. 5
   4.3. IAP regime for GBS colonised women ..................................................................... 6
5. Specific clinical scenarios ............................................................................................... 7
   5.1 Elective CS .................................................................................................................. 7
   5.2 Women with preterm labour, GBS status unknown .................................................. 7
   5.3 Term pre-labour rupture of the membranes (PROM) ................................................. 7
   5.4 Preterm pre-labour rupture of membranes (PPROM) ................................................ 7
   5.5 Obstetric procedures ................................................................................................ 7
   5.6 Clinical chorioamnionitis .......................................................................................... 7
6. Conclusion ....................................................................................................................... 8
7. References ....................................................................................................................... 9
8. Links to other College statements ................................................................................ 10
9. Patient information ....................................................................................................... 10

**Appendices** .................................................................................................................. 11
   Appendix A Women’s Health Committee Membership ................................................. 11
   Appendix B Overview of the development and review process for this statement .......... 11
   Appendix C Full Disclaimer ............................................................................................ 13
1. Patient summary

Group B streptococci (GBS) are bacteria that occur naturally in the vagina and bowel in some women. Carrying GBS on the body is normal and rarely harmful to healthy, non-pregnant women. However, the bacteria can pass to a baby in the birth canal during labour and there is a small chance a baby who contacts GBS during labour will develop an infection and become seriously ill. Giving antibiotics to the mother during labour reduces the risk of a baby developing a GBS infection soon after birth.

Whether a woman should have antibiotic treatment in labour can be determined in one of two ways: either by identifying risk factors during pregnancy and labour; or, by taking a swab at about 36 weeks in pregnancy. The swab test will usually determine whether a woman carries GBS. Using either of these approaches it is possible to identify women who are at risk and offer treatment with antibiotics during labour to reduce this risk to the baby.

2. Summary of recommendations and good practice points

<table>
<thead>
<tr>
<th>Recommendation 1</th>
<th>Grade</th>
<th>All maternity services should have an established plan for prevention of EOGBS.</th>
<th>Consensus – based recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommendation 2</td>
<td>Grade</td>
<td>Universal culture-based screening, using combined low vaginal plus or minus anorectal swab at 35-37 weeks gestation, or a clinical-risk factor based approach are both acceptable strategies for reducing EOGBS.</td>
<td>Consensus – based recommendation</td>
</tr>
<tr>
<td>Good Practice Point</td>
<td>Grade</td>
<td>If a woman’s GBS carriage status is unknown at the time of labour onset, then treatment according to clinical risk factors is appropriate.</td>
<td>Good Practice Point</td>
</tr>
<tr>
<td>Recommendation 3</td>
<td>Grade</td>
<td>Low vaginal and anorectal swabs for GBS screening should be incubated in enriched media to achieve acceptable sensitivities.</td>
<td>Consensus – based recommendation</td>
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<tr>
<td>Good Practice Point</td>
<td>Grade</td>
<td>Pathology request forms should specify that the sample has been collected for GBS screening rather than routine culture in order to facilitate specialised culture conditions for GBS. For a patient known to be allergic to penicillin, this should be indicated on the pathology form and antibiotic sensitivities requested.</td>
<td>Good Practice Point</td>
</tr>
<tr>
<td>Recommendation 4</td>
<td>Grade</td>
<td>Intrapartum antibiotic prophylaxis with IV penicillin-G or ampicillin should be offered to all women at increased risk of EOGBS.</td>
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<td>Good Practice Point</td>
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3. Introduction

Group B streptococcus (GBS) is the leading cause of early onset neonatal sepsis in developed countries.1-3 Between 15 and 25% of pregnant women are asymptomatic carriers of GBS, although less than one third of neonates delivered vaginally are colonised, and between one in 200 and 400 neonates will develop bacteraemia and early onset GBS sepsis (EOGBS).3-6 This is important, because the contemporary case fatality rate for EOGBS is approximately 14%.7 EOGBS in the neonate most commonly presents with respiratory symptoms and pneumonia; late onset GBS infection is more likely to present with meningitis and septicaemia. The risk of EOGBS can be reduced by 80% with the use of intrapartum antibiotics.8 The incidence of late onset GBS infection (occurring in babies aged between one week and three months) appears to be unchanged by the use of intrapartum antibiotics.

4. Discussion and recommendations

4.1 Prevention of EOGBS disease

The use of intrapartum antibiotic prophylaxis (IAP) for women with risk factors can prevent EOGBS2-9 and is cost effective in some health care settings.12,13 Although data from high quality randomised control trials is limited14, the decline in incidence of EOGBS seen at a population level appears to be associated with the use of IAP and has led to widespread consensus in favour of screening.

Clinical risk factors for EOGBS include:
- Spontaneous onset of labour at ≤ 37 weeks gestation.
- Rupture of membrane ≥ 18 hours.
- Maternal fever ≥ 38°C.
- A previous infant with EOGBS.
- GBS bacteruria during the current pregnancy.
- Known carriage of GBS in current pregnancy.
- Clinical diagnosis of chorioamnionitis.
- Other twin with current EOGBS.

Earlier guidelines for the prevention of EOGBS endorsed both clinical risk-based or culture-based screening approaches to identifying those at risk of EOGBS.10,15 In 2002 a large population-based study was published that supported the universal culture-based screening approach, both for identifying women at risk and for rates of IAP.16 For these reasons, the Centers for Disease Control and Prevention (CDC)13 and other professional bodies in the United States (American Congress of Obstetricians and Gynecologists17, the American Academy of Pediatrics 18) recommend a universal culture-based screening approach to determining which women should be offered IAP. However, the Royal College of Obstetricians and Gynaecologists (RCOG) currently does not recommend universal culture-based screening due to conclusions about cost-effectiveness in the United Kingdom setting.19

In Australia, a large prospective single centre study demonstrated that a policy of universal culture-based screening and IAP was associated with an 84% decline in the incidence of early onset GBS disease.4 That study reported a decline in the incidence of blood culture-proven EOGBS (1.4/1000 vs 0.2/1000 live births) with a number needed to treat (NNT) of 224. The majority of confirmed EOGBS cases were attributed to non-compliance with the screening protocol. Similar benefits to screening and IAP have been shown in the North America.7
A recent Australian systematic review that included data from nine studies concluded that the odds of EOGBS in infants of any gestation (that is, both term and preterm) was significantly lower with routine culture-based screening compared with risk factor-based screening (OR 0.45, 95% CI 0.37 - 0.53). 20 The odds ratio for term infants alone was similar (OR 0.45, 95% CI 0.36 - 0.57). Preterm infants were four times more likely to develop EOGBS than term infants, regardless of the screening approach.

Women who have previously had an infant with EOGBS (not simply colonization) should have IAP in subsequent pregnancies, irrespective of the current colonisation status. 16 Although there is little direct evidence to guide practice, consideration of the aforementioned evidence has led to recommendations that women with unknown GBS status at the time of delivery should be managed according to the presence of intrapartum risk factors.

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**Recommendation 2**

Universal culture-based screening, using combined low vaginal plus or minus anorectal swab at 35-37 weeks gestation, or a clinical-risk factor based approach are both acceptable strategies for reducing EOGBS.

**Good Practice Point**

If a woman’s GBS carriage status is unknown at the time of labour onset, then treatment according to clinical risk factors is appropriate.

**Recommendation 3**

Low vaginal and anorectal swabs for GBS screening should be incubated in enriched media to achieve acceptable sensitivities.

**Good Practice Point**

Pathology request forms should specify that the sample has been collected for GBS screening rather than routine culture in order to facilitate specialized culture conditions for GBS. For a patient known to be allergic to penicillin, this should be indicated on the pathology form and antibiotic sensitivities requested.

4.2 Culture-based screening for maternal GBS colonization

Culture-based screening for GBS is performed using a combined low vaginal and anorectal swab. Because maternal colonisation is being screened for, and not active infection, the culture needs to be performed on selective enriched media in order improve the sensitivity. False negative rates of up to 50% can occur without the use of enriched culture media. Rectovaginal culture at 36 weeks has a sensitivity of 91% and specificity of 88.9% for intrapartum maternal vaginal colonization. 21

GBS carriage is thought to fluctuate over time, and culture results have been shown to be less predictive of carrier status if more than five weeks has elapsed between sample collection and delivery. 14 For this reason screening for GBS colonization at term is predicted by screening at 35-37 weeks gestation. 13 The GBS screening swab can be collected by the clinician or the patient. The negative predictive value of GBS culture performed within five weeks of delivery is 95-98%. 22 GBS bacteriuria is commonly associated with heavy genital tract colonisation. Women with this finding during pregnancy should receive appropriate treatment for bacteriuria, and IAP at the time of labour.
As screening cultures take up to 48 hours to become positive cultures are rarely useful for women who present in active labour with unknown GBS status.

4.3. IAP regime for GBS colonised women
Intravenous penicillin and ampicillin are equally effective against GBS, but penicillin may be preferable for IAP because of its narrower spectrum of activity. Optimal IAP is defined as penicillin administered at least four hours prior to delivery. 23 Appropriate doses for intrapartum penicillin should be in line with institutional/jurisdictional protocols.

Penicillin administered to a woman with no known history of β-lactam allergy carries a risk of anaphylaxis of between 4/10,000 to 4/100,000. 10 Mortality from anaphylaxis is rare in a hospital setting. Any morbidity associated with anaphylaxis is greatly offset by reduction in incidence of neonatal and maternal sepsis.

Women with known penicillin allergy should have sensitivity testing for clindamycin and erythromycin specifically requested at the time of GBS culture. Approximately 20% of GBS strains will be resistant to clindamycin, and 30% to erythromycin. For those women allergic to penicillin, alternative antimicrobial strategies11 should be used in accordance with local institutional/jurisdictional guidelines. Women who have not experienced anaphylaxis, angioedema, urticarial, or respiratory distress after a penicillin or cephalosporin can receive IV cefazolin for IAP. 13 For woman at risk of anaphylaxis with penicillin, and where the GBS is resistant to erythromycin or clindamycin, vancomycin is the recommended alternative with a dosage regime of 20 mg/kg intravenous every 8 hours (to a maximum individual dose of 2 grams). 24

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5. Specific clinical scenarios

5.1 Elective CS
For elective Caesarean section prior to the onset of labour, no additional prophylaxis is recommended, irrespective of GBS carriage. However, if a woman screened positive for GBS commences labour or has spontaneous rupture of the membranes before her planned CS, she should receive IAP while awaiting delivery.

The safety of “vaginal seeding” at elective CS (a practice where maternal vaginal microbes are transferred to the newborn by wiping his/her face with a gauze swab that has been incubated in the mother’s vagina) in the presence of maternal GBS carriage is unknown. Given the unproven benefits of this practice for infant immune system development, and the potential risk of early or late onset GBS disease as a consequence of infant colonisation, vaginal seeding should not be performed in GBS positive women.

5.2 Women with preterm labour, GBS status unknown
Women who present with threatened preterm labour should have a rectovaginal swab taken for GBS culture. IAP for GBS should be commenced if labour establishes and continued until delivery. If labour does not establish, GBS prophylaxis should be ceased. If the culture is subsequently found to be positive IAP should be recommenced at the time of labour onset.

5.3 Term pre-labour rupture of the membranes (PROM)
Women with PROM and who have screened positive for GBS should be offered induction of labour and IAP without delay.

5.4 Preterm pre-labour rupture of membranes (PPROM)
For women with suspected or confirmed PPROM a rectovaginal swab should be taken for GBS culture. In this setting there is insufficient evidence to provide conclusive recommendations and in North America the CDC and ACOG recommend that IAP should be given for 48 hours, or until a negative GBS result is returned, whereas in the UK setting the RCOG does not support this. If the GBS result is subsequently found to be positive then IAP should be offered with the onset of labour. Antibiotics for latency (that is, to lengthen gestation) should be given independent consideration to GBS prophylaxis.

5.5 Obstetric procedures
Provided women are treated with IAP there is insufficient evidence to recommend any either avoidance of, or alterations of technique, in routine obstetric procedures such as membrane sweeping, amniotomy, and fetal scalp blood sampling on the basis of GBS status.

5.6 Clinical chorioamnionitis
If a GBS-positive woman develops clinical signs of chorioamnionitis in labour, then a broader spectrum of antibiotic cover will be required to provide a better coverage than penicillin for non-GBS causes of chorioamnionitis.
6. Conclusion

Maternal colonisation with GBS is common, and there is established evidence that programs of screening for GBS and treatment with IAP reduce the risk of EOGBS. However, considerations of cost-effectiveness have led to different approaches to prevention of EOGBS in different parts of the world. All maternity services should have an established plan for prevention of EOGBS, whether by a universal culture or a clinical risk factor-based approach. Provision should be made for management of potential or known maternal GBS carrier status in a wide variety of clinical settings, including labour or PROM occurring before a planned caesarean section, with PROM in women planning vaginal birth, and in PPROM irrespective of planned mode of delivery. Audit and review of outcomes within a maternity service is encouraged.
7. References


8. Links to other College statements

Routine Antenatal Assessment in the Absence of Pregnancy Complications (C-Obs 03b)

GBS Swab Sheet (Diagram) (C-Obs 19a)

Consent and provision of information to patients in Australia regarding proposed treatment (C-Gen 02a)

Consent and provision of information to patients in New Zealand regarding proposed treatment (C-Gen 2b)

Evidence-based Medicine, Obstetrics and Gynaecology (C-Gen 15)

9. Patient information

A range of RANZCOG Patient Information Pamphlets can be ordered via:

https://www.ranzcoog.edu.au/Womens-Health/Patient-Information-Guides/Patient-Information-Pamphlets
Appendices

Appendix A Women’s Health Committee Membership

<table>
<thead>
<tr>
<th>Name</th>
<th>Position on Committee</th>
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<tbody>
<tr>
<td>Professor Stephen Robson</td>
<td>Chair and Board Member</td>
</tr>
<tr>
<td>Dr James Harvey</td>
<td>Deputy Chair and Councillor</td>
</tr>
<tr>
<td>Associate Professor Anusch Yazdani</td>
<td>Member and Councillor</td>
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<tr>
<td>Associate Professor Ian Pettigrew</td>
<td>Member and Councillor</td>
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<tr>
<td>Dr Ian Page</td>
<td>Member and Councillor</td>
</tr>
<tr>
<td>Professor Yee Leung</td>
<td>Member of EAC Committee</td>
</tr>
<tr>
<td>Professor Sue Walker</td>
<td>General Member</td>
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<tr>
<td>Dr Lisa Hui</td>
<td>General Member</td>
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<tr>
<td>Dr Joseph Sgroi</td>
<td>General Member</td>
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<tr>
<td>Dr Marilyn Clarke</td>
<td>General Member</td>
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<tr>
<td>Dr Donald Clark</td>
<td>General Member</td>
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<tr>
<td>Associate Professor Janet Vaughan</td>
<td>General Member</td>
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<tr>
<td>Dr Benjamin Bopp</td>
<td>General Member</td>
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<tr>
<td>Associate Professor Kirsten Black</td>
<td>General Member</td>
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<tr>
<td>Dr Bernadette White</td>
<td>General Member</td>
</tr>
<tr>
<td>Dr Jacqueline Boyle</td>
<td>Chair of the ATSIWHC</td>
</tr>
<tr>
<td>Dr Martin Byrne</td>
<td>GPOAC representative</td>
</tr>
<tr>
<td>Ms Catherine Whitby</td>
<td>Community representative</td>
</tr>
<tr>
<td>Ms Sherryn Elworthy</td>
<td>Midwifery representative</td>
</tr>
<tr>
<td>Dr Michelle Proud</td>
<td>Trainee representative</td>
</tr>
</tbody>
</table>

Appendix B Overview of the development and review process for this statement

i. Steps in developing and updating this statement

This statement was originally developed in July 2003 and was most recently reviewed in March 2016. The Women’s Health Committee carried out the following steps in reviewing this statement:

- Declarations of interest were sought from all members prior to reviewing this statement.
- Structured clinical questions were developed and agreed upon.
- An updated literature search to answer the clinical questions was undertaken.
- At the March 2016 face-to-face committee meeting, the existing consensus-based recommendations were reviewed and updated (where appropriate) based on the available body of evidence and clinical expertise. Recommendations were graded as set out below in Appendix B part iii)

ii. Declaration of interest process and management

Declaring interests is essential in order to prevent any potential conflict between the private interests of members, and their duties as part of the Women’s Health Committee.
A declaration of interest form specific to guidelines and statements was developed by RANZCOG and approved by the RANZCOG Board in September 2012. The Women’s Health Committee members were required to declare their relevant interests in writing on this form prior to participating in the review of this statement.

Members were required to update their information as soon as they become aware of any changes to their interests and there was also a standing agenda item at each meeting where declarations of interest were called for and recorded as part of the meeting minutes.

There were no significant real or perceived conflicts of interest that required management during the process of updating this statement.

iii. Grading of recommendations

Each recommendation in this College statement is given an overall grade as per the table below, based on the National Health and Medical Research Council (NHMRC) Levels of Evidence and Grades of Recommendations for Developers of Guidelines. Where no robust evidence was available but there was sufficient consensus within the Women’s Health Committee, consensus-based recommendations were developed or existing ones updated and are identifiable as such. Consensus-based recommendations were agreed to by the entire committee. Good Practice Notes are highlighted throughout and provide practical guidance to facilitate implementation. These were also developed through consensus of the entire committee.

<table>
<thead>
<tr>
<th>Recommendation category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence-based</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Body of evidence can be trusted to guide practice</td>
</tr>
<tr>
<td>B</td>
<td>Body of evidence can be trusted to guide practice in most situations</td>
</tr>
<tr>
<td>C</td>
<td>Body of evidence provides some support for recommendation(s) but care should be taken in its application</td>
</tr>
<tr>
<td>D</td>
<td>The body of evidence is weak and the recommendation must be applied with caution</td>
</tr>
<tr>
<td>Consensus-based</td>
<td>Recommendation based on clinical opinion and expertise as insufficient evidence available</td>
</tr>
<tr>
<td>Good Practice Note</td>
<td>Practical advice and information based on clinical opinion and expertise</td>
</tr>
</tbody>
</table>
Appendix C Full Disclaimer

This information is intended to provide general advice to practitioners, and should not be relied on as a substitute for proper assessment with respect to the particular circumstances of each case and the needs of any patient.

This information has been prepared having regard to general circumstances. It is the responsibility of each practitioner to have regard to the particular circumstances of each case. Clinical management should be responsive to the needs of the individual patient and the particular circumstances of each case.

This information has been prepared having regard to the information available at the time of its preparation, and each practitioner should have regard to relevant information, research or material which may have been published or become available subsequently.

Whilst the College endeavours to ensure that information is accurate and current at the time of preparation, it takes no responsibility for matters arising from changed circumstances or information or material that may have become subsequently available.