

# Prevention of Early Onset Group B Streptococcal Disease (EOGBS)

Guidelines	Level of evidence	References
Early in pregnancy all women should be offered appropriate written information concerning EOGBS prevention strategies and be given an opportunity to discuss these with their midwife or doctor	IV	14a
<b>A protocol for preventing EOGBS should be consistently followed.</b>	IV	11
Prevention strategies for EOGBS should be included in routine antenatal care using either bacteriological screening strategies or risk based treatment strategies.	III-2	1a,2a,4a,5a 1, 2, 7
<p>1. If hospital policy is for universal screening, offer all women screening for group B streptococcal disease at 35 to 37 weeks' gestation with culture done from one swab first to the vagina then to the rectal area.</p> <p>2. Treat the following women intrapartum at time of labour or rupture of membranes with IV antibiotic prophylaxis for GBS:</p> <ul style="list-style-type: none"> <li>All women positive by GBS culture screening done at 35 to 37 weeks</li> <li>Any women with an infant previously infected with GBS</li> <li>Any women with documented GBS bacteriuria (regardless of level of colony-forming units per mL) in this pregnancy.</li> </ul> <p>3. Treat women in labour at less than 37 weeks' gestation with IV antibiotic prophylaxis for GBS, unless there has been a negative GBS vaginal/rectal swab culture within 5 weeks.</p> <p>4. Treat women with intrapartum fever with IV antibiotics; broad spectrum antibiotic therapy is advised when the possible diagnosis is chorioamnionitis.</p> <p>5. If a woman who is GBS-positive by culture screening or who has a history of GBS-bacteriuria presents with pre-labour rupture of membranes at or near term, treat with GBS antibiotic prophylaxis and initiate induction of labour in a clinically appropriate manner.</p> <p>6. If GBS culture result is unknown and the woman has ruptured membranes at or near term for greater than 18 hours, treat with GBS antibiotic prophylaxis.</p>	<p>III-1</p> <p>III-2</p> <p>III-3</p> <p>III-3</p> <p>III-2</p> <p>III-1</p> <p>III-2</p>	<p>1, 3, 4, 7, 8, 9, 10, 16, 17</p> <p>1a</p>

Good Practice Notes		
<p>After collection, swabs should be placed in a suitable, non-nutritive transport medium, such as Amies, or may be directly plated at the point of collection. The swab can be stored for up to four days at room temperature. Culture is performed using selective culture media such as Lim or SBM broth.</p> <p>Detection rates will be significantly reduced if transport occurs as a dry swab or in an inappropriate medium.</p>	III	1a, 2a
<p>The recommended intrapartum chemoprophylaxis for GBS is penicillin G 1.2 g (IV) load, then 0.6 g IV four-hourly throughout labour. Wherever possible antibiotics should be commenced at least four hours prior to delivery to ensure adequate prophylaxis. In the case of suspected penicillin allergy Clindamycin (600mg IV eight hourly) or Erythromycin (500mg IV six-hourly until delivery) may be used. If Clindamycin is used the woman should be advised to seek medical advice promptly if she subsequently develops bowel symptoms such as diarrhoea.</p>	III	1a-3a
<p>In the case of anaphylaxis the recommended management is to stop administration of the agent, call for assistance and administer 100 % oxygen by face mask (6-8 L/min). Administer adrenalin IM one to three ml 1:10,000 and repeat if necessary. Follow with rapid IV crystalloid or colloid via large bore cannula (two if indicated) and, when stable, take blood for serum tryptase and complement assay.</p>	III	1a, 3a
<p>Other small studies identified indicate that pregnant women are as likely as their carers to obtain positive cultures of GBS by self-collection of swabs, and that women may prefer self-collection</p>	IV	15 a, 16 a
<p>Each health service should develop a neonatal GBS treatment policy.</p>	Consensus opinion	

## Aim

effective than screening for GBS prior to 30 weeks gestation?

The aim of these guidelines is to assist midwives and doctors in the prevention of early onset group B streptococcal disease (EOGBS) in newborns.

## Introduction

Early onset GBS disease (EOGBS) is defined as “GBS occurring in infants less than 1 week old and is acquired through vertical transmission from colonized mothers.”<sup>4</sup> Clinical presentations include sepsis, pneumonia and meningitis.

Late onset GBS (LOGBS) is defined as “GBS occurring in infants older than 1 week and is acquired through vertical transmission or through horizontal transmission in the hospital or the community.”<sup>4</sup> Meningitis is the most common presentation.

The 3 Centres Collaboration contracted the Royal Women’s Hospital (RWH) Clinical Practice Improvement Unit (CPIU) to conduct a comprehensive search and critical appraisal of publications addressing the topic of screening for Group B Streptococcus (GBS) published between January 2000 and January 2005, to inform this review of the 2001 3 Centres Consensus Guidelines on Antenatal Care.

The new evidence was discussed by the Guideline Advisory Group and a new draft guideline produced. The Guideline Advisory Group, an expert multidisciplinary group, was appointed by the 3 Centres Steering Group to review the evidence produced by the CPIU, debate issues and to draft guidelines. Members of the Guideline Advisory Group were: 3 midwives, 3 obstetricians, 2 consumers and a general practitioner from a rural practice. Guidelines drafted by the Guideline Advisory Group were approved by the 3 Centres Steering Group.

## Research questions addressed

1. In pregnant women is screening for GBS using a swab more effective in detecting and improving maternal and perinatal outcomes than risk factor assessment alone?
2. In pregnant women, is screening for GBS after 30 weeks gestation more

## Evidence

An estimated 25 % of pregnant women in Victoria will have vaginal carriage of GBS.<sup>17</sup> Transmission to the newborn may occur during labour, resulting in pneumonia, septicaemia and occasionally infant death. The incidence of EOGBS is 1 to 3 per 1000 live births (declining to 0.6 per 1000 live births in active surveillance areas.) The death rate for EOGBS is 4.7 to 9%<sup>4</sup>. Most recommendations are directed at prevention of EOGBS. Future development of an effective vaccine against GBS may enable universal protection against GBS.

### Search on Defined Questions

#### 1. In pregnant women is screening for GBS using a swab more effective in detecting and improving maternal and perinatal outcomes than risk factor assessment alone?

The options for antenatal screening for GBS include:

- Risk assessment
- Universal screening and treating only those who are positive, and
- Universal screening and treating those who are positive in addition to those with a clinical risk factor<sup>2</sup>.

All combinations of these approaches have been practiced in Victorian hospitals<sup>6</sup>.

#### The case for bacteriological screening

Society of Obstetricians and Gynaecologists of Canada (SOGC) and Royal College of Obstetricians and Gynaecologists (RCOG) guidelines, recommend that all women be offered screening for GBS at 35-37 weeks gestation, by culture done with one swab first to the vagina then to the rectal area.<sup>1,3</sup> A key citation supporting this recommendation is based on the greater rates of neonatal GBS when women are managed with a risk factor approach versus a culture based approach of 1.1 per 1000 versus 0 per 1000 ( $p=0.001$ )<sup>7</sup>. A large multi-state retrospective cohort study reported a 54 % reduction in EOGBS disease in screened women versus a risk based approach<sup>8</sup>. A retrospective review of infants diagnosed with EOGBS by Pinto et al, found the use of clinical risk factors exclusively will inevitably result in cases where there has been a missed opportunity for intrapartum antibiotic prophylaxis<sup>9</sup>.

A review of RCT evidence reports “a highly significant reduction in the risk of GBS sepsis or pneumonia (pooled odds ratio [OR] = 0.17; 95% EI: 0.07, 0.39) with none of the 368 babies born to treated mothers suffering GBS bacteraemia and only one suffering clinical signs of sepsis / pneumonia”<sup>10, 4</sup>.

Additional benefits of universal screening include reductions in maternal disease due to clinical chorioamnionitis (from 7.4 % with the risk based approach compared with 5.2 % with universal screening) and endometritis (from 4.0 % with a risk-based approach to 2.8 % with a screening approach)<sup>1</sup>.

#### Estimated effects of bacteriological screening

The 3 Centres Collaboration applied the SOGC evidence to Victoria’s population, where the carriage of GBS is 25 %. Use of intrapartum antibiotics in screened women with positive GBS reduces the colonization rates to approximately one %. Ten % of these colonized women will result in colonized neonates, of which half will develop EOGBS disease. Therefore, approximately 2000 women will need to be screened and 500 treated to prevent one neonate developing EOGBS. Assuming intrapartum antibiotic prophylaxis is 80 % effective in preventing EOGBS disease, 20,000 women would need to be screened for GBS to prevent one neonatal death from EOGBS. Figures equate with those outlined in the RCOG guidelines<sup>2</sup>.

#### **The case for risk based prevention strategies**

Contrary to SOGC guidelines, a technical report by the New Zealand GBS Consensus Working Party recommends the implementation of a GBS risk-based prevention strategy, which aims to ensure the least numbers of women and their babies are exposed to antibiotics, while virtually preventing all deaths from GBS. The Working Party noted that:

- (i) No strategy will prevent all cases of early-onset GBS infection,
- (ii) Intrapartum antibiotics are associated with rare, but serious, adverse effects,
- (iii) Concerns remain over developing antibiotic resistance,
- (iv) An economic analysis is required to help inform policy,
- (v) Reliable bedside diagnostic tests for GBS in early labour are not yet available, and

- (vi) The most important determinant of effectiveness will be compliance with a single national prevention policy<sup>11</sup>.

#### **Potential risks of treating women identified as GBS carriers and/or with risk factors**

RANZCOG state the risk of anaphylaxis is 0.1 per 1000<sup>5</sup>. In the United Kingdom, using the risk factor based approach, approximately 15 % of all pregnancies would be treated with GBS intrapartum prophylaxis, and using the universal screening approach this figure is closer to 25 %<sup>2</sup>.

Other risks include the possibility of the development of antibiotic resistant organisms and that “exposure to antibiotics in the neonatal perinatal period may affect neonatal faecal flora, with a subsequent impact on immune development and later allergy”<sup>2-4</sup>.

Although penicillin is the preferred option for intrapartum antibiotic prophylaxis, Centers for Disease Control and Prevention (CDC) guidelines recommend ampicillin as an acceptable alternative to penicillin<sup>4</sup>. Schuchat reports caution should be taken when using ampicillin instead of penicillin for GBS prophylaxis due to the severity of neonatal ampicillin resistant E coli sepsis and its occurrence after maternal antibiotics<sup>13</sup>. Australian data suggests a reduction in early onset E coli sepsis in all babies secondary to widespread antibiotic use in labour<sup>14</sup>.

The 3 Centres Collaboration notes the evidence regarding the very large number needed to treat to prevent deaths from EOGBS and that this may deter some hospitals from implementing universal screening in favour of a risk based approach. On this basis and in view of the report of the New Zealand GBS Consensus Working party, the 3 Centres Guideline Advisory Group decided that the risk based treatment approach to the prevention of EOGBS is an acceptable strategy.

**It is most important that a protocol for preventing EOGBS should be consistently followed.**

**2. In pregnant women, is screening for GBS after 30 weeks gestation more effective than screening for GBS prior to 30 weeks gestation?**

There is limited data available specifically pertaining to 30 weeks' gestation.

In a Sydney study involving a prospective cohort of 500 women attending antenatal clinics, women were screened for GBS using a variety of methods. The authors state; "Although there is no difference between antenatal and intrapartum carriage rates, the positive predictive value (PPV) of early antenatal screening for intrapartum carriage was only 69%; and 24% of intrapartum carriers were not identified by screening. Based on these data, it is difficult to justify continuation of early antenatal screening. However, PPV and sensitivity can be increased to more than 85% by screening at 35-37 weeks"<sup>17</sup>.

GBS screening earlier than 35 weeks gestation is not recommended.

## Methods of search and Appraisal

### Search strategy

- The OVID interface was used to search the following electronic databases:
  - MEDLINE: 2000 – January 2005
  - CINAHL: 2000 – January 2005
  - EBM Reviews: June 2000 – January 2005
  - Cochrane Database: 2005 Issue 1
- Review of article citations and Cochrane Library references for additional citations
- Guidelines developed by specific Colleges of Obstetricians and Gynaecologists were searched including:
  - Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG)
  - Royal College of Obstetricians and Gynaecologists (RCOG) , and
  - Society of Obstetricians and Gynaecologists Canada (SOGC).
- Guidelines developed by other groups were searched for via the internet, on the:

- United States National Guidelines Clearinghouse, and
- TRIP database

### Search terms

The basis of the search was conducted using terms for Group B Streptococcus.

### Key citation selection

The initial search retrieved 118 citations and 7 guidelines

The AGREE tool was applied by the CPIU Team to the following three guidelines which were subsequently used as a basis for answering the first topic.

- Society of Obstetricians and Gynaecologists Canada (SOGC): Clinical Practice Guidelines: The prevention of early-onset neonatal group B streptococcal disease<sup>1</sup>.
- Royal College of Obstetricians and Gynaecologists (RCOG): Guideline Number 36: Prevention of early onset neonatal group B Streptococcal disease<sup>2</sup>.
- Royal College of Obstetricians and Gynaecologists (RCOG). Clinical Guideline: Antenatal care: routine care for the healthy pregnant woman<sup>3</sup>.

In addition, citations with relevant evidence or authoritative opinion were selected to answer the:

- First topic - from the initial search for the period from December 2003.
- Second topic - from the initial search for the period from January 2000.

In addition to the 7 guidelines, 23 publications were retrieved.

Publications were further screened to identify those studies with respect to quality of methodology and relevance to Australian obstetric practice. This resulted in 17 key citations that were subjected to systematic critical appraisal by the CPIU Team

The evidence within these 17 key citations fell into the following levels (see Appendix IV for definitions):

- Level I evidence: 0 publications
- Level II evidence: 0 publications
- Level III evidence: 8 publications,
- Level IV evidence: 9 publications.

## References.

1. Money DM, Dobson S, Canadian Paediatric Society IDC. The prevention of early-onset neonatal group B streptococcal disease. *Journal of Obstetrics & Gynaecology Canada: JOGC* 2004;26(9):826-40. (Level IV) ([http://sogc.medical.org/sogcnet/sogc\\_docs/common/guide/pdfs/ps149\\_e.pdf](http://sogc.medical.org/sogcnet/sogc_docs/common/guide/pdfs/ps149_e.pdf))
- 1a. Mater Hospital Perinatal Epidemiology Unit and Queensland Council on Obstetric and Paediatric Morbidity and Mortality. *Evidence-Based Clinical Practice Guidelines for the Prevention of Neonatal Early Onset Group B Streptococcal Disease* MPEU and QCOPMM, Brisbane 2000. (Level III)
2. Royal College of Obstetricians and Gynaecologists (RCOG). Guideline Number 36: Prevention of early onset neonatal group B Streptococcal disease. 2003. (Level IV) ([http://www.rcog.org.uk/resources/Public/GroupB\\_strep\\_no36.pdf](http://www.rcog.org.uk/resources/Public/GroupB_strep_no36.pdf))
- 2a. CDC Prevention of perinatal group B streptococcal disease: a public health perspective. Centre for Disease Control and Prevention [published erratum appears in *MMWR* 1996 August 9; 45 (31): 679]. *MMWR* 1996;45(RR-7):1-24. (Level IV)
3. Royal College of Obstetricians and Gynaecologists (RCOG). Evidence based guidelines Antenatal care: routine care for the healthy pregnant woman. 2003. (Level IV) ([http://www.rcog.org.uk/resources/Public/Antenatal\\_Care.pdf](http://www.rcog.org.uk/resources/Public/Antenatal_Care.pdf))
- 3a. Smaill F. Intrapartum antibiotics for Group B Streptococcal colonisation (Cochrane Review). In *The Cochrane Library*., Issue 2, 1999 Oxford: Update Software. (Level I)
4. Canadian Task Force on Preventive Health Care (CTFPHC). Prevention of group B streptococcal infection in newborns: Recommendation statement from the Canadian Task Force on Preventive Health Care. *Canadian Medical Association Journal* 2002; 166(7):928-30. (Level IV) (<http://www.ctfphc.org>)
- 4a. American Academy of Paediatrics. Revised guidelines for prevention of early onset Group B Streptococcal infection. AAP Committee on Infectious Diseases and Committee on Fetus and Newborn [see comments]. *Pediatrics* 1997;99(3):489-96. (Level IV)
5. Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG). College statement: Swabbing for Group B Streptococcus. 2003. (Level IV) (<http://www.ranzcog.edu.au/publications/statements/C-obs19.pdf>)
- 5a. American College of Obstetrics and Gynaecologists. ACOG Committee opinion. Prevention of early onset Group B Streptococcal disease in newborns. Number 173, June 1996. Committee on Obstetric Practice, American College of Obstetrics and Gynaecologists. *International Journal of Gynaecology and Obstetrics* 1996;54(2):197-205. (Level IV)
6. Connellan M, Wallace EM. Prevention of perinatal group B streptococcal disease: screening practice in public hospitals in Victoria.[see comment]. *Medical Journal of Australia* 2000;172(7):317-20. (Level III-3)
- 6a. Connellan M, Wallace E Prevention of perinatal Group B Streptococcal disease: screening practice in public hospitals in Victoria *MJA*. 2000;172(3):317-320. (Level IV)
7. Main EK, Slagle T. Prevention of early-onset invasive neonatal group B streptococcal disease in a private hospital setting: the superiority of culture-based protocols. *American Journal of Obstetrics & Gynecology* 2000;182(6):1344-54. (Level III-2)
- 7a. Hafner E, Sterniste W, Rosen A, Schuchter K, Plattner M, Asboth F, Philipp K. Group B Streptococci during pregnancy: a comparison of two screening and treatment protocols [see comments]. *American Journal of Obstetrics and Gynecology* 1998;179(3):677-81. (Level III-3)
8. Schrag SJ, Zell ER, Lynfield R, Roome A, Arnold KE, Craig AS, et al. A

### 3 Centre Consensus Guidelines on Antenatal Care

- population-based comparison of strategies to prevent early-onset group B streptococcal disease in neonates.[see comment]. *New England Journal of Medicine* 2002;347(4):233-9. (Level III-2)
- 8a. Locksmith GJ, Clark P and Duff P Maternal and neonatal infection rates with three different protocols for prevention of Group B Streptococcal disease. *American Journal of Obstetrics and Gynecology* 1999;180(2):417-422. (Level III-3)
9. Pinto NM, Soskolne EI, Pearlman MD, Faix RG. Neonatal early-onset group B streptococcal disease in the era of intrapartum chemoprophylaxis: residual problems. *Journal of Perinatology* 2003;23(4):265-71. (Level III-3)
- 9a. Rosenstein N, Schuchat A. Opportunities for Prevention of Perinatal Group B Streptococcal Disease: A Multistate Surveillance Analysis. *Obs and Gyn* 1997;90(6):901-906. (Level III-2)
10. Gilbert R. Prenatal screening for group B streptococcal infection: gaps in the evidence. *International Journal of Epidemiology* 2004;33(1):2-8. (Level IV)
- 10a. Schuchat A, Zywicki SS, Dinsmoor MJ, Mercer B, Romaguera J, O'Sullivan MJ, Patel D, Peters MT, Stoll B, Levine OS and the Prevention of Early Onset Neonatal Sepsis Study Group. Risk factors and opportunities for prevention of early onset neonatal sepsis: a multicentre case-control study *Pediatrics*. 2000;105(1):21-26. (Level III)
11. Campbell N, Eddy A, Darlow B, Stone P, Grimwood K, New Zealand GBSCWP. The prevention of early-onset neonatal group B streptococcus infection: technical report from the New Zealand GBS Consensus Working Party. *New Zealand Medical Journal* 2004;117(1200):U1023. (Level IV)
- 11a. Volumenie JL, Fernandez H, Vial M, Lebrun L, Frydmon R. Neonatal Group B Streptococcal infection. Results of 33 months of universal maternal screening and antibioprophyllaxis. *European Journal of Obstetrics and Gynaecology and Reproductive Biology* 2001;94:79-85. (Level IV)
12. Centres for Disease Control and Prevention (CDC). Guidelines: Prevention of perinatal Group B Streptococcal Disease. *MMWR Morbidity & Mortality Weekly Report* 2002;51(RR11):1-22. (Level IV) (<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5111a1.html>)
- 12a. Garland S, Kelly N. Early onset neonatal Group B Streptococcal sepsis: economics of various prevention strategies *MJA*. 1995;162(8):413-7. (Level IV)
13. Schuchat A, Zywicki SS, Dinsmoor MJ, Mercer B, Romaguera J, O'Sullivan MJ, et al. Risk factors and opportunities for prevention of early-onset neonatal sepsis: a multicenter case-control study. *Pediatrics* 2000;105(1 Pt 1):21-6. (Level III-2)
- 13a. Halliday E, Foote K, Dryden M, Heard M, Down R and Ward J. Universal maternal screening for neonatal Group B Streptococcal disease. *Lancet* 2001;356(9239):1407-8. (Level IV)
14. Daley AJ, Garland SM. Prevention of neonatal group B streptococcal disease: progress, challenges and dilemmas. *Journal of Paediatrics & Child Health* 2004;40(12):664-8. (Level IV)
- 14a Lumley, J. *What do women really want? Satisfaction with care in pregnancy, birth and the postnatal hospital stay. A summary of current evidence to April 2000*. Unpublished report commissioned by The Royal Women's Hospital, Melbourne from the Centre for Studies on Mother's and Children's Health, La Trobe University, Melbourne 2000. (Level IV)
15. Haque KN, Khan MA, Kerry S, Stephenson J, Woods G. Pattern of culture-proven neonatal sepsis in a district general hospital in the United Kingdom. *Infection Control and Hospital Epidemiology* 2004;25(9):759-64. (Level III-2)

- 15a. Molnar P, Biringer A, McGeer A, McIsaac W, Mt Sinai and the GBS Screening Group. Can pregnant women obtain their own specimens for Group B Streptococcus? A comparison of maternal versus physician screening. *Family Practice* 1997;14(5):403-405. (Level IV)
16. Lin FC, Weisman LE, Troendle J, Adams K. Prematurity is the major risk factor for late-onset group B streptococcus disease. *Journal of Infectious Diseases* 2003;188(2):267-71. (Level III-2)
- 16a. Spieker MR, White DC, Quist BK. Self Collection of Group B Streptococcus Cultures in Pregnant Women. *Military Medicine* 1999;164(7):471474. (Level IV)
17. Gilbert GL, Hewitt MC, Turner CM, Leeder SR. Epidemiology and predictive values of risk factors for neonatal group B streptococcal sepsis. *Australian & New Zealand Journal of Obstetrics & Gynaecology* 2002;42(5):497-503. (Level III-2)

**References with an “a” are original 2001 references.**

---

Updated April 10, 2006