Prevention of Early-Onset Neonatal Group B Streptococcal Disease

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Scope:	PTHB Maternity wide	

The latest approved version of this document is online.
If the review date has passed please contact the Author for advice.

Powys Teaching Health Board is the operational name of Powys Teaching Local Health Board
Bwrdd Iechyd Addysgu Powys yw enw gweithredol Bwrdd Iechyd Lleol Addysgu Powys

Impact Assessments

Evidence Base

Version	Summary of Changes/Amendments	Issue Date
1	Initial Issue	April 2018
2	Reviewed against RCOG Greentop 36 and short cover form added along with caveats related to Powys	June 2021
3	Reviewed against RCOG Green Top 36, short cover form added and additional detail regarding: Updated safeguarding statement Incorporated NEWTT2 (Newborn Early Warning Track and Trigger) BAPM, 2023 All Wales Midwifery-Led Care Guideline (2022)	26/08/2025

Key Individuals/Groups Involved in <u>Developing</u> this Document

Role / Designation
Consultant Midwife

Date	Role / Designation
10/04/2025	Powys Midwives
10/04/2025	Safeguarding Team
10/04/2025	Women and Children's Guidelines group members
10/04/2025	Maternity & Neonatal Network Neonatal colleagues

Groups Approved at

Date	Group
06/05/2025	Maternity Guidelines Group
20/05/2025	Women and Children's Guidelines Group
03/06/2025	Executive Director sign off

Royal College of Obstetricians and Gynaecologists (2017) Green-Top Guideline No. 36

BAPM, 2023 NEWTT2 – Deterioration of the Newborn. A Framework for Practice.

Equality Impact Assessment Summary

	No impact	Adverse	Differential	Positive	Statement
Age	X				Please remember policy documents are published to both the **intranet** and **internet.** The version on the internet must be translated to Welsh.
Disability	X				
Gender reassignment	X				
Pregnancy and maternity	X				
Race	X				
Religion/ Belief	X				
Sex	X				
Sexual Orientation	X				
Marriage and civil partnership	X				
Welsh Language	X				
Human Rights	X				

Risk Assessment Summary

Have you identified any risks arising from the implementation of this policy / procedure / written control document?

No risks identified.

Have you identified any Information Governance issues arising from the implementation of this policy / procedure / written control document?

No risks identified.

Have you identified any training and / or resource implications as a result of implementing this?

No risks identified.

1 Policy Statement / Introduction

This guideline is the Royal College of Obstetricians and Gynaecologists Green Top 36 guideline on the Prevention of Early-onset Neonatal Group B Streptococcal Disease (2017) and is being adopted in Powys Teaching Health Board **with exception of the caveats below.**

The link to the published document can be found here:
https://obgyn.onlinelibrary.wiley.com/doi/full/10.1111/1471-0528.14821

A version of the RCOG guidance saved on the Maternity Templates SharePoint under current guidelines – MAT062

All pregnant women should be provided with the patient information leaflet on GBS in their booking packs:

GBS in pregnancy and newborn babies - Patient information leaflet (rcog.org.uk)

2 Objective

This guideline supports the RCOG management of GBS in pregnancy and outlines caveats for recommendations and practice within Powys.

3 Equality Statement

Powys Teaching Health Board Maternity Services are committed to:

- The elimination of unlawful and unfair discrimination
- The active promotion of equal opportunities for women and their families and our workforceThe protection of the human rights of women and their families and our workforce
- The promotion of inclusive relationships between groups who share protected characteristics and those who don't
- The valuing of the diversity inherent in the communities we serve and in our workforce.

The words 'woman' and 'women' have been used throughout this document as this is the way that the majority of those who are pregnant and having a baby will identify. For the purpose of this document, this term includes girls. It also includes people whose gender identity does not correspond with their birth sex or who may have a non-binary identity. Similarly, where the term 'parents' is used, this should be taken to include anyone who has main

4 Definitions

- **PTHB** – Powys Teaching Health Board
- **GBS** – Group B Streptococcus
- **IAP** – Intrapartum Antibiotic Prophylaxis
- **CIS** – Clinical Information Sharing

5 Responsibilities

responsibility caring for a baby. It is recognised that there are many different family arrangements.

When translation services are required, there is the expectation that a face-to-face translator or digital interpretation services will be provided. The Language Line App is available to all maternity staff to use for this purpose. Consideration is required with written documents and leaflets to be provided in a woman's preferred or 1st language.

For further support and advice contact PTHB Equality Team: powys.equalityandwelsh@wales.nhs.uk

	5.1 Midwives All staff working the maternity services have responsibility for: • Reading and being familiar with contents of this document • Referring women appropriately for additional care where required • Working to the requirements of their role within the scope of this guideline
	5.2 Assistant Head of Midwifery The Assistant Head of Midwifery and Sexual Health Services has responsibility for: • Ensuring dissemination of this document to all relevant staff • Liaising with District General Hospitals (DGH) to feedback where care has fallen outside of this guideline
	5.3 Consultant Midwife **The consultant midwife has responsibility for:**

	• Supporting implementation of this document • Reviewing any new evidence or guidance that is produced that may influence the service • Communicating any key changes in advice that might influence service provision to the Midwifery Leadership and Management team for consideration. • Being available in an advisory capacity related to care outside of guidance
	5.4 Governance Lead The Women and Children's Risk and Governance Lead has responsibility for: • Monitoring review of incidents in relation to content of this document
6 Powys Caveats	
	6.1 Intrapartum Antibiotic Prophylaxis (IAP) Offer women IAP who: • have had a positive GBS result (urine and/or vaginal anorectal) in the current pregnancy • had a baby previously affected by early or late onset GBS. These will be administered in an obstetric unit and are not available in Powys. For women who have had GBS in a previous pregnancy: • Explain that the likelihood of maternal GBS carriage in this pregnancy is 50%. Discuss the options of IAP or bacteriological testing in late pregnancy and then offer IAP if still positive. • If performed, bacteriological testing should ideally be carried out at 35-37 weeks gestation or 3-5 weeks prior to anticipated delivery date, e.g. 32-34 weeks of gestation for women with twins. However, the charcoal low vaginal swabs that are offered by the NHS are only 50% effective at detecting a positive GBS result. The recommended swabs are 'enriched culture medium' swabs, which are not available on the NHS. These are considered to have a

	greater detection rate, although the precise detection rate varies depending on the brand of swab. Women should be advised of this to inform their decision making. Should they wish to obtain a private swab they should be directed to the Group B Strep Support charity; https://gbss.org.uk/
	6.2 Declining Intrapartum Antibiotic Prophylaxis (IAP) The named midwife should offer a full discussion about the recommendation for IAP and if declining, explore the rationale for this. A balanced discussion with consideration of the benefits and risks of each intrapartum setting should be had. The midwife should ensure that the woman understands the information she is provided with. A record of the discussion to be documented in the handheld pregnancy record. Pregnant women should be provided with the patient information leaflet on GBS in pregnancy and newborn to support this discussion. GBS in pregnancy and newborn babies - Patient information leaflet (rcog.org.uk) If the woman declines Intrapartum Antibiotic Prophylaxis: • Record the discussion and her decision in the handheld record • Support her chosen place of birth (Midwifery-Led Care Guideline) • Recommend post-birth transfer for neonatal review and recommended sepsis risk calculator observations Should postnatal transfer for neonatal review, sepsis risk calculator and an observation period (routinely of 24 hours) be declined, a clinical information sharing (CIS) proforma should be completed and circulated as per MAT 079 *'Informed choice, personalised care and care outside recommended guidelines'*. The care plan in Powys should include detail described in the 'Powys Births' section below.
	6.3 Where choosing a birth in Powys & declining postnatal transfer This guideline should be used in conjunction with MAT 102 NEWTT Guideline MAT 102 NEWTT2 Guideline.pdf including completion of the newborn NEWTT2 Risk Assessment Tool (Appendix A) and NEWTT2 observation chart (Appendix B). The care plan should be noted in the risk assessment and in the records.

	When a woman declines to transfer for neonatal observations. The following plan should be advised: • Babies should be evaluated at birth for clinical signs and symptoms of infection and have their observations (including temperature, heart rate and respiration rate) checked and recorded on the 'NEWTT2' observation chart. The full clinical picture from intrapartum care should be considered. • For babies born at home perform observations at 1- and 2-hours, and 2 hourly until the home is left. • For babies born in a birth centre, observations at 1- and 2-hours, then 2-hourly until discharge. • Document findings in the baby postnatal records to enable them to be reviewed during the postnatal period. • Ensure handover of care includes CIS/maternal GBS carrier status • Prioritise postnatal care according to clinical need, including early 1st visit.

7 Signs and symptoms of an unwell infant

Transfer to the nearest obstetric unit as per All Wales Transfer Guideline should be advised according to NEWTT 2 escalation. Discuss care plan and transfer with the on call neonatologist at nearest obstetric unit.

In addition, parents should be informed to seek urgent medical advice if they are concerned that the baby is showing any of the following symptoms:

- Is showing abnormal behaviour
- Is unusually floppy
- Develops feeding difficulties or difficulties with tolerating feeds
- Has an abnormal temperature unexplained by environmental factors (lower than 36c and higher than 38c)
- Has rapid breathing
- Has a change in skin colour

These should also be documented in the postnatal record.

During the postnatal period, midwives should ensure parents are fully aware of the signs and symptoms of an unwell/compromised baby and, if they are concerned that appropriate advice/actions are not being taken by parents in these circumstances and the baby is at risk, contact PTHB safeguarding team 07387064356 or PowysTHB.Safeguarding@wales.nhs.uk for advice and support.

8 Safeguarding

If any safeguarding concerns or significant risk factors are identified for a unborn child or young person/vulnerable adult practitioners must follow Wales Safeguarding Procedures (2019) and SGP036 Safeguarding Policy Policies & Written Control Documents - SGP 036 Safeguarding Policy.pdf (sharepoint.com) . Advice and support concerning any safeguarding issue can be sought from PTHB Safeguarding Team via the Safeguarding Hub on 01686 252806 or email PowysTHB.Safeguarding@wales.nhs.uk (Monday-Friday 09:00-17:00, excluding Bank Holidays). Outside of office hours, Local Authority can be contacted on 0345 0544 847 or contact Silver on Call.
All registered practitioners should access appropriate safeguarding supervision and training as per guidance. Safeguarding Supervision (sharepoint.com)

9 Monitoring Compliance, Audit & Review

This document will be reviewed every three years or earlier should audit results or changes to legislation / practice within PTHB indicate otherwise.

10 References / Bibliography

If you include a PTHB document please ensure you have the document code and correct title.

Newborn Risk Assessment Tool

(To be completed within 2 hours of birth for all babies)

Mother/Birthing person	Baby
Name:	Name:
Address:	Address:
Hospital Number:	Hospital Number:
DOB:	DOB:

Baby Care Bundle - Assessment and Monitoring for all babies (within 2 hours)	Yes	No	Time (HH:MM)	Comments/ Recommendations
Time of Birth (HH:MM)				
Skin to Skin initiated				
Feeding initiated				
Temperature taken - please state Celsius				

Place of Birth (please tick)												
Home		In Transit		Midwifery Led Unit		Obstetric Labour Unit		Obstetric Theatre				

Intrapartum	No	Yes	Comments/Recommendations
Meconium-stained amniotic fluid (MSAF)			
Maternal Thyroid Disease (e.g., hyperthyroidism)			

Birth Mode Risk Identified	No	Yes	Comments/Recommendations
Elective pre-labour Caesarean birth <39 weeks'- any concerns with clinical assessment following birth?			
General anaesthesia for birth–any concerns with clinical assessment following birth?			
If baby born before arrival of healthcare professional –any concerns with clinical assessment following birth?			
IPPV at 5 mins of age, low cord ph. ≤7.1, low Apgar score ≤ 7@ 5 mins, base deficit >/=12.0			
Umbilical cord blood lactate of ≥4 mmol/L			

Hypoglycaemia risk	No	Yes	Comments/Recommendations
Maternal Betablockers			
Intrauterine growth restriction (≤ 2 centile plotted on gestational age and sex-specific charts)			
Evidence of Macrosomia cause by hyperinsulinism			
Maternal diabetes mellitus			
Hypothermia unresponsive to thermal care (Target temperature range 36.5-37.5 C)			
34+0 – 36+6 weeks gestation			
Feeding concerns-Reluctant, refusal or irritable. Bilious vomiting is abnormal -immediate escalation required (see BFI guidance for breastfed babies)			
Symptomatic of hypoglycaemia			
Other			

Postnatal Concerns	No	Yes	Comments/Recommendations
Early onset Jaundice < 24 hours			
Reduced tone/altered behaviour			
Grunting/respiratory concerns.			
Rhesus status/ Maternal antibody status			
Parental or Health Care Professional concerns			
Any further postnatal concerns identified (following local guidance)			

Early onset of infection risk identified: All Wales policy - SRC Kaiser Permanente	No	Yes
Did the mother have a previous baby who was treated for GBS sepsis. If **YES** contact medical team even if there are no other risk factors		
Other risk factors for infection as per SRC policy (See all Wales SRC Policy)		
Baby requiring antibiotic treatment:		

If any risk factors for early onset sepsis identified – contact neonatal team for assessment and follow SRC pathway

This list is not exhaustive, and you should refer to local Health Board and NICE guidance.

Outcome of Risk Assessment	No	Yes
Have any risk factors been identified?		
Does the baby require enhanced monitoring for any other reason?		

Other Maternal Medications	No	Yes
Maternal opiates < 6 hours prior to birth		
Prescribed maternal SSRIs or SNRI's and other psychotropic medications in the 3rd trimester (see All Wales guidance)		
Maternal drugs of addiction – prescribed or illicit		

Commence

Consider

NEWTT2

(Frequency and duration as per local guidance and clinical review)

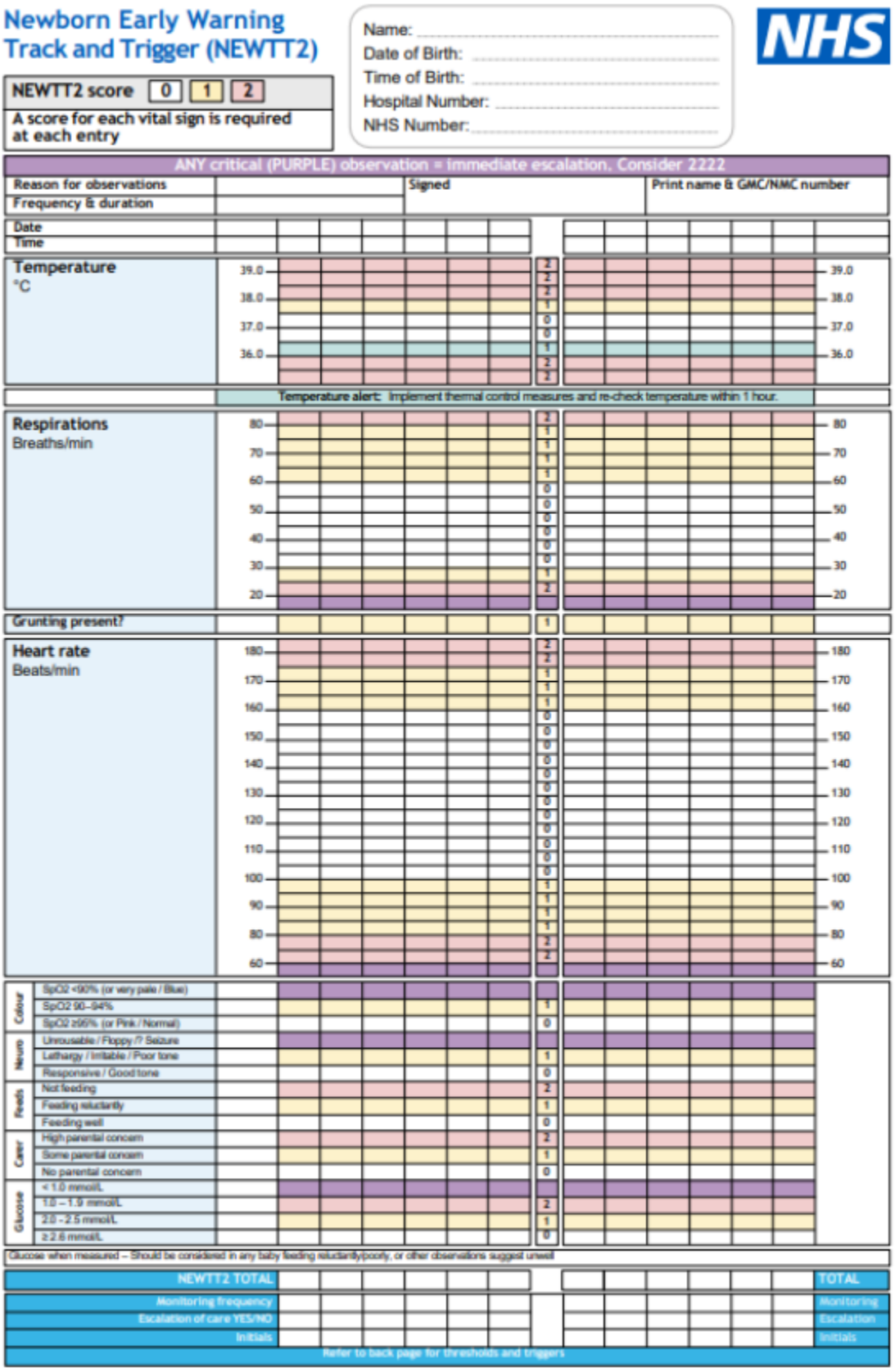
SRC Kaiser Permanente	Please record		
Gestational age (weeks/days)			
Highest maternal intrapartum temperature -From onset of established labour to 1st hour after birth			
Duration of rupture of membranes			
Maternal GBS status (+ve/ -ve / unknown)			
Type of intrapartum antibiotics and time of first dose			
EOS Risk at birth (score)			
Clinical concerns	Well appearing	Equivocal	Clinical concerns

Additional Comments/ Actions Required/Care Plan:

Risk Assessment Completed By	
Name	
Signature	
Job Title	
Date	DD:MM: YY
Time	HH:MM

Further Actions	Yes	No
Have you informed the Neonatal/Paediatric Team?		
Is there a clearly documented plan in the maternal/ infants notes		
Has the risk assessment been transferred to Infants notes?		
Have you followed local escalation and/or transfer guidance?		
Have you updated the parents?		

Appendix B



Newborn Early Warning Track and Trigger (NEWTT2)

Name:
Date of Birth:
Time of Birth:
Hospital Number:
NHS Number:

NHS

NEWTT2 score 0 1 2

A score for each vital sign is required at each entry

ANY critical (PURPLE) observation = immediate escalation. Consider 2222

Reason for observations / Frequency & duration		Signed	Print name & GMC/NMC number

Date / Time														

Temperature °C

39.0	38.0	37.0	36.0	Score
				2
				2
				2
				1
				0
				0
				1
				2
				2

Temperature alert: Implement thermal control measures and re-check temperature within 1 hour.

Respirations Breaths/min

80	70	60	50	40	30	20	Score
							2
							1
							1
							1
							0
							0
							0
							0
							0
							1
							2

Grunting present? 1

Heart rate Beats/min

180	170	160	150	140	130	120	110	100	90	80	60	Score
												2
												2
												1
												1
												1
												0
												0
												0
												0
												0
												0
												0
												0
												0
												0
												0
												1
												1
												1
												2
												2

		Score
Colour	SpO2 <90% (or very pale / Blue)	
	SpO2 90–94%	1
	SpO2 ≥95% (or Pink / Normal)	0
Neuro	Unrousable / Floppy /? Seizure	
	Lethargy / Irritable / Poor tone	1
	Responsive / Good tone	0
Feeds	Not feeding	2
	Feeding reluctantly	1
	Feeding well	0
Carer	High parental concern	2
	Some parental concern	1
	No parental concern	0
Glucose	< 1.0 mmol/L	
	1.0 – 1.9 mmol/L	2
	2.0 - 2.5 mmol/L	1
	≥ 2.6 mmol/L	0

Glucose when measured – Should be considered in any baby feeding reluctantly/poorly, or other observations suggest unwell

NEWTT2 TOTAL														TOTAL
Monitoring frequency														Monitoring
Escalation of care YES/NO														Escalation
Initials														Initials

Refer to back page for thresholds and triggers

Newborn Early Warning Track and Trigger (NEWTT2)

How to use the NEWTT2 track and trigger tool to determine the level and timelines of escalation
Calculate and document the total NEWTT2 score for a set of observations by adding together the individual scores (0-2) for every individual observation entered in a single column of the chart
Check the total against the NEWTT2 escalation tool and follow instructions in the escalation table for that set of observations
Healthcare professional concern can initiate a neonatal review at any time regardless of the zone colour of an observation or total score
For a score of zero continue routine care

Thresholds and Triggers

- The grade of team member indicated as the primary contact for each level of clinical concern is a guide and may need to be adapted depending on the local skill mix within that care setting or organisation

	Score 1	Score 2-3	Score 4-5	Score ≥6	Any critical observation
	Inform shift leader - Consider SpO_2 +/- blood glucose if not done already				
Primary escalation and response (use SBAR framework)	Repeat observations in <1 hour	Refer to paediatric/ neonatal Tier 1 doctor/ANNP	Refer to paediatric/ neonatal Tier 1 doctor/ANNP	Refer to paediatric/ neonatal Tier 1 doctor/ANNP. The Tier 2 doctor/ ANNP should be informed	Refer to paediatric/ neonatal Tier 1 doctor/ANNP AND Tier 2 doctor/ANNP
Review timings	Escalate as for score 2-3 if the repeat score remains 1	Request a review within 1 hour	Request a review within 15 minutes	Request immediate review	Immediate review and consider neonatal emergency call (2222)
Take steps to manage/address any obvious concerns/problems					
Secondary contact	**If no review within expected time frame, escalate to Tier 2 doctor/ANNP and inform shift leader**			**If no review within expected time frame, escalate to consultant and inform shift leader**	
	If still no response within required time frame, escalate to consultant				

- When the primary team member(s) contacted is unable to attend or fails to attend within the expected time for the level of clinical concern, escalation to the secondary contact is required
- The secondary contact would be expected to attend within the initial review timing, calculated from the documented time of primary escalation.

SBAR Handover

S	**Situation**
B	**Background**
A	**Assessment**
R	**Recommendation**

Document all actions and discussions in patient record

BJOG An International Journal of Obstetrics and Gynaecology

ENDORSED Royal College of Paediatrics and Child Health

Royal College of Obstetricians & Gynaecologists

Prevention of Early-onset Neonatal Group B Streptococcal Disease

Green-top Guideline No. 36

September 2017

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NICE accredited
www.nice.org.uk/accreditation

DOI: 10.1111/1471-0528.14821

Prevention of Early-onset Neonatal Group B Streptococcal Disease

This is the third edition of this guideline. The second edition was published in 2012 under the same title.

Executive summary

Information for women

What information should women be given about group B streptococcal (GBS) colonisation of the mother and the risk of neonatal infection, during pregnancy and after delivery?

All pregnant women should be provided with an appropriate information leaflet. [*New 2016*] ✓

Antenatal screening

Should all pregnant women be offered bacteriological screening for GBS?

Universal bacteriological screening is not recommended. D

What are the clinical risk factors that affect the risk of GBS disease?

Clinicians should be aware of the clinical risk factors that place women at increased risk of having a baby with early-onset GBS (EOGBS) disease. [*New 2016*] ✓

Should women be offered intrapartum antibiotic prophylaxis (IAP) if GBS was detected in a previous pregnancy, irrespective of carrier status this pregnancy?

Explain to women that the likelihood of maternal GBS carriage in this pregnancy is 50%. Discuss the options of IAP, or bacteriological testing in late pregnancy and then offer of IAP if still positive. [*New 2016*] B

If performed, bacteriological testing should ideally be carried out at 35–37 weeks of gestation or 3–5 weeks prior to the anticipated delivery date, e.g. 32–34 weeks of gestation for women with twins. [*New 2016*] C

Should women with a previous baby affected by GBS disease be offered IAP irrespective of carrier status this pregnancy?

IAP should be offered to women with a previous baby with early- or late-onset GBS disease. D

What screening tests (if any) should be offered if a woman requests testing for carrier status?

A maternal request is not an indication for bacteriological screening. [*New 2016*] D

Antenatal care

How should GBS bacteriuria in the current pregnancy be managed?

Clinicians should offer IAP to women with GBS bacteriuria identified during the current pregnancy. C

Women with GBS urinary tract infection (growth of greater than 10^5 cfu/ml) during pregnancy should receive appropriate treatment at the time of diagnosis as well as IAP. [*New 2016*] C

Should women be treated before the onset of labour if GBS carriage is detected incidentally earlier in the pregnancy?

Antenatal treatment is not recommended for GBS cultured from a vaginal or rectal swab. C

Should the management differ if the detection of GBS is incidental or following intentional testing, and if so, how?

Where GBS carriage is detected incidentally or by intentional testing, women should be offered IAP. [*New 2016*]

Should being a GBS carrier influence the method of induction? ✓

Method of induction should not vary according to GBS carrier status. [*New 2016*] ✓

Is being a GBS carrier a contraindication to membrane sweeping?

Membrane sweeping is not contraindicated in women who are carriers of GBS. [*New 2016*] D

How should planned caesarean section in women with known GBS colonisation be managed?

Antibiotic prophylaxis specific for GBS is not required for women undergoing planned caesarean section in the absence of labour and with intact membranes. C

Management of term labour (including rupture of membranes) to reduce the risk of EOGBS disease

How should rupture of membranes in a woman at term (37^{+0} weeks of gestation) with known or unknown GBS carrier status be managed?

Women who are known GBS carriers should be offered immediate IAP and induction of labour as soon as reasonably possible. C

In women where the carrier status is negative or unknown, offer induction of labour immediately or expectant management up to 24 hours. Beyond 24 hours, induction of labour is appropriate. [*New 2016*] A

How should labour in a woman with a temperature of 38°C or greater and without known GBS colonisation be managed?

Women who are pyrexial (38°C or greater) in labour should be offered a broad-spectrum antibiotic regimen which should cover GBS in line with local microbiology sensitivities. C

How should preterm labour be managed in women without known GBS colonisation?

IAP is recommended for women in confirmed preterm labour. [*New 2016*] D

IAP is not recommended for women not in labour and having a preterm planned caesarean section with intact membranes. [*New 2016*] D

Is there a role for polymerase chain reaction or other near-patient testing at the onset of labour?

Polymerase chain reaction or other near-patient testing at the onset of labour is not recommended. [*New 2016*] C

Can GBS-positive women have a water birth?

Birth in a pool is not contraindicated if the woman is a known GBS carrier provided she is offered appropriate IAP. [*New 2016*] D

Management of preterm labour (including rupture of membranes) to reduce the risk of EOGBS disease

Women with preterm rupture of membranes

How should known or unknown GBS carrier status be managed in women with preterm prelabour rupture of membranes?

Bacteriological testing for GBS carriage is not recommended for women with preterm rupture of membranes. IAP should be given once labour is confirmed or induced irrespective of GBS status. [*New 2016*] D

For those with evidence of colonisation in the current pregnancy or in previous pregnancies, the perinatal risks associated with preterm delivery at less than 34^{+0} weeks of gestation are likely to outweigh the risk of perinatal infection. For those at more than 34^{+0} weeks of gestation it may be beneficial to expedite delivery if a woman is a known GBS carrier. [*New 2016*] D

Bacteriological considerations

What are the appropriate swabs if testing for carrier status is to be undertaken?

When testing for GBS carrier status, a swab should be taken from the lower vagina and the anorectum. A single swab (vagina then anorectum) or two different swabs can be used. [*New 2016*] D

How quickly should the swabs be transported to the laboratory, in what medium and at what temperature?

After collection, swabs should be placed in a non-nutrient transport medium, such as Amies or Stuart. Specimens should be transported and processed as soon as possible. If processing is delayed, specimens should be refrigerated. [*New 2016*] B

What culture medium should be used if testing for GBS carriage is to be undertaken?

Enriched culture medium tests are recommended. The clinician should indicate that the swab is being taken for GBS. [*New 2016*] B

Which antibiotic should be used for IAP?

For women who have agreed to IAP, benzylpenicillin should be administered. Once commenced, treatment should be given regularly until delivery. B

Which antibiotic should be used in women with known or suspected penicillin allergy?

Provided a woman has not had severe allergy to penicillin, a cephalosporin should be used. If there is any evidence of severe allergy to penicillin, vancomycin should be used. [*New 2016*] ✓

How should known GBS colonisation in women who decline IAP be managed?

Women with known GBS colonisation who decline IAP should be advised that the baby should be very closely monitored for 12 hours after birth, and discouraged from seeking very early discharge from the maternity hospital. [*New 2016*] ✓

What are the adverse effects of IAP (maternal anaphylaxis, altered neonatal bowel flora and abnormal child development)?

Clinicians should be aware of the potential adverse effects of IAP. [*New 2016*] C

Should vaginal cleansing be performed in labour and does this differ according to GBS carrier status?

There is no evidence that intrapartum vaginal cleansing will reduce the risk of neonatal GBS disease. C

How should a newborn baby be managed?

If there have been any concerns about early-onset neonatal infection, what signs should prompt parents and carers to seek medical advice?

Parents and carers should seek urgent medical advice if they are concerned that the baby: D

- **is showing abnormal behaviour (for example, inconsolable crying or listlessness), or**
- **is unusually floppy, or**
- **has developed difficulties with feeding or with tolerating feeds, or**
- **has an abnormal temperature unexplained by environmental factors (lower than 36°C or higher than 38°C), or**
- **has rapid breathing, or**
- **has a change in skin colour. [*New 2016*]**

How should term babies whose mothers have received adequate IAP be managed?

Term babies who are clinically well at birth and whose mothers have received IAP for prevention of EOGBS disease more than 4 hours before delivery do not require special observation. [*New 2016*] ✓

The babies of women who have received broad-spectrum antibiotics during labour for indications other than GBS prophylaxis may require investigation and treatment as per the NICE clinical guideline on early-onset neonatal infection. [*New 2016*] ✓

How should well babies at risk of EOGBS disease whose mothers have not received adequate IAP be monitored?

Well babies should be evaluated at birth for clinical indicators of neonatal infection and have their vital signs checked at 0, 1 and 2 hours, and then 2 hourly until 12 hours. [*New 2016*] ✓

Should postnatal antibiotic prophylaxis be given to low-risk term babies?

Postnatal antibiotic prophylaxis is not recommended for asymptomatic term infants without known antenatal risk factors. C

How should a baby with clinical signs of EOGBS disease be managed?

Babies with clinical signs of EOGBS disease should be treated with penicillin and gentamicin within an hour of the decision to treat. [*New 2016*] ✓

How should the baby of a mother who has had a previous baby with GBS disease be managed?

Babies should be evaluated at birth for clinical indicators of neonatal infection and have their vital signs checked at 0, 1 and 2 hours, and then 2 hourly until 12 hours. [*New 2016*] ✓

What advice should be given to women regarding breastfeeding?

Breastfeeding should be encouraged irrespective of GBS status. [*New 2016*] ✓

Pathway of care

1. Purpose and scope

The purpose of this guideline is to provide guidance for obstetricians, midwives and neonatologists on the prevention of early-onset neonatal group B streptococcal (EOGBS) disease and the information to be provided to women, their partners and family. Prevention of late-onset group B streptococcal (GBS) disease and treatment of established GBS disease is not considered beyond initial antibiotic therapy.

2. Introduction and background epidemiology

The Lancefield group B beta-haemolytic streptococcus infection (*Streptococcus agalactiae*) is recognised as the most frequent cause of severe early-onset (less than 7 days of age) infection in newborn infants.[1] The GBS carriage rate varies among racial groups, with the highest rates in people of black African ancestry and the lowest in people of South Asian ancestry.

GBS is present in the bowel flora of 20–40% of adults (this is called 'colonisation'). People who are colonised are called 'carriers'. This includes pregnant women (there is no evidence that its carriage rate is specifically affected by pregnancy).

There remains controversy about the best strategy to prevent EOGBS disease. Surveys in 2015 demonstrated that there was a large variation in UK practice.[2] The incidence of EOGBS disease in the UK and Ireland in 2015 was 0.57/1000 births (517 cases), a significant increase in incidence since previous surveillance undertaken in 2000 (0.48/1000).[3] Of the cases, 22% had been born prematurely and overall, 35% had one or more of the following risk factors: a previous baby affected by GBS disease; GBS bacteriuria; a vaginal swab positive for GBS; or a maternal temperature of 38°C or greater in labour. Of the cases with discharge status, 7.4% were reported as having disability. A significant decline in case fatality rate was shown between the two surveillance periods: 10.6% to 5.2%, respectively.

Since 2002, the US guidelines[4] have advised that all pregnant women should be offered screening for GBS carriage at 35–37 weeks of gestation and those found to be colonised with GBS (or labouring before this time) should be offered intrapartum antibiotic prophylaxis (IAP), usually in the form of intravenous benzylpenicillin or ampicillin. IAP has been shown to significantly reduce the risk of culture-positive early-onset but not late-onset disease (occurring 7 or more days after birth). There is also indirect evidence of an impact on neonatal deaths. A longitudinal analysis of disease-related neonatal mortality in the USA showed a decline in mortality in the first week after birth, coinciding with the introduction of IAP.[5] A 2016 report from the USA shows a continuing fall in the incidence of GBS infection without any increase in deaths from other causes of neonatal disease.[6] A Cochrane review of three trials (all at high risk of bias) including 500 women concluded that IAP for colonised mothers reduced the incidence of EOGBS disease (relative risk 0.14; 95% CI 0.04–0.74) although the numbers of deaths were too small to assess the impact of the intervention on mortality.[7]

There have been no randomised studies addressing whether routine screening has had any impact on all-cause mortality. A positive antenatal screen will result in the recommendation of IAP which carries some risks for the mother and baby. These include anaphylaxis,[8] increased medicalisation of labour and the neonatal period, and possibly, infection with antibiotic-resistant organisms when broad-spectrum antibiotics, such as amoxicillin, are used for prophylaxis.[9,10] In the UK, most guidelines recommend that the first-line drug for GBS-specific IAP should be benzylpenicillin, also known as penicillin G. The UK National Screening Committee examined the issue of strategies for the prevention of EOGBS disease in 2016–17 and in March 2017 recommended that routine screening using bacteriological culture or near-patient testing techniques should not be introduced into UK practice.[11]

2.1 *Role of vaccination to prevent EOGBS disease*

An effective vaccine given to pregnant women would be expected to induce high levels of GBS-specific immunoglobulin G in the woman and, via transplacental transfer, in her baby, resulting in protection against neonatal GBS disease (both EOGBS and late-onset GBS). Phase II trials of a trivalent GBS conjugate vaccine in pregnant women in South Africa and Malawi have demonstrated safety as well as efficient transplacental transfer of vaccine-specific antibodies.[11,12] Vaccine manufacturers are now developing pentavalent formulations (i.e. covering 5 of the 10 possible GBS serotypes) which would cover an estimated 96% of EOGBS cases in the UK. Another, or additional, potential mechanism of vaccine protection may be through reduction of maternal GBS colonisation and transmission to the baby. However, no clear effect of vaccination on colonisation was observed in the 2016 pregnancy trial with the trivalent conjugate vaccine.[11] Studies in the UK suggest that vaccination against GBS would be acceptable to pregnant women.[13,14]

3. Identification and assessment of evidence

This guideline was developed using standard methodology for developing RCOG Green-top Guidelines. The Cochrane Library (including the Cochrane Database of Systematic Reviews, the Database of Abstracts of Reviews of Effects [DARE] and the Cochrane Central Register of Controlled Trials [CENTRAL]), EMBASE, MEDLINE and Trip were searched for relevant papers. The search was inclusive of all relevant articles published between January 2011 and October 2016. The databases were searched using the relevant Medical Subject Headings (MeSH) terms, including all subheadings and synonyms, and this was combined with a keyword search. Search terms included 'group B streptococcus', '*Streptococcus agalactiae*', 'group B streptococcus and pregnancy', 'streptococcal infections' and 'GBS bacteriuria'. The search was limited to studies on humans and papers in the English language. Relevant guidelines were also searched for using the same criteria in the National Guideline Clearinghouse and the National Institute for Health and Care Excellence (NICE) Evidence Search.

Where possible, recommendations are based on available evidence. Areas lacking evidence are highlighted and annotated as 'good practice points'. Further information about the assessment of evidence and the grading of recommendations may be found in Appendix I.

4. Information for women

4.1 *What information should women be given about GBS colonisation of the mother and the risk of neonatal infection, during pregnancy and after delivery?*

All pregnant women should be provided with an appropriate information leaflet. ✓

All pregnant women should be provided with an appropriate information leaflet, such as the RCOG patient information leaflet *Group B streptococcus (GBS) infection in newborn babies*.[15] Please see section 14 for more useful links and resources. Women should be offered information in a format that is accessible to them. Evidence level 4

5. Antenatal screening

5.1 *Should all pregnant women be offered bacteriological screening for GBS?*

Universal bacteriological screening is not recommended. D

The National Screening Committee[16] does not recommend universal bacteriological screening for GBS. Their view is that there is no clear evidence to show that testing for GBS routinely would do more good than harm. The reasons quoted are:

- Many women carry the bacteria and, in the majority of cases, their babies are born safely and without developing an infection.
- Screening women late in pregnancy cannot accurately predict which babies will develop GBS infection.
- No screening test is entirely accurate. Between 17% and 25% of women who have a positive swab at 35–37 weeks of gestation will be GBS negative at delivery. Between 5% and 7% of women who are GBS negative at 35–37 weeks of gestation will be GBS positive at delivery. Evidence level 4
- In addition, many of the babies who are severely affected from GBS infection are born prematurely, before the suggested time for screening.
- Giving all carriers of GBS IAP would mean that a very large number of women would receive treatment they do not need; this may increase adverse outcomes to mother and baby (see sections below).

This is why screening all women in pregnancy for GBS is not routinely offered in the UK. Some women choose to seek GBS testing outside the NHS. Providing the test is performed by an accredited laboratory, if the woman is found to be a carrier during the current pregnancy, IAP should be offered.

5.2 *What are the clinical risk factors that affect the risk of GBS disease?*

Clinicians should be aware of the clinical risk factors that place women at increased risk of having a baby with EOGBS disease. ✓

There are a number of clinical risk factors that appear to place women at increased risk of having a baby with EOGBS disease. These include:

- having a previous baby with GBS disease
- discovery of maternal GBS carriage through bacteriological investigation during pregnancy (for example, a urine infection or a swab taken to investigate a vaginal discharge)
- preterm birth
- prolonged rupture of membranes
- suspected maternal intrapartum infection, including suspected chorioamnionitis
- pyrexia.

5.3 Should women be offered IAP if GBS was detected in a previous pregnancy, irrespective of carrier status this pregnancy?

Explain to women that the likelihood of maternal GBS carriage in this pregnancy is 50%. Discuss the options of IAP, or bacteriological testing in late pregnancy and the offer of IAP if still positive. B

If performed, bacteriological testing should ideally be carried out at 35–37 weeks of gestation or 3–5 weeks prior to the anticipated delivery date, e.g. 32–34 weeks of gestation for women with twins. C

Assuming that approximately 50% of women will be recurrent carriers, the risk of EOGBS disease should be approximately 2 to 2.5 times that quoted for the total population.[17–21] The risk of EOGBS disease in the baby in this circumstance is likely to be around 1 in 700 to 1 in 800.[3] At this risk level, some women would choose IAP and others would not. Bacteriological testing in this circumstance would help to refine the risk. A positive bacteriological test in this circumstance would indicate a risk of 1 in 400, but the risk would be 1 in 5000 if the mother is GBS negative. A significant number of mothers may therefore choose to avoid IAP if they test negative. Evidence level 1+

If bacteriological tests for GBS are to be performed in pregnancy they should ideally be performed at 35–37 weeks of gestation[22] in order to determine carriage status close to delivery. There is no evidence to support the practice of varying the timing of screening. However, in women where preterm delivery is anticipated, earlier testing is justified. Evidence level 2+

5.4 Should women with a previous baby affected by GBS disease be offered IAP irrespective of carrier status this pregnancy?

IAP should be offered to women with a previous baby with early- or late-onset GBS disease. D

The proportion of term pregnant women with a previous baby affected by EOGBS is assumed to be 0.08%, based on a consensus estimate from a UK modelling study.[23] Mothers who have had a previous baby affected by early- or late-onset GBS are at increased chance of another affected baby compared with women of similar carrier status who have not had an affected baby. The reasons for this increased risk are not clear but may indicate persistence of carriage of a virulent strain of GBS or a deficient immune response.[24–26] In view of this potentially increased risk, and the possibility of false-negative antenatal testing, we recommend giving IAP in such cases and maternal bacteriological tests are not recommended. Evidence level 3

5.5 What screening tests (if any) should be offered if a woman requests testing for carrier status?

A maternal request is not an indication for bacteriological screening. D

The National Screening Committee does not recommend universal bacteriological screening for GBS. Evidence level 4

6. Antenatal care

6.1 *How should GBS bacteriuria in the current pregnancy be managed?*

Clinicians should offer IAP to women with GBS bacteriuria identified during the current pregnancy. C

Women with GBS urinary tract infection (growth of greater than 10^5 cfu/ml) during pregnancy should receive appropriate treatment at the time of diagnosis as well as IAP. C

GBS bacteriuria is associated with a higher risk of chorioamnionitis and neonatal disease although it is not possible to quantify these risks accurately. Women with GBS bacteriuria should be offered IAP. Women with GBS urinary tract infection (growth of greater than 10^5 cfu/ml) during pregnancy should receive appropriate treatment at the time of diagnosis as well as IAP.[27] Evidence level 3

6.2 *Should women be treated before the onset of labour if GBS carriage is detected incidentally earlier in the pregnancy?*

Antenatal treatment is not recommended for GBS cultured from a vaginal or rectal swab. C

Antenatal treatment for vaginal or rectal colonisation does not reduce the likelihood of GBS colonisation at the time of delivery[28] and so is not indicated in this situation. Instead, IAP should be offered to GBS-colonised women (see section 6.3). Evidence level 2+

6.3 *Should the management differ if the detection of GBS is incidental or following intentional testing, and if so, how?*

Where GBS carriage is detected incidentally or by intentional testing, women should be offered IAP. ✓

There is no evidence to support different management strategies based on how GBS carriage was detected.

6.4 *Should being a GBS carrier influence the method of induction?*

Method of induction should not vary according to GBS carrier status. ✓

There is no evidence to suggest that different induction methods increase the risk of EOGBS disease. If indicated, intravenous IAP should be commenced once a diagnosis of established labour has been made following induction.

6.5 *Is being a GBS carrier a contraindication to membrane sweeping?*

Membrane sweeping is not contraindicated in women who are carriers of GBS. D

There is evidence that membrane sweeping does not increase the risk of EOGBS disease.[29] Evidence level 2–

6.6 *How should planned caesarean section in women with known GBS colonisation be managed?*

Antibiotic prophylaxis specific for GBS is not required for women undergoing planned caesarean section in the absence of labour and with intact membranes. C

All women having caesarean section should receive broad-spectrum antibiotic prophylaxis in line with the NICE clinical guideline *Caesarean section*.[30] Women undergoing planned caesarean delivery in the absence of labour or membrane rupture do not require additional penicillin antibiotic prophylaxis specifically for GBS, regardless of GBS colonisation status. The risk of neonatal EOGBS disease is extremely low in this circumstance.

Women who are known GBS carriers who are to be delivered by caesarean section after spontaneous rupture of membranes should be offered IAP and delivered by category 2 or 3 caesarean depending on other clinical findings.[31] Evidence level 3

7. Management of term labour (including rupture of membranes) to reduce the risk of EOGBS disease

7.1 *How should rupture of membranes in a woman at term (37^{+0} weeks of gestation) with known or unknown GBS carrier status be managed?*

Women who are known GBS carriers should be offered immediate IAP and induction of labour as soon as reasonably possible. C

In women where the carrier status is negative or unknown, offer induction of labour immediately or expectant management up to 24 hours. Beyond 24 hours, induction of labour is appropriate. A

If known to be colonised with GBS, women should be offered immediate IAP because of the increased risk of EOGBS disease with prolonged rupture of membranes.[32] Evidence level 2+

As recommended in NICE clinical guideline 70[33] women should be offered induction of labour immediately or up to 24 hours after spontaneous rupture of membranes with unknown carrier status.[32] Evidence level 1+

7.2 *How should labour in a woman with a temperature of 38°C or greater and without known GBS colonisation be managed?*

Women who are pyrexial (38°C or greater) in labour should be offered a broad-spectrum antibiotic regimen which should cover GBS in line with local microbiology sensitivities. C

Intrapartum pyrexia (38°C or greater) is associated with a risk of EOGBS disease of 5.3 per 1000 (versus a background risk of 0.6 per 1000).[34]

In view of this increased risk of EOGBS, IAP should be offered in the presence of maternal pyrexia. Since a raised temperature can indicate chorioamnionitis, a broad-spectrum antibiotic, rather than penicillin G, is recommended in this situation. The antibiotic regimen of choice will depend on local microbiology guidance; intravenous amoxicillin 2 g every 6 hours (or intravenous cefuroxime 1.5 g every 6 hours in women with a nonanaphylactic reaction to penicillin) is acceptable in this context.[35]

Evidence level 3

7.3 *How should preterm labour be managed in women without known GBS colonisation?*

IAP is recommended for women in confirmed preterm labour. D

IAP is not recommended for women not in labour and having a preterm planned caesarean section with intact membranes. D

The proportion of women giving birth preterm in the UK is 8.2%.[36] More women present in **threatened** preterm labour than deliver preterm. The risk of EOGBS disease in the infants of those women who deliver preterm is estimated to be 2.3 per 1000.[23] The risk of GBS infection is higher with preterm delivery and the mortality rate from infection is increased (20–30% versus 2–3% at term).[37,38] In the 2015 British Paediatric Surveillance Unit national UK surveillance study, the mortality rate in preterm infants at 33 weeks of gestation or less was 27% versus 2.7% at term.[39] For this reason, IAP is recommended for women in **confirmed** preterm labour. However, IAP is not recommended for women having preterm planned caesarean section with intact membranes.

Evidence level 4

7.4 *Is there a role for polymerase chain reaction or other near-patient testing at the onset of labour?*

Polymerase chain reaction or other near-patient testing at the onset of labour is not recommended. C

The evidence does not suggest that using polymerase chain reaction technology for near-patient testing is feasible in UK maternity labour ward settings.[40] The technology for near-patient testing continues to improve and it is possible that this may confer benefits in the future. An ongoing cluster randomised trial is testing whether the use of near-patient testing in labour can reduce the use of IAP in women who present with clinical risk factors who would be eligible for IAP.

Evidence level 2+

7.5 *Can GBS-positive women have a water birth?*

Birth in a pool is not contraindicated if the woman is a known GBS carrier provided she is offered appropriate IAP. D

The evidence suggests that water birth is not contraindicated for GBS-positive women who have been offered the appropriate IAP.[41–43]

Evidence level 3

8. Management of preterm labour (including rupture of membranes) to reduce the risk of EOGBS disease

8.1 Women with preterm rupture of membranes

8.1.1 How should known or unknown GBS carrier status be managed in women with preterm prelabour rupture of membranes?

Bacteriological testing for GBS carriage is not recommended for women with preterm rupture of membranes. IAP should be given once labour is confirmed or induced irrespective of GBS status. D

For those with evidence of colonisation in the current pregnancy or in previous pregnancies, the perinatal risks associated with preterm delivery at less than 34^{+0} weeks of gestation are likely to outweigh the risk of perinatal infection. For those at more than 34^{+0} weeks of gestation it may be beneficial to expedite delivery if a woman is a known GBS carrier. D

There is no evidence that treating GBS colonisation before labour is beneficial.[44–46] Therefore, a prelabour-positive GBS culture does not change management in pregnancies with a gestation of less than 34^{+0} weeks because the high morbidity associated with early preterm birth means that early delivery is not indicated unless there are overt signs of infection. The risk of GBS infection is higher with preterm delivery and the mortality rate from infection is increased (20–30% versus 2–3% at term)[37,38] and this therefore justifies IAP in all cases of preterm labour.

The NICE guideline *Preterm labour and birth*[47] recommends that all women with preterm prelabour rupture of the membranes should be offered oral erythromycin 250 mg, 4 times a day for a maximum of 10 days or until the woman is in established labour (whichever is sooner). Oral penicillin should be considered for the same duration in women who cannot tolerate erythromycin or in whom erythromycin is contraindicated. Evidence level 4

A large multicentre randomised controlled trial (RCT) of elective delivery at 34–36 weeks of gestation for preterm spontaneous rupture of membranes versus conservative management[48] has demonstrated no significant differences in neonatal disease, morbidity or mortality. As a result, there is no indication to prefer one form of management over the other at this gestational age although IAP should be given once labour starts. There may be disadvantages with conservative management beyond 34^{+0} weeks of gestation in the presence of known GBS colonisation and in this group, early intervention may be preferable.[49]

9. Bacteriological considerations

Public Health England has published a standard for the detection of GBS carriage.[50]

9.1 *What are the appropriate swabs if testing for carrier status is to be undertaken?*

When testing for GBS carrier status, a swab should be taken from the lower vagina and the anorectum. A single swab (vagina then anorectum) or two different swabs can be used. D

Public Health England has published a standard for the detection of GBS carriage.[50] The standard notes that optimum yield will be achieved with swabs obtained from the lower vagina and the anorectum. A single swab for both sites of collection is rational but two different swabs can be used. The swabs may be rayon or dacron, fibre or flocked, and may be collected by the physician or other qualified caregiver, or by the woman with appropriate instruction. These tests are described as enriched culture medium tests. Evidence level 4

9.2 *How quickly should the swabs be transported to the laboratory, in what medium and at what temperature?*

After collection, swabs should be placed in a non-nutrient transport medium, such as Amies or Stuart. Specimens should be transported and processed as soon as possible. If processing is delayed, specimens should be refrigerated. D

GBS isolates can remain viable in transport media for several days at room temperature. However, the recovery of isolates declines over 1–4 days, especially at elevated temperatures, which can lead to false-negative results. When feasible, specimens should be refrigerated before processing.[4] Evidence level 4

9.3 *What culture medium should be used if testing for GBS carriage is to be undertaken?*

Enriched culture medium tests are recommended. The clinician should indicate that the swab is being taken for GBS. D

The most widely used enriched culture medium is Todd-Hewitt broth with nalidixic acid and colistin (e.g. Lim broth), or nalidixic acid and gentamicin further subcultured on a blood agar plate. Several options are available for the subculture of an enriched culture medium for isolation of GBS, including selective and chromogenic agar.[4] Evidence level 4

9.4 *Which antibiotic should be used for IAP?*

For women who have agreed to IAP, benzylpenicillin should be administered. Once commenced, treatment should be given regularly until delivery. B

It is recommended that 3 g intravenous benzylpenicillin be given as soon as possible after the onset of labour and 1.5 g 4 hourly until delivery. To optimise the efficacy of IAP, the first dose should be given at least 4 hours prior to delivery. There is evidence that benzylpenicillin levels in cord blood exceed the minimum inhibitory concentration for GBS as early as 1 hour after maternal administration[51] but it is not known how this relates to neonatal colonisation or disease. There is also evidence that giving penicillin for 2 hours before delivery reduces neonatal colonisation[52,53] but evidence from 2013[54] suggests that 4 hours of penicillin is more effective than 2 hours at reducing the risk of EOGBS disease. Amoxicillin is an alternative but the Cochrane review[7] found no difference between amoxicillin and benzylpenicillin and thus, the narrower spectrum antibiotic is preferred.

Evidence level 2+

9.5 *Which antibiotic should be used in women with known or suspected penicillin allergy?*

Provided a woman has not had severe allergy to penicillin, a cephalosporin should be used. If there is any evidence of severe allergy to penicillin, vancomycin should be used. ✓

The antibiotic chosen will depend on the confidence of the diagnosis of penicillin allergy and the severity of penicillin allergy. If the history suggests that the reaction described is not likely to be allergic in nature (e.g. vomiting only) then penicillin should be given. If the history suggests an allergy to beta-lactams, but one that is not severe (i.e. no anaphylaxis, angioedema, respiratory distress or urticaria), then a cephalosporin can be administered intravenously (e.g. cefuroxime, 1.5 g loading dose followed by 750 mg every 8 hours). If the allergy to beta-lactams is severe then intravenous vancomycin (1 g every 12 hours) is recommended.[4]

Clindamycin can no longer be recommended as the current resistance rate in the UK is 16%.[39]

Evidence level 4

9.6 *How should known GBS colonisation in women who decline IAP be managed?*

Women with known GBS colonisation who decline IAP should be advised that the baby should be very closely monitored for 12 hours after birth, and discouraged from seeking very early discharge from the maternity hospital. ✓

Women should be made aware that the risk of the baby developing EOGBS infection is higher than if they had received IAP. The overall risk remains low. The baby will require clinical evaluation at birth and monitoring of vital signs for 12 hours.[55]

Evidence level 4

9.7 *What are the adverse effects of IAP (maternal anaphylaxis, altered neonatal bowel flora and abnormal child development)?*

Clinicians should be aware of the potential adverse effects of IAP. C

A positive antenatal screen will result in the recommendation of IAP, which may carry some risks for mother and baby. A UK Obstetric Surveillance System study (2012–2015)[56] identified 37 cases of maternal anaphylaxis over 3 years (1.6/100 000 maternities), around 50% of which were associated with the administration of antibiotics (0.8/100 000 maternities) although it is not known whether any were given as IAP.

Evidence level 3

A number of studies have shown an effect of IAP on neonatal bowel flora, for example, causing reductions in colonisation with lactobacilli or bifidobacterium, but these findings have not been consistent across all studies.[57–61] Evidence level 2++

Changes in the neonatal bowel microbiome have been linked to a number of later effects in the child, including allergy, and obesity and diabetes.[62–64] However, these risks remain theoretical. Evidence level 2+

There are no studies showing that IAP adversely affects child development. The ORACLE I trial showed that oral erythromycin or co-amoxiclav given to pregnant women with preterm prelabour rupture of the membranes for up to 10 days was not associated with any long-term adverse outcomes.[65] However, the ORACLE II trial showed that oral erythromycin given to pregnant women in spontaneous preterm labour with intact membranes for up to 10 days was associated with long-term functional impairment in children (odds ratio 1.18, 95% CI 1.02–1.37), and both oral erythromycin (odds ratio 1.93, 95% CI 1.21–3.09) and co-amoxiclav (odds ratio 1.69, 95% CI 1.07–2.67) were associated with cerebral palsy at the age of 7 years.[66] However, this was a different scenario to that of IAP. Moreover, at the age of 11 years, no effect of these antibiotics given in either spontaneous preterm labour or prelabour rupture of membranes was found on continuous outcome scores, contextual value added measure (a measure of education progress), or on criterion-referenced attainment or identified special needs.[67] Evidence level 4

10. Should vaginal cleansing be performed in labour and does this differ according to GBS carrier status?

There is no evidence that intrapartum vaginal cleansing will reduce the risk of neonatal GBS disease. C

Although vaginal cleansing with chlorhexidine has been shown to reduce the risk of neonatal GBS colonisation, there is no evidence to show that this has any impact on EOGBS disease.[68] Evidence level 3

11. How should a newborn baby be managed?

11.1 *If there have been any concerns about early-onset neonatal infection, what signs should prompt parents and carers to seek medical advice?*

Parents and carers should seek urgent medical advice if they are concerned that the baby: D

- **is showing abnormal behaviour (for example, inconsolable crying or listlessness), or**
- **is unusually floppy, or**
- **has developed difficulties with feeding or with tolerating feeds, or**
- **has an abnormal temperature unexplained by environmental factors (lower than 36°C or higher than 38°C), or**
- **has rapid breathing, or**
- **has a change in skin colour.**

The NICE clinical guideline *Neonatal infection (early onset): antibiotics for prevention and treatment*,[55] outlines symptoms and signs in the neonate that should prompt urgent medical advice. Parents and carers should be aware of these if there have been any concerns about early-onset neonatal infection before a baby is discharged.

Evidence level 4

11.2 *How should term babies whose mothers have received adequate IAP be managed?*

Term babies who are clinically well at birth and whose mothers have received IAP for prevention of EOGBS disease more than 4 hours before delivery do not require special observation. ✓

The babies of women who have received broad-spectrum antibiotics during labour for indications other than GBS prophylaxis may require investigation and treatment as per the NICE clinical guideline on early-onset neonatal infection. ✓

Given that adequate IAP reduces the risk of EOGBS disease to a level approaching that of the general population it seems reasonable to manage these babies as low risk.[7]

Evidence level 4

11.3 *How should well babies at risk of EOGBS disease whose mothers have not received adequate IAP be monitored?*

Well babies should be evaluated at birth for clinical indicators of neonatal infection and have their vital signs checked at 0, 1 and 2 hours, and then 2 hourly until 12 hours. ✓

Two studies[52,69] have shown that 90% of infants who are diagnosed with early-onset infection will display signs by 12 hours.[55]

Evidence level 4

11.4 *Should postnatal antibiotic prophylaxis be given to low-risk term babies?*

Postnatal antibiotic prophylaxis is not recommended for asymptomatic term infants without known antenatal risk factors. C

The incidence of EOGBS disease in asymptomatic term infants without known antenatal risk factors in the UK is estimated at 0.2 cases/1000 births.[70] No RCT has investigated treatment in this group. If postnatal antibiotic treatment was completely effective and there were no adverse effects, 5000 infants would need to be treated to prevent a single case and at least 80 000 infants would have to be treated to prevent a single death from EOGBS disease. Routine postnatal antibiotic prophylaxis is not recommended.

Evidence level 3

11.5 *How should a baby with clinical signs of EOGBS disease be managed?*

Babies with clinical signs of EOGBS disease should be treated with penicillin and gentamicin within an hour of the decision to treat. ✓

The NICE guideline on early-onset neonatal infection[55] contains a list of clinical indicators of neonatal infection and is provided as an appendix in this guideline (see Appendix II). Clinicians caring for babies with clinical signs of EOGBS disease should be aware of these factors. Appropriate investigations should be performed in line with the NICE guidance,[55] and treatment with intravenous penicillin and gentamicin commenced without delay and without awaiting the results of investigations.

Evidence level 4

11.6 *How should the baby of a mother who has had a previous baby with GBS disease be managed?*

Babies should be evaluated at birth for clinical indicators of neonatal infection and have their vital signs checked at 0, 1 and 2 hours, and then 2 hourly until 12 hours. ✓

The baby of a mother who has had a previous baby with GBS disease is believed to be at increased risk of EOGBS although it is not possible to estimate the size of this risk.

Mothers who have had a previous baby with GBS disease will be offered IAP. Following careful clinical assessment the baby's vital signs and clinical condition should be monitored closely for at least 12 hours (see NICE clinical guideline 149).[55]

Evidence level 4

Although some clinicians prefer to obtain blood cultures and treat the baby with intravenous penicillin, and then stop the antibiotics at 36 hours if the cultures are negative, there is no evidence that this is necessary.

11.7 *What advice should be given to women regarding breastfeeding?*

Breastfeeding should be encouraged irrespective of GBS status. ✓

There is no evidence to discourage breastfeeding where there are concerns regarding the possible risk of transmission of GBS disease.

12. Recommendations for future research

- Cluster randomised trial of screening for GBS carriage with the offer of IAP for carriers to investigate the benefits and harms of a bacteriological screening programme.
- Studies of the virulence of specific strains identified using genetic markers and of serological correlates of protection.
- What is the long-term prognosis and associated costs for infants who survive EOGBS disease?
- What is the safety, immunogenicity and efficacy of a GBS vaccine in pregnant women?
- Can serocorrelates of protection against GBS be defined and used to facilitate the licensure of a GBS vaccine without the need for large-scale prelicensure efficacy trials in pregnant women?

13. Auditable topics

- Proportion of pregnant women with the following indications for IAP who actually received IAP (100%):
  - preterm labour
  - previous invasive GBS disease
  - known GBS carrier (however detected)
  - GBS bacteriuria or GBS urinary tract infection in current pregnancy.
- Proportion of women who are pyrexial in labour who are offered appropriate antibiotics, including antibiotic for preventing EOGBS (100%).
- Proportion of pregnant women who were colonised in a previous pregnancy who are offered testing and/or IAP (100%).
- Proportion of pregnant women given high-quality patient information (100%).
- Percentage of professionals with knowledge and understanding of GBS carriage and EOGBS disease (100%).

14. Useful links and support groups

- Royal College of Obstetricians and Gynaecologists. *Group B streptococcus (GBS) infection in newborn babies. Information for you.* London: RCOG; 2017 [https://www.rcog.org.uk/en/patients/patient-leaflets/group-b-streptococcus-gbs-infection-in-newborn-babies/].
- Free information materials both printed and online are available from Group B Strep Support [www.gbss.org.uk; *Telephone: 01444 416176*].

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Appendix I: Explanation of guidelines and evidence levels

Clinical guidelines are: 'systematically developed statements which assist clinicians and patients in making decisions about appropriate treatment for specific conditions'. Each guideline is systematically developed using a standardised methodology. Exact details of this process can be found in Clinical Governance Advice No.1 *Development of RCOG Green-top Guidelines* (available on the RCOG website at www.rcog.org.uk/green-top-development). These recommendations are not intended to dictate an exclusive course of management or treatment. They must be evaluated with reference to individual patient needs, resources and limitations unique to the institution and variations in local populations. It is hoped that this process of local ownership will help to incorporate these guidelines into routine practice. Attention is drawn to areas of clinical uncertainty where further research may be indicated.

The evidence used in this guideline was graded using the scheme below and the recommendations formulated in a similar fashion with a standardised grading scheme.

Classification of evidence levels

1++	High-quality meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a very low risk of bias
1+	Well-conducted meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a low risk of bias
1–	Meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a high risk of bias
2++	High-quality systematic reviews of case–control or cohort studies or high-quality case–control or cohort studies with a very low risk of confounding, bias or chance and a high probability that the relationship is causal
2+	Well-conducted case–control or cohort studies with a low risk of confounding, bias or chance and a moderate probability that the relationship is causal
2–	Case–control or cohort studies with a high risk of confounding, bias or chance and a significant risk that the relationship is not causal
3	Non-analytical studies, e.g. case reports, case series
4	Expert opinion

Grades of recommendation

A	At least one meta-analysis, systematic review or RCT rated as 1++, and directly applicable to the target population; or A systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population and demonstrating overall consistency of results
B	A body of evidence including studies rated as 2++ directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1++ or 1+
C	A body of evidence including studies rated as 2+ directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2++
D	Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+

Good practice points

✓	Recommended best practice based on the clinical experience of the guideline development group

Appendix II: Clinical indicators of possible early-onset neonatal infection (observations and events in the baby), including 'red flags'

Clinical indicator	Red flag
Altered behaviour or responsiveness	
Altered muscle tone (for example, floppiness)	
Feeding difficulties (for example, feed refusal)	
Feed intolerance, including vomiting, excessive gastric aspirates and abdominal distension	
Abnormal heart rate (bradycardia or tachycardia)	
Sign of respiratory distress	
Respiratory distress starting more than 4 hours after birth	Yes
Hypoxia (for example, central cyanosis or reduced oxygen saturation level)	
Jaundice within 24 hours of birth	
Apnoea	
Signs of neonatal encephalopathy	
Seizures	Yes
Need for cardio-pulmonary resuscitation	
Need for mechanical ventilation in a preterm baby	
Need for mechanical ventilation in a term baby	Yes
Persistent fetal circulation (persistent pulmonary hypertension)	
Temperature abnormality (lower than 36°C or higher than 38°C) unexplained by environmental factors	
Signs of shock	Yes
Unexplained excessive bleeding, thrombocytopenia, or abnormal coagulation (International Normalised Ratio greater than 2.0)	
Oliguria persisting beyond 24 hours after birth	
Altered glucose homeostasis (hypoglycaemia or hyperglycaemia)	
Metabolic acidosis (base deficit of 10 mmol/litre or greater)	
Local signs of infection (for example, affecting the skin or eye)	

National Institute for Health and Clinical Excellence (2012) Neonatal infection (early onset): antibiotics for prevention and treatment. Available from: [https://www.nice.org.uk/guidance/cg149] NICE guidance is prepared for the National Health Service in England, and is subject to regular review and may be updated or withdrawn. NICE has not checked the use of its content in this guideline to confirm that it accurately reflects the NICE publication from which it is taken.

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The final version is the responsibility of the Guidelines Committee of the RCOG.

The guideline will be considered for update 3 years after publication, with an intermediate assessment of the need to update 2 years after publication.

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Group B Strep Support

Royal College of Obstetricians & Gynaecologists

Information for you

Published in December 2017

Group B Streptococcus (GBS) in pregnancy and newborn babies

About this information

This information is for you if you (or a friend or relative) are expecting a baby, planning to become pregnant or have recently had a baby. It tells you about group B Streptococcus (GBS) infection in babies in the first week after birth (known as early-onset GBS) and provides links to further information about late-onset GBS infection. It includes the current UK recommendations for preventing GBS infection in newborn babies.

A glossary of all medical terms is available on the RCOG website at: www.rcog.org.uk/en/patients/medical-terms.

Key points

- Group B Streptococcus (GBS) is one of the many bacteria that normally live in our bodies and which usually cause no harm.
- Screening for GBS is not routinely offered to all pregnant women in the UK.
- If you carry GBS, most of the time your baby will be born safely and will not develop an infection. However, it can rarely cause serious infection such as sepsis, pneumonia or meningitis.
- Most early-onset GBS infections are preventable.
- If GBS is found in your urine, vagina or rectum (bowel) during your current pregnancy, or if you have previously had a baby affected by GBS infection, you should be offered antibiotics in labour to reduce the small risk of this infection to your baby.
- The risk of your baby becoming unwell with GBS infection is increased if your baby is born preterm, if you have a temperature while you are in labour, or if your waters break before you go into labour.
- If your newborn baby develops signs of GBS infection, they should be treated with antibiotics straight away.

What is GBS?

GBS is a common bacterium (bug) which is carried in the vagina and rectum of 2–4 in 10 women (20–40%) in the UK. GBS is not a sexually transmitted disease and most women carrying GBS will have no symptoms. Carrying GBS is not harmful to you but it can affect your baby around the time of birth. GBS can occasionally cause serious infection in newborn babies, and, very rarely, during pregnancy and before labour.

How is GBS found?

GBS is sometimes found during pregnancy when you have vaginal or rectal swabs or a urine test.

In the UK, the NHS does not routinely offer all pregnant women screening for GBS. For more information about available tests, visit the Group B Strep Support (GBSS) website: www.gbss.org.uk/TestingforGBS.

What could GBS mean for my baby?

Many babies come into contact with GBS during labour or around birth. The vast majority of these babies will not become ill. However, if you carry GBS, there is a small chance that your baby will develop GBS infection and become seriously ill, or even die.

Around 1 in every 1750 newborn babies in the UK and Ireland is diagnosed with early-onset GBS infection. The infections that GBS most commonly causes in newborn babies are sepsis (infection of the blood), pneumonia (infection in the lungs) and meningitis (infection of the fluid and lining around the brain).

Although GBS infection can make your baby very unwell, with prompt treatment most babies will recover fully. However, of the babies who develop early-onset GBS infection, 1 in 19 (5.2%) will die and, of the survivors, 1 in 14 (7.4%) will have a long-term disability.

On average in the UK, every month:

- 43 babies develop early-onset GBS infection
- 38 babies make a full recovery
- 3 babies survive with long-term physical or mental disabilities
- 2 babies die from their early-onset GBS infection.

What puts my baby at higher risk of developing GBS infection?

Infection is more likely to happen if:

- your baby is born preterm (before 37 completed weeks of pregnancy) – the earlier your baby is born, the greater the risk
- you have previously had a baby affected by GBS infection
- you have had a high temperature or other signs of infection during labour
- you have had any positive urine or swab test for GBS in this pregnancy
- your waters have broken more than 24 hours before your baby is born.

How can the risk to my baby be reduced?

- A urine infection caused by GBS should be treated with antibiotic tablets straight away and you should also be offered antibiotics through a drip during labour.
- You should be offered antibiotics through a drip during labour if you have had a GBS-positive swab or urine test from an NHS or other accredited laboratory (see the GBSS website for further information: www.gbss.org.uk/TestingforGBS).

- If you have previously had a baby who was diagnosed with GBS infection, you should be offered antibiotics through a drip when you are in labour.
- If your waters break after 37 weeks of your pregnancy and you are known to carry GBS, you will be offered induction of labour straight away. This is to reduce the time that your baby is exposed to GBS before birth. You should also be offered antibiotics through a drip.
- Even if you are not known to carry GBS, if you develop any signs of infection in labour, you will be offered antibiotics through a drip that will treat a wide range of infections including GBS.
- If your labour starts before 37 weeks of your pregnancy, your healthcare professional will recommend that you have antibiotics through a drip even if you are not known to carry GBS.

What are my options for where I can have my baby?

You should discuss your planned place of birth with your healthcare professional during pregnancy to make sure that you can receive antibiotics as required in labour. If you choose to have antibiotics, they will be given through a drip and it may not always be possible to arrange this at home or in some midwifery-led units.

As soon as you go into labour or your waters break, contact your healthcare professional as it is important that you have antibiotics as soon as possible. You should always let your healthcare professional know if you have previously had a baby who had GBS infection or if you have tested positive for GBS in this pregnancy.

If GBS has been found, when should I have antibiotics?

If you are found to carry GBS in your vagina or rectum, treating you with antibiotics *before* your labour begins does not reduce the chance of your baby developing GBS infection. You do not need antibiotic treatment until labour starts, when you will be offered antibiotics through a drip to reduce the chance of your baby being infected. These antibiotics reduce the risk of your baby developing a GBS infection in their first week of life from around 1 in 400 to 1 in 4000.

If GBS is found in your urine then you will need antibiotics as soon as it is diagnosed to treat your urinary tract infection; you will also be offered antibiotics through a drip during labour to prevent GBS infection in your baby.

There are other situations where you will be offered antibiotics but these are not specifically related to GBS infection:

- If your waters break preterm (before 37 weeks) but you are not in labour, you may be offered a course of antibiotics. See the National Institute for Health and Care Excellence (NICE) guideline NG25 on *Preterm Labour and Birth*: www.nice.org.uk/guidance/ng25/ifp/chapter/If-your-waters-break-early.
- If you are having a planned caesarean section and you carry GBS, you do not need antibiotics to prevent GBS infection in your baby unless labour has started or your waters have broken. All women having a caesarean section will be offered antibiotics at the time of the operation to reduce the risk of a wide variety of infections.

If I had GBS in a previous pregnancy, should I be given antibiotics during labour?

- If a previous baby was affected with GBS infection then you should be offered antibiotics during labour in all following pregnancies, as there is an increased risk that a future baby may also be affected.
- If, however, GBS was found in a previous pregnancy and your baby was unaffected, then there is a 1 in 2 (50%) chance that you will be carrying it again in this pregnancy. To help you choose

whether you would like to have antibiotics in labour, you can have a specific swab test (known as the enriched culture medium or ECM test) to see whether you are carrying GBS when you are 35–37 weeks pregnant. If the result shows that:

- you are still carrying GBS at this stage of pregnancy then the risk of your baby developing early-onset GBS infection is increased to around 1 in 400 and you will be offered antibiotics in labour
- you are not carrying GBS at this stage of pregnancy then the risk of your baby developing early-onset GBS infection is much lower (1 in 5000) and you may choose not to have antibiotics.

What will my treatment during labour involve?

If you have been offered antibiotics to prevent GBS infection in your baby, these should be started as soon as possible after your labour begins, or after your waters have broken. They will be given through a drip and continued at regular intervals (usually 4-hourly) until your baby is born.

You should still be able to move around freely during labour and this should not stop you from having a water birth.

If your waters break before labour, your healthcare professional will talk to you about when you will need antibiotics and about the best time for your baby to be born. This will depend on your individual circumstances and on how many weeks pregnant you are.

The antibiotic that you will be offered to prevent GBS infection in your baby is usually penicillin. If you are allergic to penicillin then you will be offered a suitable alternative.

Can antibiotics in labour cause any harm?

Some women may experience temporary side effects such as feeling sick or having diarrhoea. Women can be allergic to certain antibiotics and in rare cases the reaction may be severe and life-threatening (anaphylaxis). Tell your healthcare professional if you know that you are allergic to penicillin or any other medications.

Your healthcare professional should discuss with you the benefits and risks of taking antibiotics in labour to prevent early-onset GBS infection in your baby.

If you choose not to have antibiotics in labour then your baby will be monitored closely for 12 hours after birth as they are at increased risk of developing early-onset GBS infection.

How will my baby be monitored after birth?

If your baby is born at full term (after 37 completed weeks) and you received antibiotics through a drip in labour at least 4 hours before giving birth then your baby does not need special monitoring after birth.

If your baby is felt to be at higher risk of GBS infection and you did not get antibiotics through a drip at least 4 hours before giving birth then your baby will be monitored closely for signs of infection for at least 12 hours. This will include assessing your baby's general wellbeing, heart rate, temperature, breathing and feeding.

If you have previously had a baby affected by GBS infection then your baby will be monitored for 12 hours even if you had antibiotics through a drip in labour.

The chance of your baby developing GBS infection after 12 hours is very low and neither you nor your baby will need antibiotics after this time unless you or your baby becomes ill.

What are the signs of GBS infection in my baby?

Most babies who develop GBS infection become unwell in the first week of life (which is known as early-onset GBS infection), usually within 12–24 hours of birth. Although less common, late-onset GBS infection can affect your baby up until they are 3 months old. Having antibiotics during labour does not prevent late-onset GBS. More information on late-onset GBS infection is available here: www.gbss.org.uk/infection.

Babies with early-onset GBS infection may show the following signs:

- grunting, noisy breathing, moaning, seeming to be working hard to breathe when you look at their chest or tummy, or not breathing at all
- be very sleepy and/or unresponsive
- be crying inconsolably
- be unusually floppy
- not feeding well or not keeping milk down
- have a high or low temperature and/or their skin feels too hot or cold
- have changes in their skin colour (including blotchy skin)
- have an abnormally fast or slow heart rate or breathing rate
- have low blood pressure*
- have low blood sugar.*

*identified by tests done in hospital

If you notice any of these signs or are worried about your baby, you should urgently contact your healthcare professional and also mention GBS. If your baby has GBS infection, early diagnosis and treatment is important as delay could be very serious or even fatal.

What tests and treatments are available for my baby?

If it is thought that your newborn baby has an infection, tests will be done to see whether GBS is the cause. This may involve taking a sample of your baby's blood, or a sample of fluid from around your baby's spinal cord (a lumbar puncture). This will be discussed fully with you before the tests are done.

Babies with signs of GBS infection or babies who are suspected to have the infection should be treated with antibiotics as soon as possible. Antibiotics can be life-saving when given to babies with suspected infection. Treatment will be stopped if there is no sign of infection after at least 36 hours, and all the tests are negative.

Can I still breastfeed?

It is safe to breastfeed your new baby. Breastfeeding has not been shown to increase the risk of GBS infection, and it offers many benefits to both you and your baby.

Why aren't all women tested for GBS during pregnancy in the UK?

The UK National Screening Committee does not recommend testing all pregnant women for the presence of GBS using vaginal and rectal swabs. This is because:

- many women carry the GBS bacteria and, in the majority of cases, their babies are born safely and do not develop an infection
- screening all women late in pregnancy cannot accurately predict which babies will develop GBS infection

- no screening test is entirely accurate: a negative swab test does not guarantee that you do not carry GBS
- many babies who are severely affected by GBS infection are born preterm, before the suggested time for screening (35–37 weeks)
- giving antibiotics to all women who carry GBS would mean that a very large number of women would receive treatment they do not need.

Further information

Group B Strep Support (GBSS): www.gbss.org.uk

RCOG Green-top Guideline No. 36, *Prevention of Early-onset Neonatal Group B Streptococcal Disease*: www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg36

NICE clinical guideline CG190, *Intrapartum Care for Healthy Women and Babies*: www.nice.org.uk/guidance/cg190

NICE clinical guideline CG149, *Neonatal Infection (Early Onset): Antibiotics for Prevention and Treatment*: www.nice.org.uk/guidance/CG149

UK National Screening Committee, recommendation on GBS screening in pregnancy: https://legacyscreening.phe.org.uk/groupbstreptococcus

A full list of useful organisations (including the above) is available on the RCOG website at: www.rcog.org.uk/en/patients/other-sources-of-help

Making a choice

Shared Decision Making

If you are asked to make a choice, you may have lots of questions that you want to ask. You may also want to talk over your options with your family or friends. It can help to write a list of the questions you want answered and take it to your appointment.

Ask 3 Questions

To begin with, try to make sure you get the answers to three key questions if you are asked to make a choice about your healthcare.

1. What are my options?
2. What are the pros and cons of each option for me?
3. How do I get support to help me make a decision that is right for me?

* Ask 3 Questions is based on Shepherd HL, et al. Three questions that patients can ask to improve the quality of information physicians give about treatment options: A cross-over trial. Patient Education and Counselling. 2011;84: 379-85

AQuA Advancing Quality Alliance

Right Care Shared Decision Making Programme

NHS

https://www.aquanw.nhs.uk/SDM

Sources and acknowledgements

This information has been developed by the RCOG Patient Information Committee in collaboration with Group B Strep Support (GBSS). It is based on the RCOG Green-top Guideline No. 36, *Prevention of Early-onset Neonatal Group B Streptococcal Disease*, published in September 2017. The Guideline contains a full list of the sources of evidence used. You can find it online at: www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg36.

This information has been reviewed before publication by women attending clinics in Wrexham and London, by the RCOG Women's Network and the RCOG Women's Voices Involvement Panel, and by Group B Strep Support and their networks.