

NEONATAL SEPSIS - MANAGEMENT OF POTENTIAL INFECTION

Subject:	Neonatal Sepsis – Management of Potential Infection
Policy Number	N/A
Ratified By:	Maternity Clinical Audit & Guideline Group
Date Ratified:	September 2012, reviewed with minor change March 2015
Version:	3.0
Policy Executive Owner:	WCF Divisional Director
Designation of Author:	Neonatal Consultant, Neonatal ST1
Name of Assurance Committee:	Maternity Clinical Audit & Guideline Group
Date re-issued:	March 2015
Review Date:	3 years hence
Target Audience:	Obstetricians, Paediatricians, Midwives, Nurses.
Key Words:	Neonatal infection, Group B Streptococcus (GBS), Prolonged rupture of membranes,

Version Control Sheet

Version	Date	Author	Status	Comment
1	Sep 2012	Wynne Leith Chris Kelly	Neonatal Consultant Neonatal ST1	New guideline
2	Jan 2015	Wynne Leith Sharon D`Sousa	Neonatal Consultant Neonatal Consultant	Update post NICE guidance
3	April 2017	Louise Brennan	Midwife	Removal of Midwifery Supervision

➤ **Criteria for use**

This guideline covers the identification of babies at risk of neonatal infection, or with clinical signs of infection that are identified on the labour ward or postnatal ward.

➤ **Background/ introduction**

Sepsis in newborn babies can develop extremely quickly with potentially devastating consequences. It is therefore important to detect and treat these babies early. Group B Streptococcal infection is an important cause of early neonatal mortality and morbidity. Affected infants present with septicaemia or respiratory distress, usually within the first 12 hours of life.


➤ **Inclusion/ exclusion criteria**

All newborn babies.

No exclusion criteria.

➤ **Clinical management**

Management of symptomatic babies with clinical signs of infection

 If the decision to treat is made, antibiotic treatment for early-onset neonatal infection should be started without delay (and without waiting for test results) and always within 1 hour to improve clinical outcomes for the baby.

Any baby that is suspected to have clinical signs of bacterial infection should be transferred to the neonatal intensive care unit immediately, receive a full septic screen including lumbar puncture (if stable and clinically appropriate) and chest film (if appropriate), and receive first line antibiotics benzylpenicillin and gentamicin.

Midwives are often the first to notice that a baby is unwell, and it is their responsibility to arrange an urgent review by the neonatal team. If a neonatal SHO is not immediately available, this should be escalated to the neonatal registrar, or the Consultant neonatologist on call if necessary.

Vital signs monitoring should be started immediately on a Neonatal Early Warning Score (NEWS) chart (see appendix 2), including temperature, heart rate, respiratory rate, oxygen saturations and general wellbeing.

Do not perform a skin swab in the absence of clinical signs of a localised infection. Do not collect urine for microscopy and culture, although it should be considered if there are additional risk factors – e.g. an abnormal renal tract or if the baby is more than 48 hours old.

Signs of infection:



Red flags

- Respiratory distress starting more than 4 hours after birth
- Need for mechanical ventilation in a term baby
- Seizures
- Signs of shock
-

Other clinical indicators of infection include

- Pyrexia (axillary $> 37.5^{\circ}\text{C}$)
- Hypothermia (axillary temp persistently $< 36.5^{\circ}\text{C}$ that does not respond to environmental measures)
- Pallor
- Cyanosis
- Lethargy
- Irritability
- Respiratory distress
- Apnoea
- Rash (other than erythema toxicum and pustular melanosis)
- Hypoglycaemia with clinical signs

Poor feeding – there are many causes of poor feeding, with the majority not being related to infection. Therefore a careful assessment should be made.

Jaundice – although this can be a sign of infection on the first day of life, the majority of cases of isolated jaundice are not due to infection. Therefore these babies should be closely monitored on the Whittington's NEWS chart and serum bilirubin repeated.

Not all signs above carry equal weight, but should contribute to an overall sensible clinical decision about whether to treat with antibiotics. In a stable well baby with borderline signs of potential infection (in particular poor feeding / hypoglycaemia), then a senior doctor (SpR / Consultant) should ideally review the baby before commencing antibiotic treatment.

Management of asymptomatic babies with risk factors for infection

1. Preterm babies (born < 37 weeks gestation)

Pre-term well babies born to mothers that have been given adequate intra-partum antibiotics (first dose given greater than 4 hours prior to delivery) can be observed for at least 24 hours on the post natal ward without antibiotics. However, this guidance should be interpreted sensibly in the wider clinical context, and there should be a low threshold for intervening if required.

If the mother did not receive intra-partum antibiotics, but premature labour was induced by the obstetric team due to maternal factors (i.e. PET), a well baby can also be observed on the postnatal ward without antibiotics.

However, if the mother did not receive intra-partum antibiotics, and premature labour was for **unknown** reasons (which could feasibly include infection), the baby should have a partial septic screen and treatment with IV benzylpenicillin and gentamicin. Observations should be recorded on a neonatal early warning score (NEWS) chart. A repeat CRP should be performed 18-24 hours after birth, to help guide duration of treatment.

At **36 hours** after starting antibiotics, if both birth and 24 hour CRP readings were below 10, the blood culture has not been flagged as positive on ICE (please ensure sample was actually “received” – check for a “REC” label in the “Requests” section of ICE), and the baby remains clinically well, antibiotics can be stopped and baby discharged.

Please give parents the Whittington Neonatal Sepsis advice card, document this in the baby notes and advise them to bring their baby back to A&E if they have any concerns.

2. All babies (Term and Preterm)

a) Maternal chorioamnionitis or systemic sepsis

Babies born to mothers with clinical chorioamnionitis (usually diagnosed by the obstetric team and defined by the presence of a combination of maternal fever, tachycardia, raised WBC / CRP, uterine tenderness, foul-smelling vaginal discharge, or fetal tachycardia)

Should receive a partial septic screen and treatment with IV benzylpenicillin and gentamicin. Observations should be recorded on the neonatal early warning score (NEWS) chart. A repeat CRP should be performed 18-24 hours after birth, to help guide duration of treatment.

For babies of women receiving parenteral antibiotic treatment for confirmed or suspected invasive bacterial infection (such as septicaemia) at any time during labour, or in the 24 hour periods before and after birth (this does not



refer to intrapartum antibiotic prophylaxis), consider a partial septic screen and antibiotic treatment after discussion with a senior.

(This is a red flag for intrapartum and immediate postpartum sepsis. However, if sepsis in mum occurs after 12 hrs of delivery, babies may not need treating and therefore always discuss with a senior before starting antibiotics)

At 36 hours after starting antibiotics, if both birth and 24 hour CRP readings were below 10, the blood culture has not been flagged as positive on ICE (please ensure sample was actually “received” – check for a “REC” label in the “Requests” section of ICE), and the baby remains clinically well, antibiotics can be stopped and baby discharged.

Please give parents the Whittington Neonatal Sepsis advice card, document this in the baby notes and advise them to bring their baby back to A&E if they have any concerns.

b) Previous baby with invasive GBS sepsis

A mother who has had a previous baby with confirmed invasive group B sepsis confers a greater risk of early-onset sepsis to her subsequent babies. If the mother has not had adequate intrapartum antibiotics given (>4 hours prior to delivery), these babies should receive a partial septic screen and be treated with IV benzylpenicillin only (to treat GBS).

If the mother has received adequate antibiotics, the baby can be observed on a neonatal early warning score (NEWS) chart for at least 12 hours without antibiotics, and discharged after this provided that they remain well.

Please give parents the Whittington Neonatal Sepsis advice card at time of discharge, document this in the baby notes and advise them to bring their baby back to A&E if they have any concerns.



c) Suspected or confirmed infection in another baby in the case of a multiple pregnancy (Red flag)

d) Other risk factors for sepsis:

Risk factors for sepsis include:

- Maternal GBS urine/swab culture positive in **this** pregnancy (with ruptured membranes at time of delivery: a cold Caesarian section with intact membranes is not considered high risk)
- Prolonged rupture of membranes (PROM) (>18 hours in preterm or 24 hrs in term infants)
- Maternal fever (>38°C)
- Persistent fetal tachycardia during labour

One Risk Factor:

If a well, asymptomatic baby has **ONE** of these risk factors, the baby can be observed on the post natal ward without receiving antibiotics. If the mother has received adequate (>4 hours) intrapartum antibiotics prior to delivery, the observation time must be at least 12 hours. If no or inadequate antibiotics have been given, the mother and baby should be observed for at least 24 hours before discharge.

Please give parents the Whittington Neonatal Sepsis advice card at time of discharge, document this in the baby notes and advise them to bring their baby back to A&E if they have any concerns.

Two or More Risk Factors:

If the mother has two or more risk factors above, and has had no treatment or intra-partum antibiotics < 4 hours before delivery, the baby should receive a partial septic screen and IV benzylpenicilin and gentamicin.

If mother has had at least 1 dose IV antibiotics >4 hours before delivery, GBS has been adequately treated and GBS is removed as a risk factor. Therefore treat as above, taking the GBS treatment into account.

Further Management on the Postnatal Ward

All transitional care babies should have:

- 1) Observations performed on the Whittington Neonatal Early Warning (NEWS) chart.
- 2) Daily review by the neonatal postnatal team.
- 3) Repeat CRP at 18-24 hours of age and compare with the initial CRP taken at birth.
- 4) Once babies have received **36** hours of antibiotics, the baby should be reviewed with a view to discontinuing treatment. In the context of the overall clinical scenario, antibiotics could be justifiably stopped and the baby discharged home if:
 - a) The baby has remains well throughout admission.
 - b) Both CRP measurements have been < 10
 - c) The blood culture is not flagged as positive on ICE. Please check that the blood culture has actually been received (in ICE, look in the "Patient Requests" section, and check that a "REC" for received is stated in the blood culture row). All blood cultures are automatically flagged as "POSITIVE" on

ICE as soon as the machine picks up a positive growth signal, so the absence of a positive result can be taken as a negative result at that particular time.

It is not necessary to delay discharge while waiting for a “negative” result to be confirmed on ICE, nor is it necessary to ring the microbiology lab staff for a manual check before discharge home.

- 5) Please give parents the Whittington Neonatal Sepsis advice card, document this in the baby notes and advise them to bring their baby back to A&E if they have any concerns.

There are occasions where swab results become available after a baby has been discharged home. Because early onset group B streptococcal infection presents in the majority of cases by 12 hours of age there is rarely any need to recall babies back to hospital. **However**, it is important that the result is communicated to the community team (GP or community midwife) because of the potential risk of late onset GBS sepsis.

➤ **Contacts (inside and outside the Trust including out-of-hours contacts)**

Consultant Paediatrician:	air call/mobile via switch
Consultant obstetrician:	air call/mobile via switch
Labour Ward Co-ordinator:	0207 288 5502
Matron Labour Ward:	0782 486 4439

➤ **References (evidence upon which the guideline is based)**

1. Antibiotics for early-onset neonatal infection (2012) NICE guideline CG149
2. Group B Streptococcus for Health Professionals
http://www.gbss.org.uk/filepool/2011_06_21_The_Facts_4_HealthProfessionals.pdf - also lots of helpful information for parents at <http://www.gbss.org.uk>

➤ **Compliance with this guideline (how and when the guideline will be monitored e.g. audit and which committee the results will be reported to)**

Objectives of the audit:

The objective of this audit is to measure current practice in the care of women and their babies during childbirth against the recommendations in the guideline Management of potential neonatal infection

Audit criteria and standards

This document provides audit criteria based on the guideline's key priorities for implementation for use in clinical audit. The standards given are typically 100% or 0%. If these are not achievable, a more appropriate standard should be set based on discussions with clinicians.

This will be audited yearly.

Auditable Standards

1 Definition		Assessment Baby case notes	Time Frame
Evidence	Evidence that babies have had the appropriate observations undertaken including appropriate timings These are documented on the NEWS chart	<input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> yes <input type="checkbox"/> no	Yearly
2 Definition		Assessment Baby case notes	Time Frame
Evidence	Where appropriate 2 C-reactive proteins (CRP) have been taken and the results recorded in the baby notes	<input type="checkbox"/> yes <input type="checkbox"/> no	Yearly

3 Definition		Assessment Baby case notes	Time Frame
--------------	--	----------------------------------	------------

Evidence	Babies are given antibiotics where appropriate	<input type="checkbox"/> yes <input type="checkbox"/> no	Yearly
	The antibiotic are given at the prescribed time intervals	<input type="checkbox"/> yes <input type="checkbox"/> no	

4 Definition		Assessment Maternal case notes	Time Frame
Evidence	Whittington Neonatal Sepsis advise given to parents and documented in the baby notes	<input type="checkbox"/> yes <input type="checkbox"/> no	Yearly

Tool to Develop Monitoring Arrangements for Policies and guidelines

What key element(s) need(s) monitoring as per local approved policy or guidance?	Who will lead on this aspect of monitoring? Name the lead and what is the role of the multidisciplinary team or others if any.	What tool will be used to monitor/check/observe/Assess/inspect/ authenticate that everything is working according to this key element from the approved policy?	How often is the need to monitor each element? How often is the need complete a report ? How often is the need to share the report?	What committee will the completed report go to?
Element to be monitored	Lead	Tool	Frequency	Reporting arrangements
Ensure that all babies born wherein risk of sepsis has been diagnosed in either the mother or baby, are managed in accordance with this guideline	Mr Raoul Blumberg Lead Neonatologist for Labour Ward	Audit	An annual audit	These reports will be reviewed by the Maternity Clinical Guidelines and Audit Group. It is their responsibility to monitor the findings from each report. Evidence to support this will be found in the form minutes. Presented yearly at perinatal

Appendix 1

The following are estimates of the chances a baby in Britain will become infected with Group B Streptococcus (GBS) if no preventative measures are taken and no other risk factors are present:

- 1 in 1,000 where the woman is not known to be a carrier of GBS
- 1 in 400 where the woman is carrying GBS during the pregnancy
- 1 in 300 where the woman is carrying GBS at delivery
- 1 in 100 where the woman has had a previous baby infected with GBS.

If a woman who carries GBS is given antibiotics as described in this guideline, the baby's risk is reduced significantly:

- 1 in 8,000 where the mother carries GBS during pregnancy
- 1 in 6,000 where the mother carries GBS at delivery and
- 1 in 2,000 where the mother has previously had a baby infected with GBS.

Preterm babies are between 3 and 15 times more likely to develop GBS infection and to die as a result than full term babies.

The vast majority of pregnancies can be managed so that babies are protected and born free of GBS infection

Name:

Hospital Number:

DOB:

Birth Weight: Kg Gestation: /40

Neonatal Early Warning Score



Date								
Time								
Hours From time of birth	Birth	1 Hour	2 Hours	4 Hours	6 Hours	8 Hours	10 Hours	12 Hours
Temperature (°C)	> 38.0							
	37.5-38.0							
	36.5-37.4							
	36.0-36.4							
Heart rate (beats per minute)	<35.9							
	>220							
	180-219							
	160-179							
	140-159							
	120-139							
Respiratory Rate (breaths per minute)	100-119							
	80-99							
	<80							
	> 70							
	51-70							
Respiratory distress	41-50							
	31-40							
	20-30							
	<20							
Conscious level	Present							
	Absent							
Pre-feed blood sugar (mmol)	Alert							
	Irritable / lethargic / jittery							
	Unresponsive							
[] Tick if indicated	Time (pre-feed only)							
	> 6.0							
	2.0 – 5.9							
	1.1-1.9							
Normal tone and behaviour	<1.0							
<input checked="" type="checkbox"/> If passed urine								
<input checked="" type="checkbox"/> if passed meconium								
<input checked="" type="checkbox"/> if concerned about patient								
Total NEW Score								
Patient Reviewed <input checked="" type="checkbox"/>								

Tick if indicated:

GBS; PROM; meconium; <37 weeks; risk of hypoglycaemia; other (specify)

12 hours; until discharged by neonatal SHO/Registrar

Neonatal SHO/Registrar signature at start:

Date: / /20

Neonatal SHO/Registrar signature at discharge:

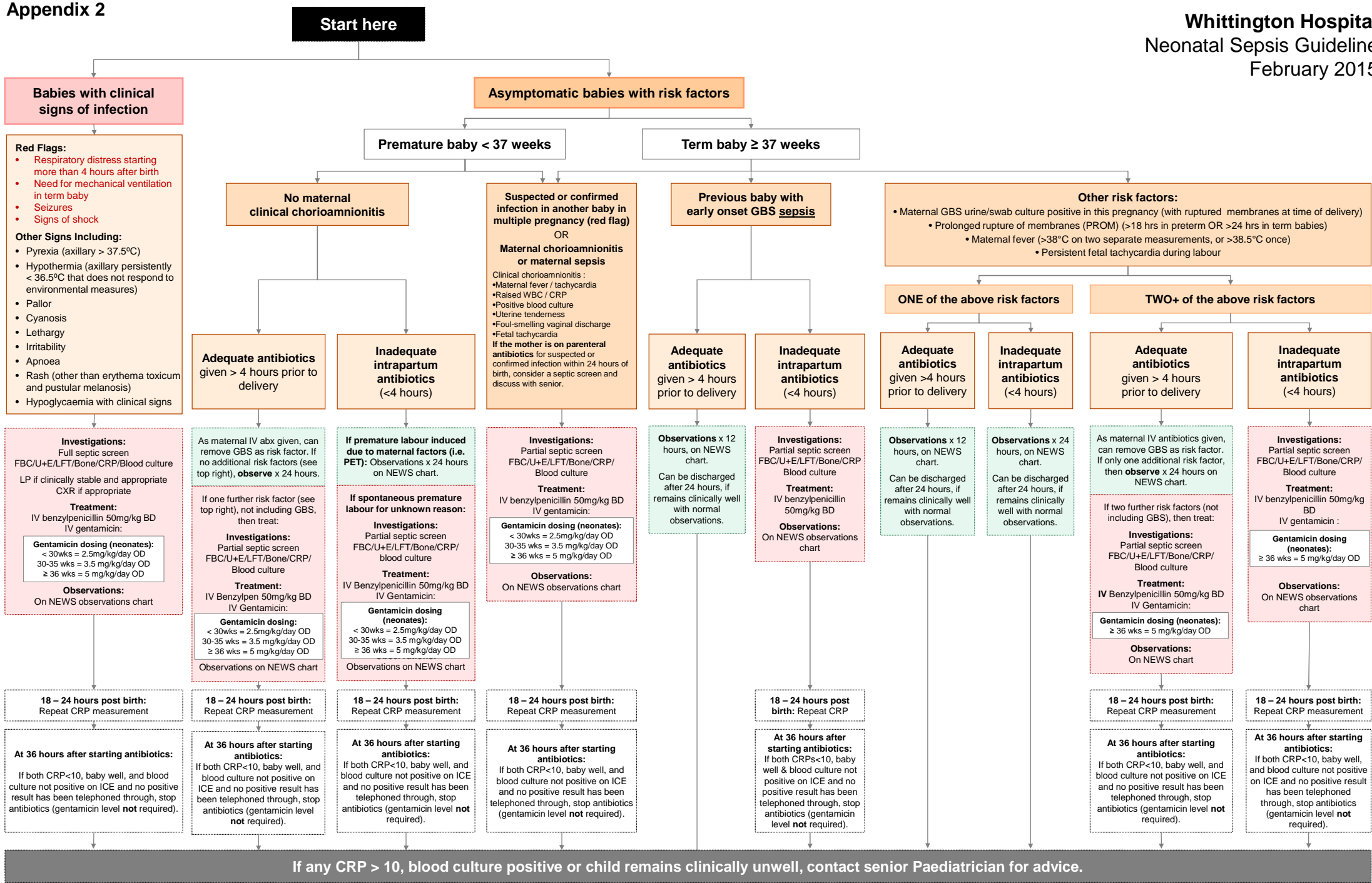
Date: / /20

NEW Score	Action
0	Continue
1	Inform Neonatal SHO (bleep 3100)
2	Request urgent review
3	CALL 2222

References:

- C Flannigan, M Hogan. Prolonged rupture of membranes in term infants: should all babies be screened? February 2010, Volume 2010:2 Pages 1 - 6 DOI 10.2147/CA.S8425

Harriet Holme, Reena Bhatt and Wynne Leith March 2011



The CRP should ideally be repeated 18-24 hours after the first CRP, but can be repeated up to 36hrs later. For all babies who have been at risk of infection, Whittington Hospital Neonatal Sepsis advice card to be given to parents at time of discharge home.

To be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval

		Yes/No	Comments
1.	Does the procedural document affect one group less or more favourably than another on the basis of:		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
	• Disability - learning disabilities, physical disability, sensory impairment and mental health problems	No	
2.	Is there any evidence that some groups are affected differently?	No	
3.	If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?	No	
4.	Is the impact of the procedural document likely to be negative?	No	
5.	If so can the impact be avoided?	N/A	
6.	What alternatives are there to achieving the procedural document without the impact?	N/A	
7.	Can we reduce the impact by taking different action?	N/A	

If you have identified a potential discriminatory impact of this procedural document, please refer it to the Director of Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact the Director of Human Resources.

Checklist for the Review and Approval of Procedural Document

To be completed and attached to any procedural document when submitted to the relevant committee for consideration and approval.

	Title of document being reviewed:	Yes/No	Comments
1.	Title		
	Is the title clear and unambiguous?	Yes	
	Is it clear whether the document is a guideline, policy, protocol or standard?	Yes	
2.	Rationale		
	Are reasons for development of the document stated?	Yes	
3.	Development Process		
	Is it clear that the relevant people/groups have been involved in the development of the document?	Yes	
	Are people involved in the development?	Yes	
	Is there evidence of consultation with stakeholders and users?	Yes	
4.	Content		
	Is the objective of the document clear?	Yes	
	Is the target population clear and unambiguous?	Yes	
	Are the intended outcomes described?	Yes	
5.	Evidence Base		
	Are key references cited in full?	N/A	
	Are supporting documents referenced?	N/A	
6.	Approval		
	Does the document identify which committee/group will approve it?	Yes	
7.	Dissemination and Implementation		
	Is there an outline/plan to identify how this will be done?	Yes	
8.	Document Control		
	Does the document identify where it will be held?	Yes	
9.	Process to Monitor Compliance and Effectiveness		

	Title of document being reviewed:	Yes/No	Comments
	Are there measurable standards or KPIs to support the monitoring of compliance with and effectiveness of the document?	Yes	
	Is there a plan to review or audit compliance with the document?	Yes	
10.	Review Date		
	Is the review date identified?	Yes	
	Is the frequency of review identified? If so is it acceptable?	Yes	
11.	Overall Responsibility for the Document		
	Is it clear who will be responsible for co-ordinating the dissemination, implementation and review of the document?	Yes	

Executive Sponsor Approval			
If you approve the document, please sign and date it and forward to the author. Procedural documents will not be forwarded for ratification without Executive Sponsor Approval			
Name		Date	
Signature			
Relevant Committee Approval			
The Director of Nursing and Patient Experience's signature below confirms that this procedural document was ratified by the appropriate Governance Committee.			
Name		Date	
Signature			
Responsible Committee Approval – only applies to reviewed procedural documents with minor changes			
The Committee Chair's signature below confirms that this procedural document was ratified by the responsible Committee			
Name		Date	
Name of Committee		Name & role of Committee Chair	
Signature			