
Guideline

Jaundice in the newborn: screening and assessment

Key points

Screening & assessment

1. All parents should be offered information about neonatal jaundice that is tailored to their needs. A specific jaundice leaflet should be given to those babies identified as having a risk factor for significant hyperbilirubinaemia (see table 1).
2. With regard to the four risk factors for significant jaundice (table 1, page 3):
 - All midwives should be familiar with these risk factors
 - All babies in these 'at risk' groups should be visually inspected on days one and two of life (ie daily in first 48 hours).
 - Babies who are visibly jaundiced within the first 24 hours (risk factor 3) and who are still in hospital must not be sent home.
 - All other 'at- risk' babies in hospital should be notified to the community midwife and, if discharged before day two, all those with risk factors 1, 2 and 4 should receive an 'extra' post-natal contact by the community midwife/ maternity support worker in the first 48 hours, ie be reviewed on post-natal days one **and** two.
3. A visual inspection alone is inadequate in assessing the level of jaundice: where there is obvious visible jaundice, the bilirubin level should be monitored by the transcutaneous bilirubinometer device, if available, or by serum measurement.
4. The interpretation of the TCBR should follow the guidance in section 6 and in figures 1 and 2.
5. All babies who develop jaundice before 24 hours of age should have an urgent review **on the same day** (ideally within two hours) by a paediatrician/ neonatologist so that investigation can be initiated and treatment given, if required. Babies in the community should be discussed with the on-call paediatric registrar and referred to the paediatric team in the childrens observation unit (see figure 2, page 9).
6. All term babies with jaundice after 14-21 days of birth should be referred to the baby Review clinic by contacting the on-call Neonatal Registrar (see section 6) and a letter of referral faxed through to NICU (see section 6 and figure 2).
7. Babies with jaundice should have a midwifery care plan written, which may include attention to:
 - ensuring the baby is well hydrated by initiating early, regular feeds – this may include waking a sleepy baby to feed and stimulating the baby to ensure frequent feeding;
 - observing the baby for signs of lethargy, dehydration and/ or significant weight loss.

Treatment

1. Infants, whose serum bilirubin has reached, or exceeded, the threshold level should commence phototherapy.
2. The NICE SBR treatment tables or charts from NICE for the appropriate gestational age should be used for the interpretation of SBR values.

1 Scope

Local: This guideline is for use within maternity services by midwives, in the home or hospital setting. It is also of relevance to the neonatal services. It applies to all newborns who are considered as well neonates and also to babies who are receiving 'extra care', 'transitional care' or 'special care', as defined by the British Association of Perinatal Medicine (BAPM) and applied in the Rosie. It does not apply to babies receiving high-dependency or intensive care, as defined by BAPM, as the immaturity or critical illness of these neonates might necessitate special considerations and individual jaundice management.

2 Purpose

To ensure early recognition and prompt treatment of jaundice in the neonate, by appropriate screening and assessment in the hospital and/ or home environment, and to ensure safe and effective treatment including the provision of phototherapy.

This guideline covers two areas:

- sections 4 to 7 covers screening and assessment of jaundice
- section 8 covers management of hyperbilirubinaemia

All sections are relevant to hospital and community midwives, and section 8 to neonatal staff.

For guidance on phototherapy, refer to the Trust's [phototherapy guideline](#).

3 Abbreviations

DAGT	Direct Antiglobulin Test
NICU	Neonatal Intensive Care Unit
SBR	Serum bilirubin
TCBR	Trancutaneous bilirubin

4 Background: types of jaundice

The term 'jaundice' describes a yellow discoloration of the skin and sclera of the eyes. It occurs when the level of circulating bilirubin (a yellow pigment) increases. Bilirubin is formed from haemoglobin, a product of red cell breakdown after birth. It is fat-soluble, but is made water-soluble by an enzymatic reaction. It is then excreted in bile into the gut. The liver enzyme responsible for this process becomes effective slowly after birth.

Jaundice is common in the term newborn affecting between 60% of term and 80% of preterm babies in the first week of life. About 10% of breastfed babies are still jaundiced at one month. In most babies jaundice is a **physiological** process that is harmless unless the bilirubin level reaches a critical value that can occur in rare cases. In term babies jaundice presents on the third or fourth day of life, peaks on the fifth or sixth day and usually fades by ten days. Exclusively breast-fed babies tend to develop more significant jaundice than formula fed infants. In some babies jaundice is a symptom of an underlying **pathological** condition.

5 When is jaundice significant and when does it require treatment?

Assessment of jaundice in newborn babies is important in the newborn period because:

- It may indicate underlying disease eg infection, blood group incompatibilities;
- Unconjugated free bilirubin is neurotoxic, particularly in babies who are ill, acidotic, hypoxic or preterm, and can lead to cerebral palsy, seizures and deafness; this is the condition known as **kernicterus**;
- Conjugated bilirubin may indicate neonatal hepatitis, biliary atresia or inborn error of metabolism; the success of treatment of the latter is dependent on prompt diagnosis and surgery.

Intervention is required in the following clinical situations:

- Early-onset jaundice in the first 24 hours;
- Later-onset (days two to five) jaundice if the bilirubin level is above the level that is considered safe
- Prolonged jaundice, beyond two weeks in term infants (three weeks in preterm infants)
- Conjugated jaundice, that is increased direct bilirubin level at any age.

6 Screening & risk assessment for jaundice

6.1 Risk assessment

In order for treatment to be effective, it is important that the signs of jaundice are recognised early. All midwives and neonatal staff should be familiar with the risk factors for significant jaundice (see table 1):

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Table 1: Risk factors for jaundice requiring treatment (NICE, 2010)

1. Gestational age <38 weeks
2. Previous sibling had jaundice requiring phototherapy
3. Visible jaundice in the first 24 hours
4. Mothers intention to exclusively breastfeed*

* Exclusive breast-feeding does increase the risk of jaundice but the benefits of breastfeeding outweigh this risk. It not should **not** be used as an argument against breastfeeding. Mothers should be encouraged to breastfeed.

6.2 Provision of information

All parents should be educated about the significance of jaundice and offered information about neonatal jaundice that is tailored to their needs and expressed concerns. The post-natal booklet should be given to all mothers and 'emergency', 'urgent' and 'non-urgent' actions discussed with respect to neonatal jaundice so that parents are made aware of who to contact, and how to contact a health professional to assess the baby, if required.


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Parents can also be shown what jaundice looks like using the laminated visual teaching aid attached to all cots.

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For babies at risk (see table 1, section 5.1), the [jaundice in newborn babies patient information leaflet](#) should be given and discussed. 





Information to be given may include:

- Why some babies are more at risk of developing severe jaundice
- How to identify jaundice
- What will happen if jaundice is suspected
- How phototherapy works
- Why jaundice in the first 24 hours is significant and why urgent medical help is required
- Checking the nappies for dark urine or pale stools
- Reassurance that jaundice in the neonate is common, that it is usually transient and harmless
- Breastfeeding can continue though fluid supplements may be required

6.3 Babies at risk

It is important to ensure that any infant who has any of the above risk factors associated with an increased risk of hyperbilirubinaemia (table 1) is closely monitored in the first 72 hours. Babies who are visibly jaundiced within the first 24 hours (risk factor #3) and who are still in hospital must not be sent home.

For any baby with any of the above risk factors, there should be a documented plan in place to monitor for jaundice which must include: 

- Recognition of the risk factors in the paediatric notes during the newborn examination by the midwife or neonatologist (a rubber stamp is available for this purpose) 
- Notifying the community midwife of the risk factor via the discharge process – on the discharge slip, the discharge letter and the post-natal care record 
- A record of a discussion with the mother/ parents; the jaundice leaflet should be provided and the laminated information sheet attached to each cot may be used for reference. 
- In the case of risk factors #1, #2 and #4, if the baby is discharged home before 48 hours, that he/ she should receive **an additional visual check for jaundice in the first 48 hours by the community midwife/ maternity support worker ie an assessment on days one and two.** This may require additional contact with a community practitioner. 

6.4 Review of history

In case of neonatal jaundice the maternal and neonatal history should be reviewed, as certain factors may influence the risk of jaundice (table 2):

Table 2: Influencing factors from history of mother and baby B

Mother

Gestation

Maternal blood group (blood group incompatibility)

Rhesus isoimmunisation

Delivery mode

Family history: eg hypothyroidism, red blood cell disorders; sibling with severe jaundice

Ethnicity

Diabetes

Risk of infection (PROM, signs of chorioamnionitis, GBS in vaginal swab or urine)

Baby

Blood group and Rhesus factor

Result of direct antiglobulin test (DAT)

Risk of infection

Birth trauma eg bruising

Genetic disorders eg G6PD deficiency

Polycythaemia

Baby of diabetic mother

Feeding method and effectiveness

Fetal distress' in labour

Timing of examination

Timing of onset of jaundice

6.5 Clinical examination

Jaundice progresses in a cephalo-caudal manner, from head to toe. The degree of yellowness is related to the level of serum bilirubin and related to the amount of bilirubin within the extravascular tissues. C

A basic physical examination of all babies must be undertaken by midwives during **at least the first two post-natal days, or at each post-natal contact.** ✓

When looking for jaundice by visual inspection:

- Check the naked baby in a warm room with bright, and preferably natural light
- Examine the sclerae, gums and blanched skin (useful across all skin tones). Note that the sclerae become yellow fairly quickly and lose their colour slowly. Consequently, they are not a good guide to serum bilirubin levels. C

Do not rely on visual inspection alone to estimate the bilirubin level in a baby with jaundice as this is unreliable.

In addition to assessing the jaundice clinically, the baby's behaviour should be assessed in consultation with the mother, eg:

- feeding pattern (whether waking for feeds) and frequency,
- degree of weight loss,
- urine volume and frequency.

6.6 Use of the jaundice meter

Midwives who have received appropriate training, particularly those who undertake neonatal examinations, may use the jaundice meter (transcutaneous bilirubinometer) to determine a transcutaneous bilirubin reading (TCBR). It is good practice to assess the jaundice level of all babies in whom there is concern particularly prior to discharge home, as the device offers a B

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more objective method of assessment of the level of jaundice. However, bilirubin levels should not be measured routinely in infants who are not visibly jaundiced.

The jaundice meter may be used by midwives or neonatal staff in the postnatal or neonatal ward areas, or in the community where there is access to such a device, for babies who fulfill the criteria listed in table 3. Interpretation of the TCBR should follow the algorithms in figures 1 and 2 (pages 8 and 9).

Table 3: Criteria for using the transcutaneous bilirubinometer device

- Gestation of baby \geq 35 weeks
- Age of baby > 24 hours
- Baby visibly jaundiced
- Baby not on phototherapy
- Competency training undertaken by user
- Daily calibration of machine undertaken in accordance with manufacturer's instructions

If a transcutaneous bilirubinometer is not available, measure the serum bilirubin. Serum measurements should also be used in the situations listed in table 4.

Table 4: Criteria for checking serum bilirubin (SBR) (ie for not using the TCBR):

- Baby < 35 weeks gestation corrected gestational age
- Baby < 24 hours old and visibly jaundiced
- Any baby whose bilirubin level is at, or above, the treatment threshold for their postnatal age, or is on phototherapy
- If haemolysis is the likely cause (DCT positive, known Rhesus isoimmunisation)
- If baby appears severely jaundiced (deep yellow colour, sole staining)
- Baby is clinically unwell (eg not feeding well, dehydrated)
- Baby needs blood tests other than SBR
- On any areas where there is bruising or discolouration
- If you are discharging a baby who is **significantly** jaundiced
- No jaundice meter available and baby visibly significantly jaundiced

7 When midwives should refer

1. Babies who are jaundiced and unwell **or** visibly jaundiced within the first 24 hours of life (risk factor #3) should be referred **urgently** for medical review (ideally within two hours) including serum bilirubin measurement. Babies in the hospital should be referred as outlined in figure 1 and in the community as defined in the procedure below in section 6.1, and in figure 2. **B**
2. Poor feeding, significant weight loss (>10%) and lethargy in the presence of jaundice requires immediate neonatal referral.
3. A TCBR measurement above > 250 at any time. **B**
4. A TCBR level which, when applied to the NICE threshold charts for hyperbilirubinaemia (table 5) would suggest the need for phototherapy (red columns in table 5). For babies in the community refer to the gestation-specific charts in [appendix 1](#). **B**
5. The presence of jaundice after 14-21 days of baby's birth (or 21 days if preterm).

7.1 Procedure for referral of jaundiced babies from the community

Refer to figure 2.

1. Babies requiring review for jaundice from the community require referral to the paediatric specialist registrar (SpR) (bleep 156-0002), in the following situations, as detailed in figure 2:
 - Early onset (<24 hours) jaundice – requires **urgent** review (ideally within 2 hours)
 - A TCBR at, or above, the phototherapy line suggesting the need for phototherapy. If phototherapy is needed, the baby will be admitted to the Paediatric Ward (C3).
 - If the baby is unwell and jaundiced at any time

Such babies will initially be seen in the emergency department (ED) for assessment.

2. Prolonged jaundice in term babies greater than 14-21 days (or pre-term infants >21 days) and less than 28 days old require referral to the neonatal registrar to arrange review in the baby clinic. If the baby is more than 28 days of age, refer to the paediatric team.

7.2 Repeated TCBR measurements

If an initial TCBR measurement falls in the amber category, then a repeat measurement will be required. If the repeat measurement is also in the amber category, then further measurements are not necessary, unless the measurement is rapidly increasing or is almost in the red category.

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Figure 1: Flow-chart for management of babies with neonatal jaundice in hospital

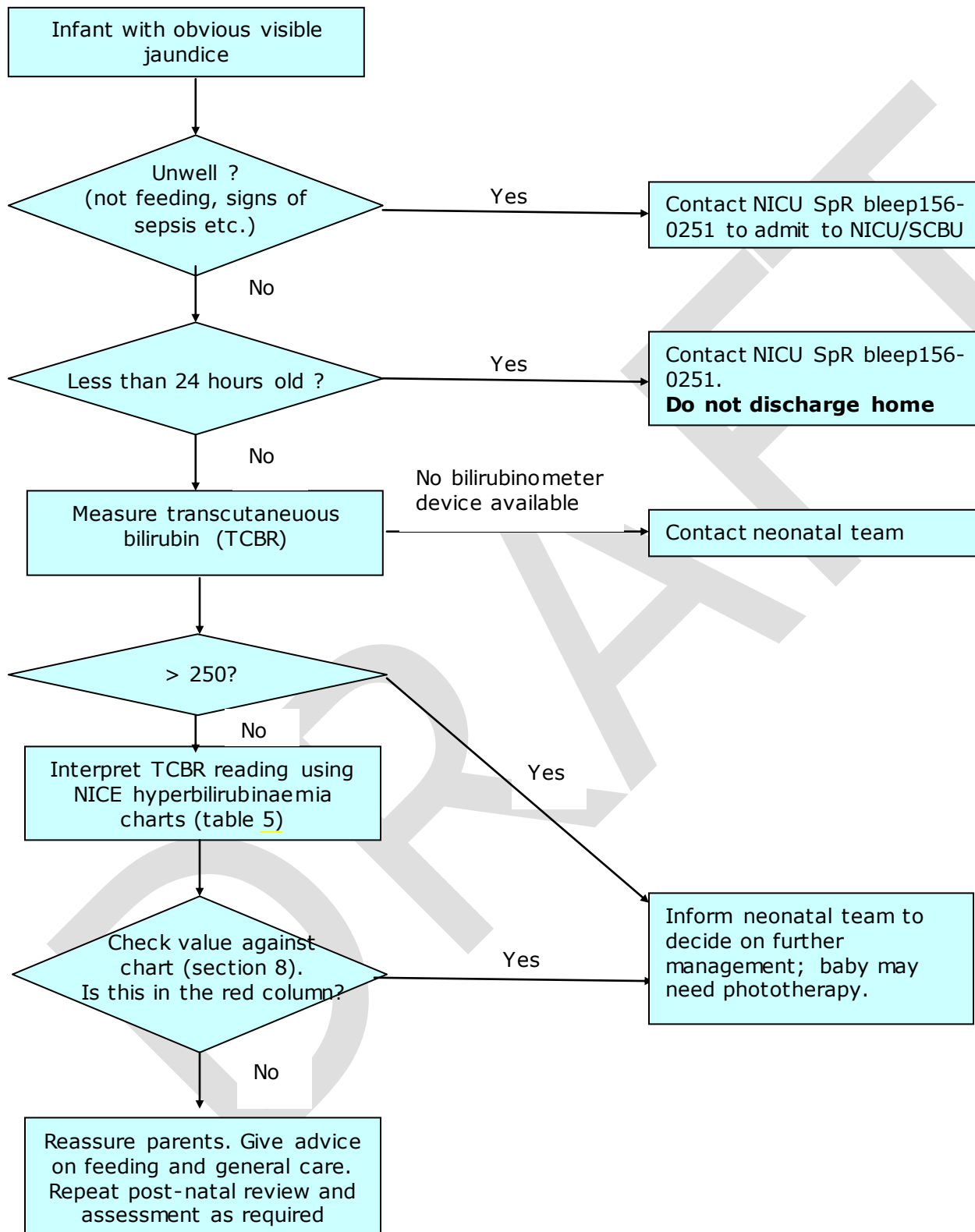
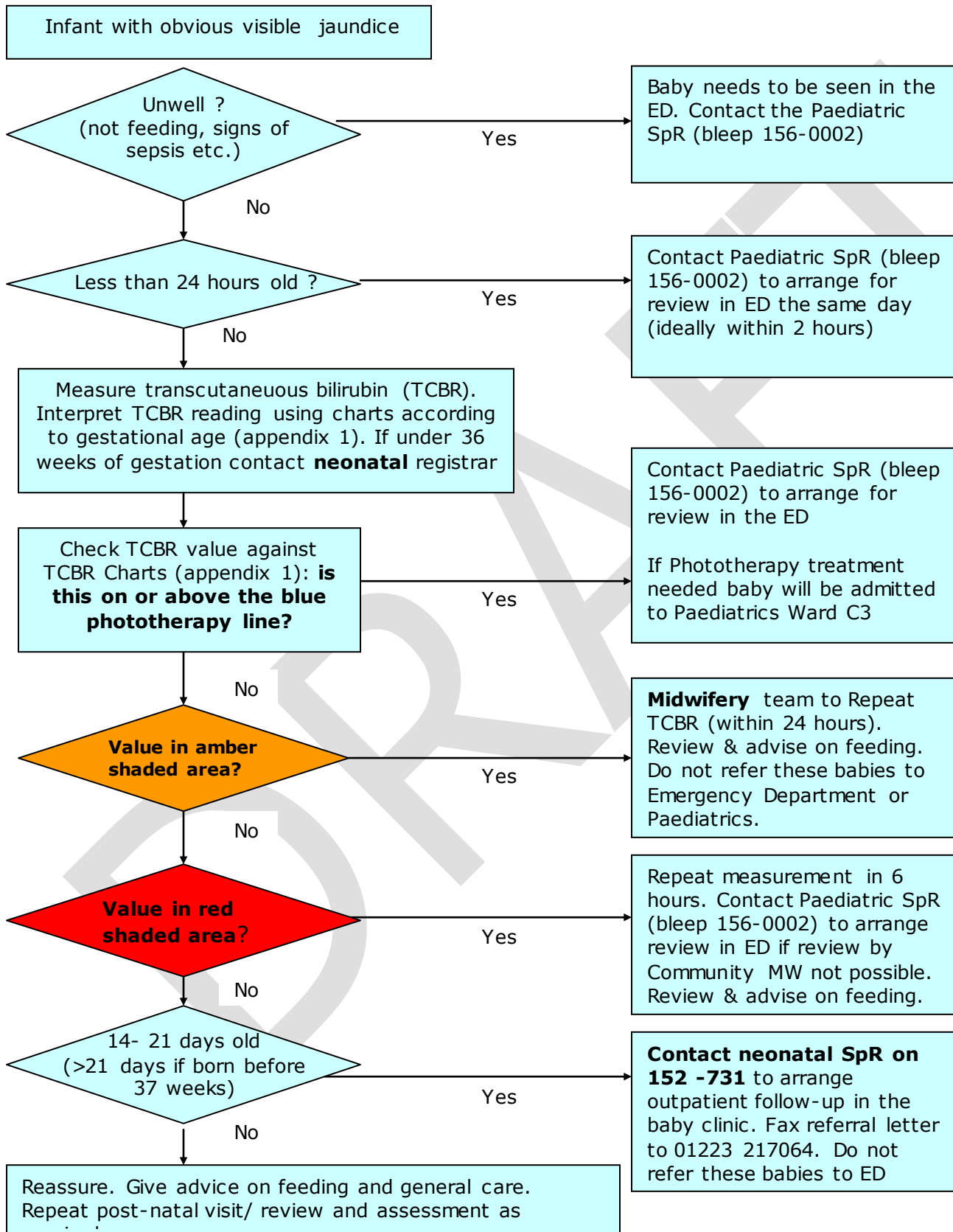


Figure 2: Management of babies with neonatal jaundice in the community



8 Other practice points in relation to the care of jaundiced babies

Ensure the baby is well hydrated by initiating early, regular feeds and supporting successful establishment of feeding, whether breast or artificial. This will promote gut motility, reducing the risks of dehydration and jaundice. Breast-feeding at least ten times per 24 hours will help the jaundiced baby eliminate the bilirubin from his/ her system. **B**

Carefully assess the baby for signs of lethargy, dehydration and/ or significant weight loss, and initiate swift intervention if there are any concerns. Sleepy babies may need to be woken to feed and the mother may need to stimulate the baby to ensure frequent feeding. **B**

A baby should have at least three to four stools per day by the third day of life, if breast-feeding. This ensures that bilirubin is eliminated from the baby’s body via the stools. If there are fewer stools than this, or the stools have not changed from meconium to the green transitional stools, then the baby should be stimulated to feed more frequently or more actively to help eliminate bilirubin. **C**

Ensure accurate documentation to ensure effective liaison between different midwives providing postnatal care, and to facilitate prompt referral to the appropriate health professional for optimum management. **✓**

9 Hyperbilirubinaemia and treatment

9.1 Babies in hospital

The treatment of hyperbilirubinaemia should be guided by the following tables (table 5 and table 6), or SBR charts adapted from the NICE guideline.

9.1.1 Babies ≥ 38 weeks

Table 5: Threshold management of babies 38 weeks gestation or more with hyperbilirubinaemia (taken from NICE, 2010)

Age (hours)	Bilirubin measurement (micromol/litre)			
0	-	-	>100	>100
6	>100	>112	>125	>150
12	>100	>125	>150	>200
18	>100	>137	>175	>250
24	>100	>150	>200	>300
30	>112	>162	>212	>350
36	>125	>175	>225	>400
42	>137	>187	>237	>450
48	>150	>200	>250	>450
54	>162	>212	>262	>450
60	>175	>225	>275	>450
66	>187	>237	>287	>450
72	>200	>250	>300	>450
78	-	>262	>312	>450

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	84	-	>275	>325	>450
	90	-	>287	>337	>450
	96+	-	>300	>350	>450
Action					
		↓	↓	↓	↓
In Hospital		Repeat bilirubin measurement in 6-12 hours (TCBR, if appropriate)	Consider phototherapy and repeat bilirubin measurement in 6 hours	Start phototherapy	Perform an exchange transfusion unless the bilirubin level falls below threshold while the treatment is being prepared

9.1.2 Treatment thresholds for infants <38weeks

The bilirubin should be measured in all babies who are at a treatment threshold. The Treatment Threshold Graphs should be used according to gestational age (in whole weeks) eg infant born at 35⁺² would use a 35 week graph and day 0 is the day of birth, see appendix 1-4 downloadable from the NICE guidelines website:

<http://guidance.nice.org.uk/CG98/treatmentthresholdgraph/xls/English>

9.2 Babies in the community

Refer to the charts in [appendix 1](#).

10 Monitoring compliance with and the effectiveness of the guideline

The use and effectiveness of this guideline will be monitored through the following two processes:

- Risk management: data will be collected on any incident relating to an adverse outcome related to the screening, assessment, management or failure to treat jaundice. This will be investigated according to the risk management & incident reporting process (see: [Perinatal services incident reporting and investigation procedure](#))
- clinical audit to look at compliance with the recommendations contained in this guideline regarding when, and how often, to perform screening for jaundice and appropriate care planning; and appropriate care during treatment.

Results will be fed back to the research midwife, document author and/ or relevant others, who will consider review, and initiate change(s) to the document and/ or practice, as appropriate.

11 References

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13. Thayyil S & L Marriott L (2005) Can transcutaneous bilirubinometry reduce the need for serum bilirubin estimations in term and near term infants? *Archives of Disease in Childhood*, 90: 1311-1312.

12 Associated documents

- [jaundice in newborn babies patient information leaflet](#)
- [perinatal services incident reporting and investigation procedure](#)
- [phototherapy guideline](#)

Equality and diversity statement

This document complies with the Cambridge University Hospitals NHS Foundation Trust service equality and diversity statement.

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Document management

Document control/change history					
Version	Author (s)	Owner	Date	Circulation	Comments
Draft 1	L Mitton, J Stokes, J Hurley	Women's Services: The Rosie Hospital (Maternity)	May 2004	A Curley; Cons Neonatologist; Polices & Procedures Group (Maternity); Obstetric Divisional Group	
Draft 2	J Ford & L Mitton	As above	July 2007	E Murdoch, Cons Neonatologist; Polices & Procedures Group (Maternity); Obstetric Divisional Group	Audit standards added.
Draft 3	J Ford	As above	Dec 2008	A D'Amore, Cons Neonatologist; Polices & Procedures Group (Maternity); Obstetric Divisional Group	Use of bilichex machine incorporated. Minor changes to procedure for referral of jaundiced babies in the community.
Draft 4	J Ford	As above	June 2009	A D'Amore, Cons Neonatologist; Policies & Procedures Group (Maternity); Obstetric Divisional Group	Bilichex machine changed to jaundice meter
Draft 5	J Ford & G Belteki	As above	Jan 2011	Policies & Procedures Group (Maternity); 2 community midwives & 2 hospital midwives; Perinatal Services Management Group	Significant update in line with NICE 2010. Screening & assessment process revised; use of TCBR measurement altered. Moved from low to high risk section.
Version 6	As above	As above	Oct 2011 - March 12	A D'Amore, Neonatal Consultant; L Poulter, Community development lead; P Heinz, Consultant Paediatrician; Policies & Procedures Group (Maternity); 2 community midwives & 2 hospital midwives; Perinatal Services Management Group	Minor changes to document to reflect timing of review if jaundiced, BF added to risk factor list on page 4 requiring 'extra' PN contact in first 48 hrs. Flow chart for referral updated; 2 flow charts now in document for hospital & community babies.
Version 7	J Ford	As above	Oct 12	A D'Amore, Neonatal Consultant; Policies & Procedures Group (Maternity); Perinatal Services Management Group	Section 7.2 added re no need to undertake more than 2 serial TCBR measurements if in amber category

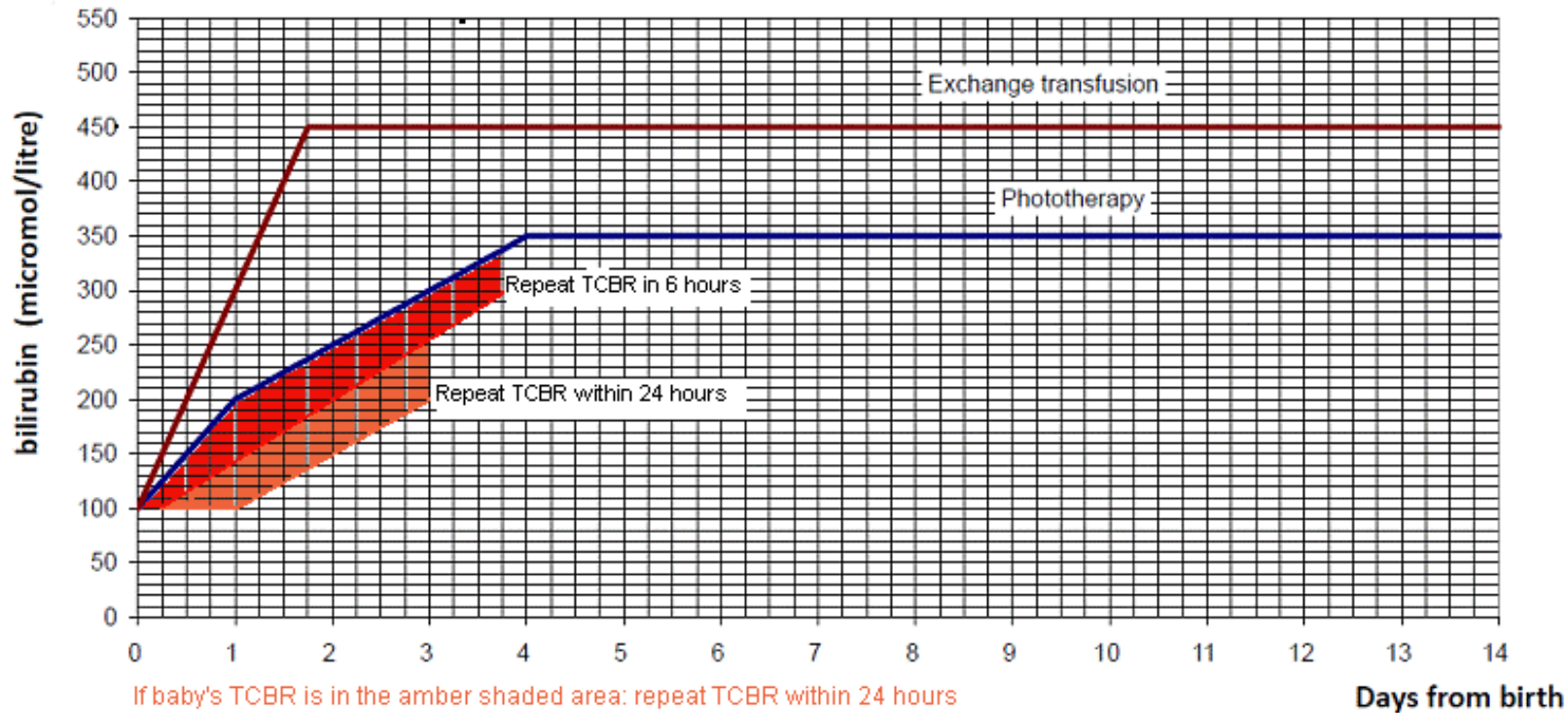
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Appendix 1- TCBR gestations



Transcutaneous Bilirubin Measurement (TCBR) in the Community

Gestation: **>= 38 weeks**

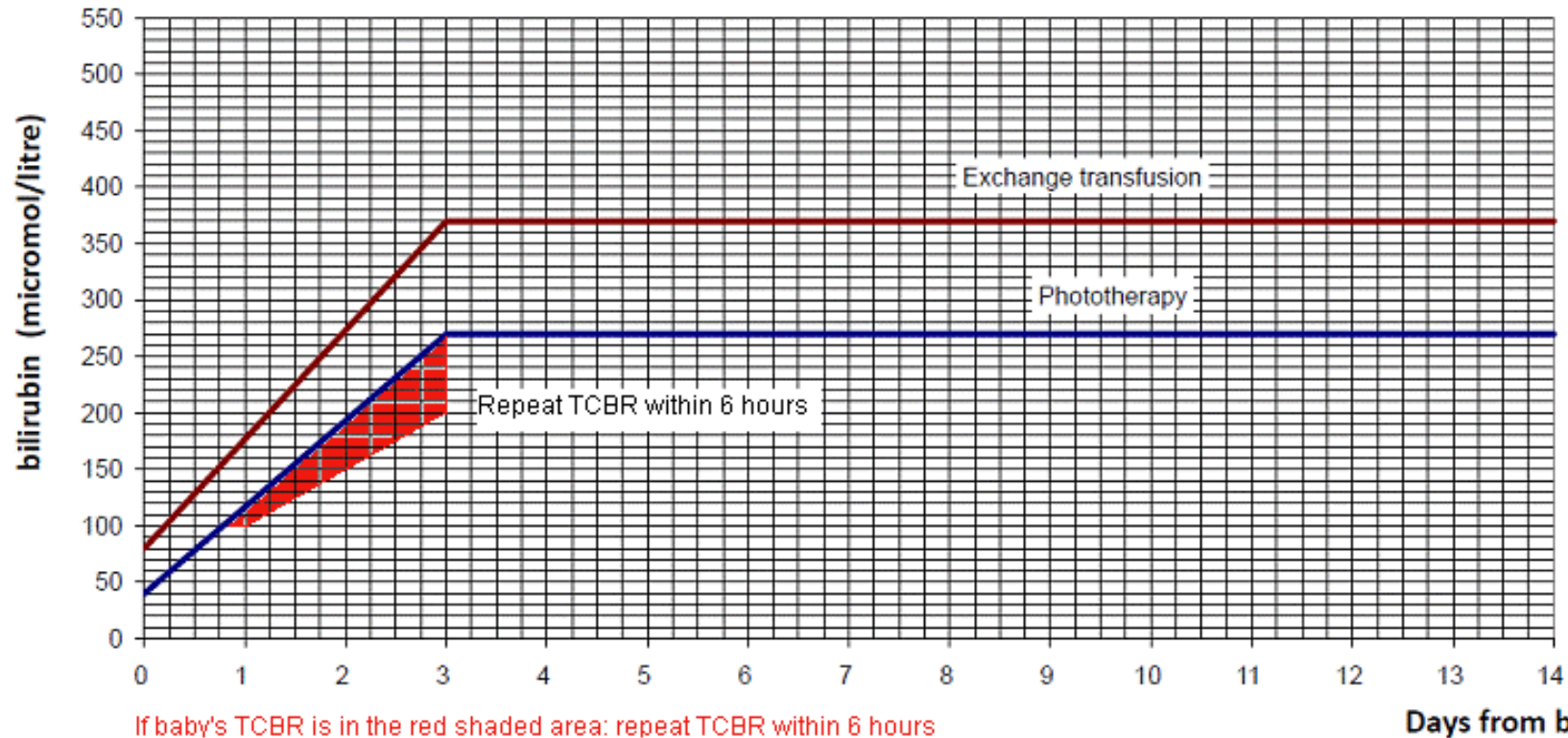


If baby's TCBR is in the amber shaded area: repeat TCBR within 24 hours
If baby's TCBR is in the red shaded area: repeat TCBR within 6 hours
If baby's TCBR is above the blue line: refer to paediatrics for phototherapy

Adapted from:
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Transcutaneous Bilirubin Measurement (TCBR) in the Community

Gestation: **37 weeks**

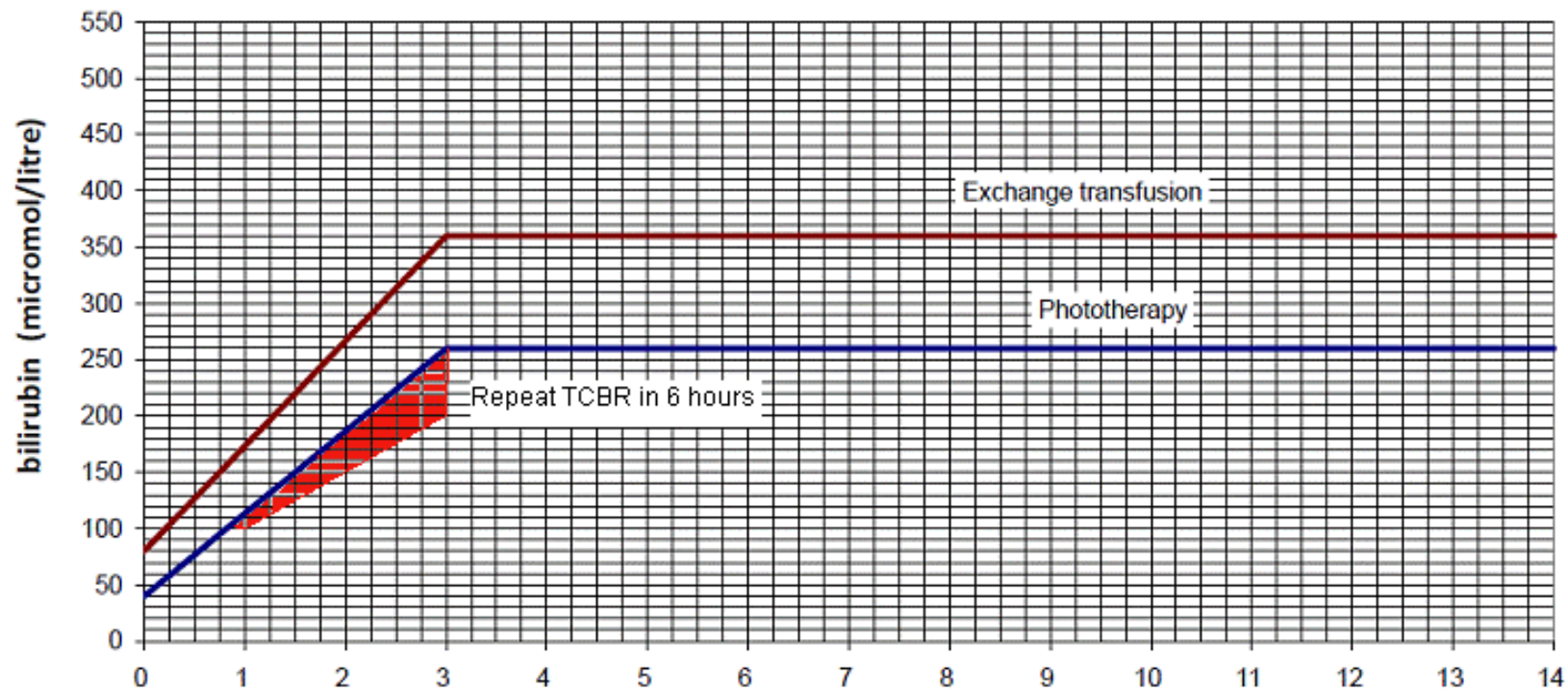


If baby's TCBR is in the red shaded area: repeat TCBR within 6 hours
If baby's TCBR is above the blue line: refer to paediatrics for phototherapy

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Transcutaneous Bilirubin Measurement (TCBR) in the Community

Gestation: **36 weeks**



If baby's TCBR is in the red shaded area: repeat TCBR within 6 hours
If baby's TCBR is above the blue line: refer to paediatrics for phototherapy

Days from birth

Adapted from:

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