Worcestershire Acute Hospitals NHS Trust

Management of Neonatal Jaundice

Key Document code:	WAHT-KD-015
Key Documents Owner:	Dr Viviana Weckemann Consultant Paediatrician
Approved by:	Neonatal Guidelines Review Meeting
Date of Approval:	16th August, 2024
Date of Review: This is the most current version and should be used until a revised document is in place	16th August, 2027

Key amendments

Date	Amendment	Approved By
2nd August 2019	Links to Neonatal Jaundice Charts added into document	Liza Harry
25th March 2021	Updated to clarify plotting of bilirubin on maternity Badgernet	Viviana Weckemann/ Anna Gregory
21st May 2021	Minor amendment in line with Badgernet.	Maternity Governance Meeting
November 2022	Document approved for 3 years with no amendments	Dr Gregory/ Neonatal Guidelines Review Meeting
August 2024	Prolonged jaundice pathway altered Double phototherapy clarified	Obstetric and Paediatric Governance meetings
16th August, 2024	Document approved	Maternity Governance
21st August, 2024	Document approved	Paediatric Governance

Hyperbilirubinaemia is extremely common and affects almost all newborn infants. When the bilirubin level exceeds 85 micromol/litre this results in clinical jaundice which affects 60% of term infants and even more preterm infants. Jaundice may be a sign of an underlying illness, and may itself lead to neurological damage in severe cases. While it is hoped that phototherapy would reduce the risk of kernicterus, there is no proof that it does so. It will reduce the need for exchange transfusion, which itself is a risky and potentially dangerous procedure.

Management of neonatal jaundice has been standardised with the publication of NICE Guideline 98, which sets out a standard approach to investigation and management of neonatal jaundice. This guideline is based on the current NICE Guidance, which is available on the following link: www.nice.org.uk/guidance/CG98

Treatment threshold graphs for each week of gestation are available in all relevant clinical areas. These graphs have been modified and improved for ease of use and should be the first choice method of recording the bilirubin results.

NNU will need charts from 27 – 38+ weeks; WR2117 to WR2128

TCU will need 34 – 38+ week charts; WR2124 to WR2128

PNW will need 36 – 38+ charts; WR2126 to WR2128

Neonatal Jaundice Graph 27 weeks
Neonatal Jaundice Graph 28 weeks
Neonatal Jaundice Graph 29 weeks
Neonatal Jaundice Graph 30 weeks
Neonatal Jaundice Graph 31 weeks

Neonatal Jaundice Graph 32 weeks
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Neonatal Jaundice Graph 36 weeks
Neonatal Jaundice Graph 37 weeks
Neonatal Jaundice Graph 38 weeks

Competencies Required

Any trained midwife, neonatal nurse or doctor who is responsible for the clinical assessment of newborn infants

This pathway will apply to all newborn infants cared for by staff employed by Worcestershire Acute Hospitals NHS Trust.

The evaluation of jaundice should include a thorough history and examination, looking particularly for evidence of haemolysis and the hydration status. The assessment should also include the following:

1. Review and record mothers blood group
2. If mum is group O, and the baby requires phototherapy for jaundice, request baby's group and Coombs test if not already done with cord bloods.
3. Check FBC if any suspicion of haemolysis; this is particularly relevant for jaundice within 24 hours of birth
4. Obtain urine for microscopy and culture only if suspicious of U.T.I.

For well babies bilirubin levels should be checked when the baby appears jaundiced clinically, with repeat levels as necessary until it is clear that the jaundice is not progressing (see the Threshold Table). The following babies are at greater risk of developing significant jaundice:

1. Babies of less than 38 weeks gestation
2. Babies whose sibling(s) have needed phototherapy
3. Babies whose mothers plan to exclusively breast feed
4. Babies who appear jaundiced within 24 hours of birth

All babies should be assessed clinically for jaundice at every opportunity during the first 72 hours.

Babies who are clinically jaundiced within 24 hours of birth must be investigated in hospital, with repeat bilirubin estimation until the level is stable or falling.

Babies with any of the above risk factors should have at least two assessments by a health professional within the first 48 hours. Increased risk factors should be documented on maternity Badgernet.

Babies with risk factors 1, 2 or 3 above, can continue to be discharged at 4–6 hours after birth if parents wish however careful arrangements are required to monitor these babies for jaundice in the community:

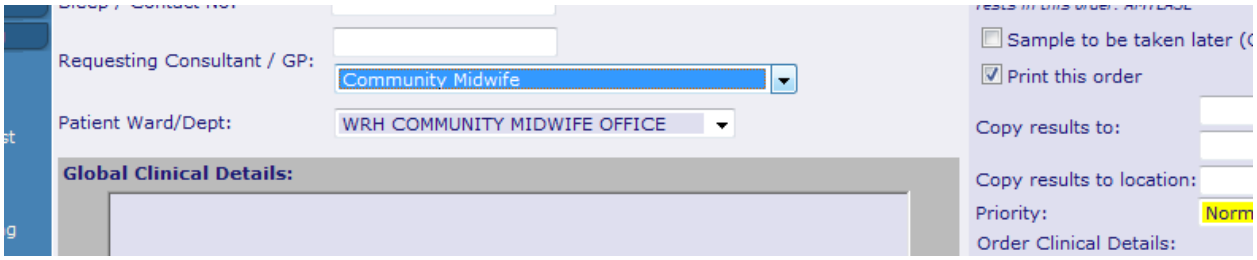
All babies should be assessed on the day after discharge.
If they are less than 24hrs of age at this first community assessment they should be reviewed the next day and then on Day 3 of life*.
If they are >24hrs of age at this first community assessment the next review can be on Day 3 of life*.

- The day of birth is Day 0, the next calendar day is Day 1. For example a baby born on 23rd Jan would be Day 3 on 26th Jan. This is the same as the day counting system used for the newborn blood spot screening test.

It is no longer acceptable to rely on visual inspection alone to estimate the bilirubin level in a jaundiced baby.

For babies born at 35 weeks or more, who are over 24 hours of age and less than 14 days old, the transcutaneous jaundice meter (bilirubinometer) is the method recommended by NICE. If this is unavailable, or the baby is less than 24 hours old or born at a gestation below 35 weeks, blood should be taken to measure the serum bilirubin. The transcutaneous jaundice meter (bilirubinometer) should not be used to assess jaundice on babies who have undergone or are undergoing phototherapy or who have undergone an exchange transfusion. Blood specimens will be required for these babies. Blood specimens will also be needed for any infant who requires phototherapy treatment, or if the transcutaneous measurement is over 250micromol/L.

Blood samples for babies in hospital should be requested on ICE under the relevant consultant and ward area. Babies at home should have “Requesting Consultant/GP” given as “Community Midwife” and “Patient Ward / Department” given as “Community Midwife Office”



For infants receiving intensive care at Worcester the bilirubin should be checked with each blood gas specimen using the analyser on the unit. However for those babies who require phototherapy the bilirubin level must be confirmed with a laboratory specimen.

Each bilirubin result (regardless of whether the sample is obtained via transcutaneous measurement or blood test) should be assessed against the threshold table (for babies => 38 weeks gestation; NICE do not provide a threshold table for less mature babies) and plotted on a chart appropriate for the gestation. Plot the measurement on the chart at the correct age in hours. The total bilirubin measurement should be plotted. However, if there is a raised conjugated component (>25 micromol/L) exclude underlying liver disease.

Decide whether the baby needs no intervention, repeat measurement after an interval, phototherapy, double phototherapy☼ or urgent plans for an exchange transfusion. Even if phototherapy is not required a repeat specimen 6 to 24 hours later may well be needed – see threshold table. Whenever a bilirubin measurement is made, there must be clear documentation in maternity Badgernet of the date and time of the measurement, the result and the action taken or plan made – for those babies in hospital, this needs recording in maternity Badgernet **AND** on the back of each bilirubin chart.

Our local policy is to move to a new Bilirubin chart as the baby’s gestational age advances. For example, a baby born at 37+4 would move onto a new chart at 72hrs of life, this would move his phototherapy treatment line up from 270 to 350 micromol/L. Maternity badgerNET bilirubin charts do not have this functionality and therefore remain the same as birth gestation regardless of corrected age. Community midwives should still plot Bilirubin on maternity BadgerNET charts and if the result plots above the treatment line this would prompt a call to the oncall paediatrician via switchboard on Bleep ‘0676’. If the paediatrician then plots the Bilirubin based on corrected gestational age and the baby doesn’t require phototherapy the midwife can document this on maternity BadgerNET.

All babies commencing phototherapy should have a repeat bilirubin performed 4 to 6 hours later to assess the response. It is essential that if the level is rapidly rising or is within 50 micromol/L of the exchange level you should not wait longer than 6 hours to repeat the bilirubin.

When the bilirubin is stable, it may be appropriate to repeat the level no sooner than the next day. This should ideally be done in the morning so that the result can be checked and further management plan formulated and implemented during daytime hours. However, if the bilirubin level is very high, it would be prudent to repeat the level every 6-12 hours, so as not to miss a slow but continued increase. Once the bilirubin is at least 50 micromols/L below the phototherapy level phototherapy can be stopped. The level should also be rechecked once more 12 to 24 hours after discontinuing phototherapy. It may not be necessary for the baby to remain in hospital for this as the follow up specimen could be obtained at home by the community midwifery team.

☼ Double phototherapy is most effectively achieved by nursing the baby under two blue light phototherapy units “double phototherapy” (rather than using a biliblanket plus overhead light source)

Babies must not be discharged from Community Midwife care until either
a) visible jaundice has resolved completely or
b) a split bilirubin has been checked at 14 to 21days of age and the result communicated to parents (see prolonged jaundice guidance below)

This link will open a parent information leaflet which can be printed off to give to parents of any infant who requires phototherapy.

http://www.nice.org.uk/nicemedia/live/12986/48607/48607.pdf

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Here are the threshold table and graph for babies of 38 weeks or above

Age in hours	Bilirubin measurement (micromol/litre)				
0-5	–	-	-	-	> 100
6-11	-	-	>100	> 125	> 150
12-17	-	-	>100	> 150	> 200
18-24	-	-	>100	> 175	> 250
25-29	>100	-	>150	> 200	> 300
30-35	> 112	-	>162	> 212	> 350
36-41	> 125	-	>175	> 225	> 400
42-47	> 137	-	>187	> 237	> 450
48-53	> 150	-	>200	> 250	> 450
54-59	> 162	-	>212	> 262	> 450
60-65	> 175	-	>225	> 275	> 450
66-71	> 187	-	>237	> 287	> 450
72-77	> 200	>250	-	> 300	> 450
78-83	–	>262	-	> 312	> 450
84-89	–	>275	-	> 325	> 450
90-95	–	>287	-	> 337	> 450
96+	–	>300	-	> 350	> 450
Action	↓	↓	↓	↓	↓
	Repeat bilirubin measurement in 6–18 hours **This may require admission to hospital**	Discuss with Paediatric Registrar, usually safe to repeat in 24hrs.	Repeat bilirubin measurment in 6 hours and consider phototherapy **This will require admission to hospital**	Start phototherapy (these values plotted represent the phototherapy line on the jaundice charts)	Perform an exchange transfusion unless the bilirubin level falls below threshold while the treatment is being prepared
Colour zone on chart	**GREEN**	**GREY**	**RED**		

Treatment threshold graph for babies with neonatal jaundice

NHS
National Institute for
Health and ClinicalExcellence

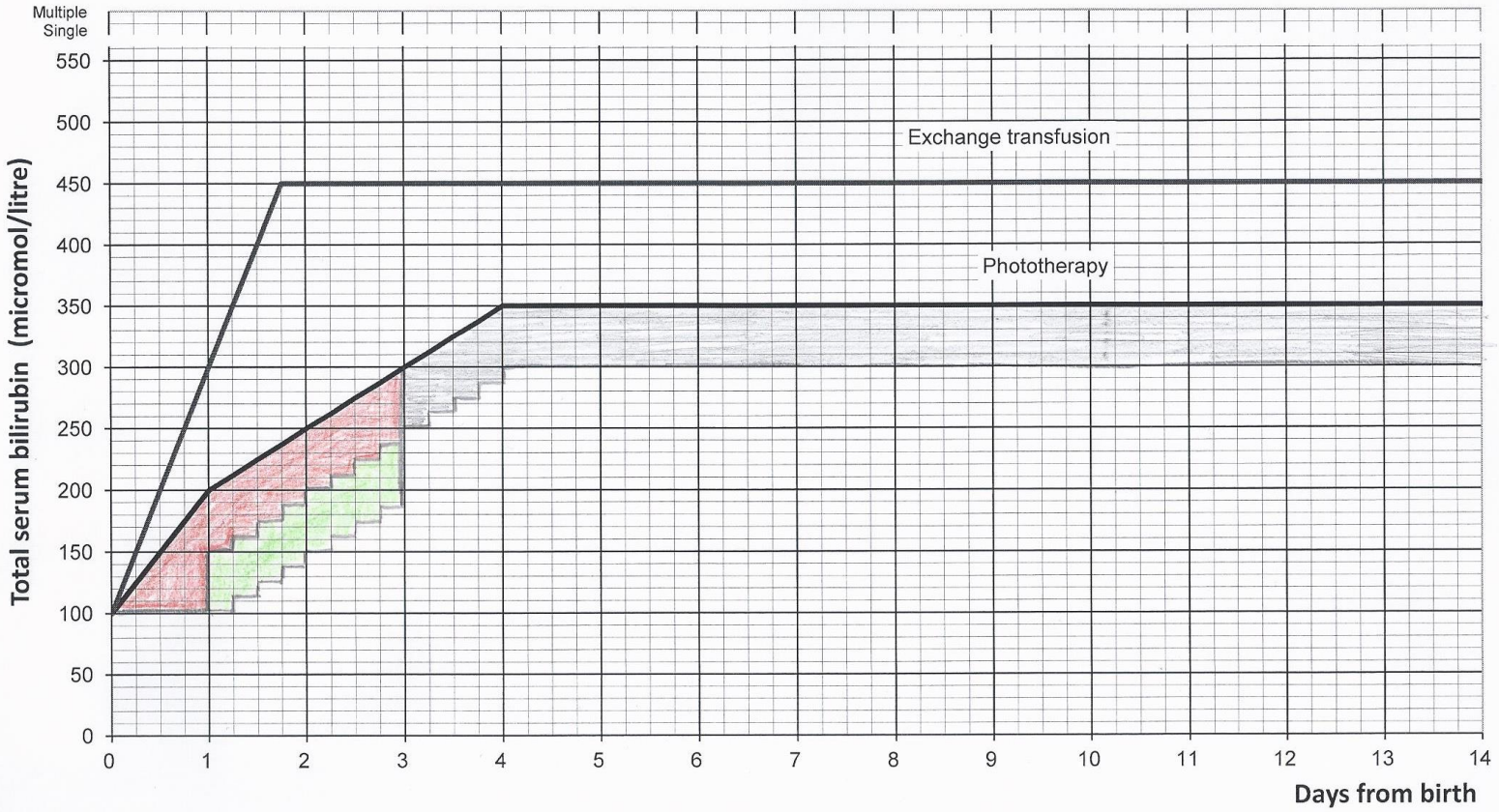
Baby's name _____ Date of birth _____

Hospital number _____ Time of birth _____ Direct Antiglobulin Test _____

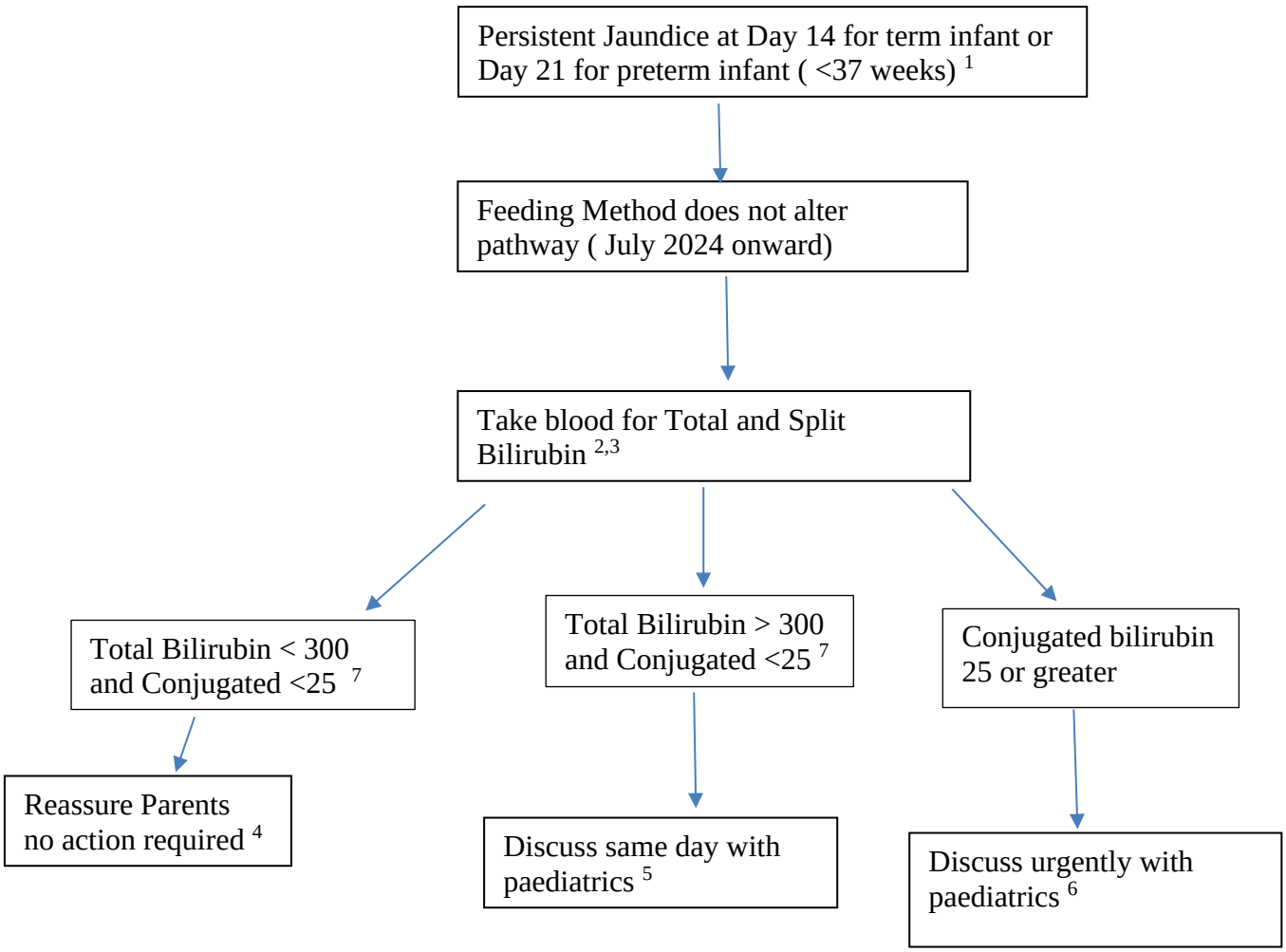
Shade for phototherapy Baby's blood group _____ Mother's blood group _____

Click below and choose gestation

>=38 weeks gestation



Management of prolonged jaundice in well babies



*****It is the responsibility of the referring Professional (in most cases the community midwife) to ensure that results are reviewed and actioned as appropriate.**

Notes

1. If there is concern that baby is unwell refer to GP or Paediatric Registrar as appropriate. The tests outlined in this guidance will still be necessary but they are not a substitute for clinical assessment by an experienced doctor or advanced nurse practitioner.

2. Blood for a split bilirubin may be taken by the community midwife. If this is not possible the Hospital Paediatric Clinic should be contacted for help. A split bilirubin measures Unconjugated and conjugated bilirubin, the two values added together constitute the total bilirubin level.

   Request as Community Midwife on ICE please – see screen shot above on page 3.

3. This volume of blood (approx.0.5ml l)should be obtained by community staff, but they may refer the baby to children's clinic for the blood test to be obtained if there are collection difficulties. The split bilirubin should be requested as Community Midwife as above. The visit to children's clinic is **purely for blood testing** usually by a paediatric nurse – no clinical assessment of the baby should be assumed. If there is concern that the baby is unwell (eg poor feeding, breathlessness, floppy, excessively sleepy, diarrhoea, pallor, poor weight gain etc) this should be addressed as in note 1 above.

4. These babies may be assumed to have "Prolonged Physiological Jaundice" It is more common in breast fed infants. It is a harmless condition. It can persist for a few months after birth. It often appears to fluctuate in intensity from day to day. No further testing is required as long as baby remains well and jaundice does not deepen significantly.

5. This is an unusual situation and baby will require further testing, preferably within 48hrs. Remember that any value over 350 micromol/litre requires urgent phototherapy **at any age.**

6. These babies must be assumed to have liver disease and need urgent clinical and laboratory assessment (especially clotting screen – risk of intracranial haemorrhage)

7. Conjugated/Total Bilirubin % will be reported by the laboratory but it is not important and can be ignored in this context. We are only interested in the actual level of Conjugated Bilirubin.

Monitoring

STANDARDS	%	CLINICAL EXCEPTIONS
Term infants with prolonged jaundice should be referred and seen by 3 weeks of age	100%	none
Compliance with phototherapy guideline	95%	Babies over 14 days old
Preterm infants less than 37 weeks should be seen and assessed by 4 weeks of age	100%	none
All jaundiced babies over 14 days old must have split bilirubin measured	100%	none

How will monitoring be carried out?	Clinical review of all exchange transfusions Use of NICE audit tool
Who will monitor compliance with the guideline?	Paediatric medical and midwifery staff Paediatric Clinical Governance Committee