Key Points

- Jaundice is common, usually harmless, and typically requires no treatment
- Smaller, less mature babies, and those with isoimmunisation (DAT+ve) are at higher risk of jaundice and its sequelae
- Jaundice <24 hours of age is considered a neonatal emergency
- Hyperbilirubinaemia can be assessed transcutaneously (TcB) and/or with a total serum bilirubin level (SBR)
- SBR determines the need for treatment in babies with unconjugated hyperbilirubinaemia
- Treatment of high SBR is determined by age in hours, total SBR, birth weight, gestation and presence of risk factors on one of two ‘Treatment of hyperbilirubinaemia in newborn babies’ charts (Appendix 2):
  - Babies ≥38 weeks’ gestation and ≥2500 g, without risk factors for serious jaundice (MR/1813F)
  - Babies 35-37+6 weeks’ gestation or <2500g or who have risk factors for serious jaundice (MR/1813E)
- Treatment is with single or multiple unit phototherapy (fibre optic and/or overhead), and rarely with exchange transfusion
- DAT+ve babies are either admitted to NICU for immediate treatment and monitoring (Rhesus isoimmunised), or, for those at less risk (ABO incompatibility), monitored in maternity using 12-hourly TcB screening, with SBR testing if visibly jaundiced
- Babies whose SBR reached exchange transfusion level need formal audiology review at 8-months of age
- Babies only requiring ongoing admission for single unit phototherapy should be considered for Home Phototherapy, see guideline
- Some babies with jaundice and haemolysis are at risk of late anaemia and require close post-discharge follow-up (Section 4.8).
- If jaundice is not improving/worsening at >14 days, further investigations should be initiated for prolonged unconjugated hyperbilirubinaemia (Section 4.9).
- Conjugated SBR >30 µmol/L requires prompt referral to the neonatal RMO for investigation (Section 4.10).

1. **Purpose**

   This clinical guideline outlines the management of jaundice (hyperbilirubinaemia) in babies born at ≥35 completed weeks gestation or more, in Neonatal Intensive and Special Care, Maternity, Women’s Emergency Care at The Women’s and in the community.

   Where processes differ between campuses, those that refer to the Sandringham campus are differentiated by pink text or have the heading Sandringham campus.

2. **Definitions**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>NICU</td>
<td>Neonatal Intensive Care</td>
</tr>
<tr>
<td>SCN</td>
<td>Special Care Nursery</td>
</tr>
<tr>
<td>RC</td>
<td>red cell</td>
</tr>
<tr>
<td>HCT</td>
<td>haematocrit</td>
</tr>
<tr>
<td>SBR</td>
<td>total serum bilirubin</td>
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<tr>
<td>G6PD</td>
<td>glucose-6-phosphate dehydrogenase</td>
</tr>
<tr>
<td>TcB</td>
<td>transcutaneous bilirubin</td>
</tr>
</tbody>
</table>
3. Responsibilities
Medical, nursing and midwifery staff caring for babies at the Women's and in the community.

4. Guideline

4.1 Background and importance of jaundice
Approximately 60% of healthy term newborns develop ‘physiological jaundice’ during the first week of life. A few have a pathological cause and are more likely to need treatment.

Jaundice presenting in the first 24 hours of life is always pathological and is considered a neonatal emergency. Prolonged jaundice lasting beyond 14 days in a term infant requires additional investigation (Section 4.9).

Very jaundiced babies are at risk of developing acute bilirubin encephalopathy; this occurs if the total serum bilirubin (SBR) rises too rapidly (>8.5 µmol/L/hr) or is very high (>360 µmol/L). Clinical features include: poor feeding, lethargy, abnormal posture, irritability, opisthotonus and seizures.

Kernicterus is the long-term consequence of acute bilirubin encephalopathy comprising athetoid cerebral palsy, sensorineural deafness, seizures and cognitive impairment. The treatment for very high or rapidly rising bilirubin levels is NICU admission for multiple unit phototherapy / exchange transfusion.

It is important to recognise babies with pathological jaundice early to:

- Prevent serious hyperbilirubinaemia (> 360 µmol/L)
- Prevent acute bilirubin encephalopathy and subsequent kernicterus
- Avoid an exchange transfusion
- Minimise separation of mother and baby
- Support breastfeeding.

4.3 Risk factors for serious jaundice
Physiological and pathological factors increase the likelihood of elevated bilirubin levels in the newborn period. These need to be considered and investigated in cases of early (<24 hours), rapidly rising, prolonged (>14 days in infants >35 weeks gestation), or predominantly conjugated hyperbilirubinaemia (Section 4.10).

Major risk factors:

- Babies < 2500 g or < 38 weeks’ gestation
- DAT positive isoimmunisation (ABO blood group incompatibility, Rhesus isoimmunisation, other red blood cell antibodies), or previous sibling treated with phototherapy for haemolytic disease
- Family history of red cell defects e.g. G6PD deficiency, hereditary spherocytosis
- Significant (extensive) bruising.

Minor risk factors requiring close observation:

- Jaundice within the first 48 hours
- Previous sibling treated with phototherapy
- Macrosomia in neonate born to a diabetic mother
- Weight loss greater than 10% of birth weight
- Cephalhematoma.

DAT: direct antiglobulin titre
IAT: indirect antiglobulin titre
FBE: full blood evaluation
Rh: Rhesus
EBM: expressed breast milk
NHITH: Neonatal Hospital in the Home
PNCITH: Postnatal Care in the Home
4.4 **Assessment of jaundice**

Assessment of jaundice may be by transcutaneous screening or formal SBR measurements.

**Screening with transcutaneous bilirubinometry (TcB)**

Jaundice is usually clinically visible when the SBR is >100 µmol/L (but higher in dark-skinned or very plethoric babies) and there is a normal progression of the depth of jaundice from head to toe as the SBR rises. However, visual assessment alone is inaccurate, such that objective testing with transcutaneous bilirubinometry (TcB) is recommended.

TcB is a non-invasive technique used to screen babies who have not been treated with phototherapy, to determine the need for a formal SBR level.

TcB is used routinely to screen babies who are

a) visibly jaundiced if ≥ 35/40 and > 24 hours of age,
b) DAT positive and <24 hours old if not visibly jaundiced, or
c) at time of their newborn screen.

SBR should be performed if TcB is above the set cut-off level and when a warning TcB level is displayed. Link to procedure: [Jaundice - Transcutaneous Bilirubinometry Procedure](#)

**Serum bilirubin level**

SBR testing is the gold standard test for hyperbilirubinaemia.

Total SBR consists of unconjugated bilirubin plus conjugated bilirubin levels. Total bilirubin is used to determine management in cases of predominantly unconjugated hyperbilirubinaemia.

SBR must be performed where there is any doubt or concern about the bilirubin level, where the baby has previously received phototherapy and in any baby where the level is thought to be very high (e.g. TcB warning level seen). A result is normally available within an hour of reaching the laboratory. **An unexpectedly very high SBR and warning TcB levels must be treated with phototherapy whilst a confirmatory sample is awaited.**

SBR from capillary, venous or arterial samples are the same and all sampling techniques are acceptable. Samples obtained out of hospital must be protected from light (by covering with foil during transportation) and must reach the Pathology laboratory for processing within four hours. Link to guideline: Jaundice – Assessment of Babies in the Community

Assessment of pathological jaundice should include:

- SBR
- FBE (include HCT and blood film for haemolysis, spherocytes, etc)
- Blood group
- Direct antiglobulin (DAT) titre (Coombs’ test)
- Consideration of G6PD deficiency in babies of Mediterranean, African or Asian ethnicity
- Mothers blood group, Rh status and indirect antiglobulin titre (IAT)

**4.5 Management of hyperbilirubinaemia**

Management is primarily determined by postnatal age in hours, and by the total SBR level.

Investigations and frequency of repeat SBR testing are determined by the baby’s condition, the SBR level in relation to the baby’s age and whether treatment for jaundice is required.

Always consider whether sepsis may be a factor.

Babies with moderately raised SBR levels will not require treatment; those with higher levels may need single or multiple unit phototherapy, and those with very high or rapidly rising levels may need exchange transfusion.

Sunlight is not a treatment for jaundice.

Management of jaundice under specific situations are outlined below.
Isoimmunisation

Cord blood is routinely tested for group and DAT in babies born:

- to Rhesus (Rh) negative mothers
- to mothers with red cell antibodies
- below 37 completed weeks’ gestation

A plan for the baby will be documented in the maternal antenatal history and in the neonatal admissions email inbox (“NeoAd”) for women with known alloimmunisation.

A visibly jaundiced baby who is DAT positive should have an urgent SBR performed.
Pathology will inform neonatal medical staff of all babies with positive DAT results.

There are 2 management pathways for the possible scenarios:

1. Baby is DAT positive, and there is maternal isoimmunisation with an antibody which may cause severe Haemolytic Disease of the Newborn (-D, -C, -c, -E, -e, -K, -k, -Fy\textsubscript{a}), at a significant titre (IAT > 1:16). Baby is isoimmunised and at risk of Haemolytic Disease of the Newborn
   - Admit baby to NICU for immediate SBR, FBC, DAT, single/multiple phototherapy and 6-hourly SBR monitoring

2a. The baby is DAT positive, and there is maternal isoimmunisation with an antibody which usually causes mild Haemolytic Disease of the Newborn (-C\textsubscript{w}, -Fy\textsubscript{b}, -Jk\textsubscript{a}, -Jk\textsubscript{b}, -Jk\textsubscript{3}, -S, -s, -Ge\textsubscript{a}). Baby is isoimmunised, but these antibodies are less likely to cause severe jaundice, OR

2b. The baby is DAT positive, without known maternal isoimmunisation. Most likely due to ABO-incompatibility, or passive transfer of Anti-D from an Rh negative mother who received anti-D prophylaxis. ABO incompatibility is common, typically mother is blood group O and baby is A or B. Jaundice is typically visible on day 1-2. Exchange transfusion is rarely needed. DAT is occasionally negative in ABO incompatibility. Other pathologies e.g. G6PD deficiency may coexist with a positive DAT
   - If there is no visible jaundice, the baby can be monitored in the maternity ward, with 12-24 hourly TcB screening which
   - should be discussed with the Neonatal RMO
   - An SBR should be performed if there is any visible jaundice in the first 24 hours of life, and TcB thereafter if visibly jaundiced.

Phototherapy

Phototherapy treatment with blue light photo-isomersises bilirubin into a form that is water soluble, and more readily excretable in urine and stool.

Phototherapy can be delivered using an overhead light (NICU only) or by a fibre optic device (NICU, maternity and at home). A single light source usually provides sufficient irradiance to treat hyperbilirubinaemia in most jaundiced babies. When multiple unit phototherapy (NICU only) is required additional units may be a combination of overhead and fibre optic devices.

Link to PGP: [Jaundice - Phototherapy at home](#)

Parents should be made aware of, and provided with, the [Jaundice and your Newborn Baby](#) information sheet.

Immunoglobulin

Intravenous immunoglobulin may be considered in babies with isoimmunisation (Rhesus or ABO incompatibility) to avoid an exchange transfusion, when the SBR continues to rise by >8.5 micromol/L per hour despite multiple unit phototherapy.

Exchange transfusion

Exchange transfusion is reserved for babies with very high or rapidly rising SBR levels, ~ 5/ year at the
Guideline

Jaundice (Hyperbilirubinaemia) in Newborn Babies ≥ 35 Weeks Gestation

Women’s. It refers to the replacement of the majority of the baby’s circulating blood volume with RCs. It is a high risk procedure with significant morbidity and mortality.

Most exchange transfusions are performed in babies with pathological jaundice from Rh isoimmunisation, other blood group incompatibilities, red cell enzyme defects, and rarely ABO incompatibility.


Hearing tests following hyperbilirubinaemia

Formal audiology assessment at 8 months of age is recommended for babies whose SBR reached exchange transfusion level, whether or not they received an exchange transfusion. If the baby passes the newborn hearing screen, then either parents are advised to self-refer or the Maternal and Child Health Nurse refers the baby for audiology assessment. If the baby meets ‘refer’ criteria on the newborn hearing screen, then the Victorian Infant Hearing Screening Program service refers the baby for formal audiology assessment.

4.6 Jaundice in the first 24 hours of life

This is a medical emergency due to the risk of developing acute bilirubin encephalopathy and the need to avoid an exchange transfusion. The aetiology is always pathological, urgent neonatal medical assessment is required and a Neonatal MET call should be initiated. Admission to NICU is indicated if phototherapy is required.

A jaundiced baby <24 hours old in the community should be referred immediately to the Women’s and present to NICU for assessment by the Neonatal RMO / Fellow.

4.7 Unconjugated hyperbilirubinaemia between 24 hours and 14 days of age

The Postnatal Care in the Home nurse/midwife assesses, monitors and investigates jaundice in babies at home (Jaundice – Assessment of Babies in the Community).

Refer to Appendix 1: Treatment of hyperbilirubinaemia in newborn babies ≥ 35 weeks gestation - Flowchart

TcB is used as a screening test to determine the need for SBR testing in babies ≥35 weeks' gestation:

- who are >24 hours of age, visibly jaundiced, and neither receiving, nor previously received phototherapy, or
- who are DAT positive, at risk of significant jaundice but who are not visibly jaundiced and who may be <24 hours of age. N.B. All TcB results in the first 24 hours of life should be discussed with the Neonatal RMO
- at 48 hours of age, at the time of their newborn screening test, either prior to discharge or at home,

Formal SBR level must be measured if:

- the baby is receiving, or has previously received, overhead phototherapy or
- the baby is <24 hours of age with visible jaundice
- the TcB is above the level shown in the table below, or a warning level is displayed

<table>
<thead>
<tr>
<th>Age</th>
<th>Babies ≥ 38 weeks gestation and ≥ 2500 g</th>
<th>Babies 35 – 37th weeks gestation or &lt; 2500 g</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TcB (µmol/L)</td>
<td>TcB (µmol/L)</td>
</tr>
<tr>
<td>&lt; 24 hrs*</td>
<td>Perform SBR if visibly jaundiced</td>
<td></td>
</tr>
<tr>
<td>24 – 48 hrs</td>
<td>200</td>
<td>150</td>
</tr>
<tr>
<td>49 – 72 hrs</td>
<td>230</td>
<td>190</td>
</tr>
<tr>
<td>73 – 96 hrs</td>
<td>260</td>
<td>220</td>
</tr>
<tr>
<td>&gt; 96 hrs</td>
<td>290</td>
<td>250</td>
</tr>
</tbody>
</table>

If first TcB is within 20 µmol/L below this value it should be repeated in 24 hrs

If any TcB is ≥ 300 µmol/L (or a warning level is displayed e.g. -0- or 000 or - - -), send an urgent SBR, blood group and DAT (if not already done) and notify the neonatal medical officer about need to commence phototherapy whilst awaiting SBR result

*If TcB used to screen DAT +ve baby <24 hrs old - discuss result with Neonatal RMO

An SBR should be taken as indicated by the TcB result, or if there is a significant change in depth of jaundice
from a previous observation, or a significant change in the infant's behaviour (alertness; frequency, effort and duration of feeding) or condition (weight, urine output, stool frequency and colour).

The SBR result should be plotted on the appropriate hyperbilirubinaemia treatment chart and placed in the baby's medical history.

Appendix 2: Treatment of hyperbilirubinaemia in newborn babies born ≥ 38 weeks gestation and ≥ 2500 g, without risk factors for serious jaundice (MR/ 1813F) BLUE

Appendix 3: Treatment of hyperbilirubinaemia in newborn babies born at 35–37+6 weeks gestation or < 2500g or who have risk factors for serious jaundice (MR/ 1813E) RED

**Monitoring hyperbilirubinaemia and treatment with phototherapy at 24 hrs-14 days**

All babies being treated for jaundice in the maternity wards or at home should be under neonatal medical care. Decisions regarding starting, stopping and altering treatment should be jointly made between the neonatal medical and maternity ward/PNCITH teams.

**Monitoring jaundice prior to phototherapy treatment**

Visibly jaundiced babies should have their TcB checked 12 - 24 hourly. In babies who are 35 – 37+6 weeks’ gestation, <2500 g, or who have a risk factor for serious jaundice, consider need for more frequent testing e.g. 6-hourly TcB.

A single SBR, taken in the first 96 hours of life, which is within 40 micromol/L of the phototherapy treatment level, should be reassessed within 24 hours using TcB, and SBR if indicated.

**Commencing phototherapy and monitoring response**

Fibre optic or overhead (NICU only) phototherapy should be commenced according to the appropriate treatment graph. Babies at home who require single unit phototherapy may be treated at home if otherwise well, or in the maternity wards. The SBR should be rechecked at least daily once on phototherapy (in maternity wards at ~06:00 so that the result is available by 08:00 to facilitate workflows and discharges).

Most babies with uncomplicated physiological jaundice usually only require a brief period of phototherapy treatment. It is very unusual to require phototherapy beyond the first week unless there is a pathological condition, or they are preterm.

If single unit phototherapy is the only reason for ongoing RWH admission, and the mother and baby fulfill appropriate criteria, then Home Phototherapy should be considered ([Jaundice - Phototherapy at Home](#))

**Escalating phototherapy**

Babies with rapidly rising SBR levels:

- rate of rise > 8.5 micromol/L per hour (~ 50 micromol/L in 6 hrs) prior to phototherapy or
- rise of > 50 micromol/L in 24 hrs (or equivalent) during single unit phototherapy and
- babies with very high SBR levels (within 50 micromol/L of exchange level) should be discussed with the Neonatal Fellow/Consultant. If the decision is to escalate treatment the baby will require admission to NICU for multiple unit phototherapy and consideration for exchange transfusion.

**Reducing phototherapy**

When the SBR is more than 50 micromol/L below the exchange level, the number of phototherapy units can be reduced. Once the baby only requires single unit phototherapy the baby can return to the maternity wards and Home Phototherapy may be considered.

**Stopping phototherapy and assessing for rebound**

Consider stopping phototherapy when the SBR is below the treatment level; definitely stop phototherapy when the SBR is 50 micromol/L below the treatment level. Repeat SBR should be done 24 -48 hours after ceasing phototherapy. Some rebound is expected (about a 10% rise).

If the repeat SBR is static or falling no further SBR levels are needed.

If the repeat SBR is rising then another repeat level should be done 24 hours later. If that repeat SBR has risen
to above the treatment threshold consider restarting phototherapy; if it is static or falling no further SBR levels are needed.

**Restarting phototherapy**

Restart phototherapy if the SBR is clearly above the treatment threshold (e.g. rebound >15%, or rate of rise greater than expected for the day of life), or the baby is losing weight or not feeding well and <14 days old.

Well babies who need to recommence phototherapy may be considered for phototherapy at home, following NHITH referral and parental education.

If the baby is >14 days old the Neonatal RMO / Fellow should be contacted for consideration of further investigations and / or referral to the Newborn Follow-Up Clinic.

**4.8 Discharge and follow-up of jaundiced babies with haemolysis**

Infants with significant haemolytic disease (Rhesus isoimmunisation) often develop anaemia in the first month of life after the initial management for hyperbilirubinemia, and frequently require RC transfusion. See Blood - Exchange Transfusion– Newborn Intensive Care.

Most infants with haemolysis secondary to ABO incompatibility and other forms of alloimmunisation will not have significant haemolysis (Hb <130g/L or rapidly declining Hb during hospitalisation) leading to late anaemia.

- ABO incompatibility (whatever the strength of the DAT) that is not treated with phototherapy or is treated with single unit phototherapy does not need follow-up
- ABO incompatibility and/or red cell membrane or enzyme defects (hereditary spherocytosis, G6PD) with significant haemolysys treated with multiple unit phototherapy should be followed up
- Any baby who had an exchange transfusion needs follow-up

Where there is evidence of significant haemolysis, the consultant in charge of the patient’s care at the time of discharge is responsible for follow-up, which may be as an outpatient, or by phone and text messages.

- Weekly Hb and reticulocyte counts need to be monitored after discharge until renewed erythropoiesis is noted.

**Note:**

- Notify the consultant in charge of baby at time of discharge that discharge is imminent, to plan the follow-up arrangements.
- Explain late anaemia to the parents and why we need to test for it
- Give parents 6 pathology forms requesting Hb and reticulocyte count to be done either at RWH outpatients pathology, or a local pathology lab, for use over the next 4-6 weeks.
- Give parents a contact telephone number and/or email for the responsible consultant.
- Parents need to be aware to inform consultant or have the baby reviewed if they become concerned about pallor, poor feeding or lethargy.
- If the infant is being followed in neonatal outpatients, the FBC and Reticulocyte count needs to be done ~one hour before the appointment.
- If being followed up by email and/or phone calls and text, then the consultant needs to organise this with the family.

**4.1 Prolonged unconjugated hyperbilirubinaemia**

Up to 10% of breast-fed babies will remain jaundiced beyond the first week of life. ‘Breast milk jaundice’ is a diagnosis of exclusion and should not lead to the cessation of breastfeeding.

Investigation of prolonged jaundice should be considered if the:

- level of jaundice is not improving or is worsening at >14 days in a baby ≥35 weeks gestation (or 21 days in babies < 35 weeks gestation)
- jaundice has become apparent for the first time after the first week of life, or
conjugated bilirubin level is increasing.

Babies should be assessed for:

- adequate feed intake – dehydration, wet nappies, weight loss >10% of birth weight
- evidence of bacterial infection – especially of the urinary tract

If indicated investigations should include:

- FBE, differential and blood film including screening for hereditary spherocytosis
- thyroid function and liver function tests
- galactose-1-phosphate uridyl transferase activity, for galactosaemia
- glucose-6-phosphate dehydrogenase activity, for G6PD deficiency
- consider tests for other red cell membrane and enzyme defects e.g. pyruvate kinase deficiency
- consider urine collection for culture

4.10 **Conjugated hyperbilirubinaemia**

Conjugated hyperbilirubinaemia, defined as conjugated SBR >30 µmol/L (the upper limit of normal) in babies at RWH, is always pathological and indicates hepatobiliary dysfunction.

Conjugated jaundice occurs in 1 in every 2500 term infants and can present at any age (rarely <24 hours of life).

Early identification of conjugated hyperbilirubinaemia is crucial so that conditions in which early treatment improves prognosis can be identified. These include extrahepatic biliary atresia (25%-40%), metabolic syndromes (25%), hepatitis and liver failure.

The laboratory will notify the neonatal RMO or Fellow of any baby with a conjugated SBR >30 µmol/L.

The neonatal consultant must be informed of any baby with conjugated hyperbilirubinaemia.

Clinical assessment and examination, particularly of stool colour (acholic vs. pigmented), is important and should be performed at each assessment.

Initial investigations include:

- FBE, LFTs, coagulation profile
- α-1-antitrypsin level and phenotype (Pi typing)
- newborn screening results (TSH and T4 if not available)
- galactosaemia screen
- urinalysis
- fasting abdominal ultrasound
- Sepsis may be considered, including congenital infections.

Any baby with a conjugated fraction >20% of the total SBR level at discharge from RWH requires referral to outpatient follow up by RCH Gastroenterology.

The neonatal consultant will take primary responsibility for any baby with conjugated hyperbilirubinaemia after RWH discharge and liaise directly with the RCH Gastroenterology consultant.

4.11 **Jaundice (hyperbilirubinaemia) in babies born before 35 weeks gestation**

Preterm babies are at higher risk of becoming jaundiced. They are more likely to become symptomatic at lower bilirubin levels and therefore require treatment at lower levels.

See guideline: [Jaundice (Hyperbilirubinaemia) in Preterm Babies Less Than 35 Weeks Gestation](#)
5. **Evaluation, monitoring and reporting of compliance to this guideline**

Compliance to this guideline will be monitored by incidences reported to VHIMS and the annual number of exchange transfusions performed. It will be evaluated by annual audit of documentation on treatment charts in patient histories.

6. **References**

4. Up to Date: Treatment of unconjugated hyperbilirubinemia in term and late preterm infants, [www.uptodate.com](http://www.uptodate.com), Oct 2016


7. **Legislation/Regulations related to this guideline**

Not applicable.

8. **Appendices**

Appendix 1: [Treatment of hyperbilirubinemia in newborn babies ≥ 35 weeks gestation - Flowchart](#)

Appendix 2: [Treatment of hyperbilirubinemia in newborn babies born ≥ 38 weeks gestation and ≥ 2500 g, without risk factors for serious jaundice](#)

Appendix 3: [Treatment of hyperbilirubinemia in newborn babies born at 35-37+6 weeks gestation or < 2500g or who have risk factors for serious jaundice](#)
Appendix 1

Treatment of hyperbilirubinaemia in newborn babies ≥ 35 weeks gestation - Flowchart

Jaundiced baby ≥ 35 weeks

≤ 24 hours old

Neonatal Emergency

> 24 hours – 14 days old

Obtain TcB and/or SBR (RWH or at home)

≥ 14 days old

Refer to guideline ‘Treatment of jaundice in newborn babies ≥ 35 weeks gestation and Hyperbilirubinaemia treatment charts:
- Babies ≥ 38 weeks gestation and ≥ 2500g without risk factors for serious jaundice, or
- Babies 35–37+6 weeks or <2500g or with risk factors for serious jaundice

Baby’s location

RWH (NICU, maternity, WEC)

Home

Advise parents to bring baby to NICU urgently

Neonatal MET call

Admit NICU

Urgent SBR, DAT, FBE
Commence multiple unit phototherapy

Multiple unit

Single unit

Phototherapy

Home with NHITH, or Admit to maternity

≥ 24 weeks gestation

Flowchart

Prolonged unconjugated hyperbilirubinaemia.
Discuss further investigations with neonatal fellow/consultant &/or referral to Newborn Outpatients
# Treatment of Hyperbilirubinaemia in Newborn Babies
(Born >38 weeks gestation and >2500g without risk factors for serious jaundice)

<table>
<thead>
<tr>
<th>Date of birth</th>
<th>Time of birth</th>
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<table>
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<tr>
<th>Age (hours)</th>
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<table>
<thead>
<tr>
<th>SBR (µmol/L)</th>
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<table>
<thead>
<tr>
<th>Phototherapy</th>
<th>Start time</th>
<th>Stop time</th>
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<table>
<thead>
<tr>
<th>No. of phototherapy units</th>
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<th>TcB (µmol/L)</th>
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</table>

**Closely observe neonates with:**
- Jaundice prior to 48 hours
- Sibling treated with phototherapy
- Macrosomia in neonate born to a diabetic mother
- Greater than 10% weight loss
- Cephalohaematoma

**TcB trigger for SBR**
- 24 – 48 h: 200 µmol/L
- 48 – 72 h: 230 µmol/L
- 72 – 96 h: 260 µmol/L
- >96 h: 290 µmol/L

*Do not plot TcB on chart*
# Treatment of Hyperbilirubinaemia in Newborn Babies

(Born >38 weeks gestation and >2500g without risk factors for serious jaundice)

<table>
<thead>
<tr>
<th>Age in hours</th>
<th>SBR measurement (micromol/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Commence single unit phototherapy</td>
</tr>
<tr>
<td>ACTION if total SBR is above this value</td>
<td></td>
</tr>
<tr>
<td>Birth</td>
<td>110</td>
</tr>
<tr>
<td>12 hours</td>
<td>160</td>
</tr>
<tr>
<td>24 hours</td>
<td>205</td>
</tr>
<tr>
<td>36 hours</td>
<td>235</td>
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<td>48 hours</td>
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<td>60 hours</td>
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<td>72 hours</td>
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<td>84 hours</td>
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</tr>
<tr>
<td>96 hours</td>
<td>340</td>
</tr>
<tr>
<td>108 hours</td>
<td>350</td>
</tr>
<tr>
<td>5 days</td>
<td>360</td>
</tr>
<tr>
<td>6 days</td>
<td>360</td>
</tr>
<tr>
<td>7-14 days</td>
<td>360</td>
</tr>
<tr>
<td>&gt;14 days</td>
<td>Contact Neonatal Registrar/Fellow for consideration of further investigations and/or referral to Neonatal Outpatients</td>
</tr>
</tbody>
</table>

## Monitor SBR

Measure SBR 12-24 hourly whilst SBR rising, then once daily as SBR stabilises during phototherapy.

## Increase phototherapy

Increase to multiple phototherapy if:

1. Rate of rise > 8.5 micromol/L per hour prior to phototherapy
2. SBR rises by > 50 micromol/L in 24 hours (or equivalent) during single unit phototherapy
3. SBR is within 50 micromol/L of exchange level

## Reduce phototherapy

When SBR is more than 50 micromol/L below exchange level, reduce the number of phototherapy units.

## Stop phototherapy and monitor response

- Consider stopping phototherapy when SBR is below treatment level
- Definitely stop phototherapy when SBR is 50 μmol/L below the treatment level
- Check for rebound (~10% rebound expected) 12-24 hours after ceasing phototherapy. If SBR is static or falling repeat tests only if clinically indicated. If SBR is rising repeat in 24 hours or restart phototherapy if above treatment threshold.

## Restart phototherapy

Restart phototherapy if SBR is clearly above treatment threshold (e.g. rebound > 10% or rate of rise is greater than expected for the day of life).
## Treatment of Hyperbilirubinaemia in Newborn Babies
(Born 35-37\textsuperscript{6} weeks gestation or <2500g or with risk factors for serious jaundice)

### Risk factor:
- 35-37\textsuperscript{6} weeks
- <2500g
- DAT positive isoimmunisation (RhD, ABO incompatibility or other blood group antibodies)
- Family history of red cell defects e.g. G6PD deficiency, hereditary spherocytosis
- Significant/extensive bruising

### TcB trigger for SBR
- 24 - 48 h: 150 \( \mu \text{mol/L} \)
- 48 - 72 h: 190 \( \mu \text{mol/L} \)
- 72 - 96 h: 220 \( \mu \text{mol/L} \)
- >96 h: 250 \( \mu \text{mol/L} \)

Do not plot TcB on chart

### Table:

<table>
<thead>
<tr>
<th>Date</th>
<th>Age (hours)</th>
<th>SBR (( \mu \text{mol} / \text{L} ))</th>
<th>Phototherapy Start time</th>
<th>Phototherapy Stop time</th>
<th>No. of phototherapy units</th>
<th>TcB (( \mu \text{mol} / \text{L} ))</th>
</tr>
</thead>
</table>

### Graph:
- Phototherapy
- Exchange transfusion

---

**Note:** The graph depicts the progression of total serum bilirubin levels over time and the stages of treatment. The graph should be used as a reference for monitoring bilirubin levels and determining the appropriate time for initiating treatment interventions such as phototherapy or exchange transfusion.
# Treatment of Hyperbilirubinaemia in Newborn Babies
(Born 35 – 37\(^{+6}\) weeks gestation or < 2500g or with risk factors for serious jaundice)

<table>
<thead>
<tr>
<th>Age in hours</th>
<th>SBR measurement (micromol/L)</th>
<th>Monitor SBR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Commence single unit phototherapy</td>
<td>Urgent neonatal medical review for consideration of exchange transfusion</td>
</tr>
</tbody>
</table>

**Jaundice <24 hours of age needs urgent neonatal medical review**

- **Birth** 85 235
- **12 hours** 130 260
- **24 hours** 170 280
- **36 hours** 200 300
- **48 hours** 225 325
- **60 hours** 240 340
- **72 hours** 260 360
- **84 hours** 275 375
- **96 hours** 290 385
- **108 hours** 290 385
- **5 days** 290 385
- **6 days** 290 385
- **7-14 days** 290 385

**>14 days**

Contact Neonatal Registrar/Fellow for consideration of further investigations and/or referral to Neonatal Outpatients

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