#ASSESSMENT AND MANAGEMENT OF NEONATAL JAUNDICE IN THE FIRST TWO WEEKS OF LIFE – NEONATAL CLINICAL GUIDELINE

See Flow Chart Appendix 4

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1. Aim/Purpose of this Guideline
This local guideline encompasses recognition, investigation and management of neonatal jaundice due to unconjugated hyperbilirubinaemia within the first two weeks of life. See Flow Chart Appendix 4.

2. The Guidance
2.1. Background
Jaundice is the yellow colouration of skin and sclera caused by hyperbilirubinaemia. Bilirubin is mainly produced from the breakdown of red blood cells. Unconjugated bilirubin circulates mostly bound to albumin although some is unbound (‘free’). In young infants, free unconjugated bilirubin can penetrate the blood–brain barrier causing neurotoxicity. The term kernicterus denotes the clinical features of acute or chronic bilirubin encephalopathy, as well as the yellow staining in the brain associated with the former. The management of unconjugated jaundice is aimed at preventing kernicterus. Jaundiced infants with any of the following features are at increased risk of kernicterus:
Term (37 weeks gestation or more) infants with a Serum Bilirubin (SBR) greater than 340 micromol/l.
- Infants with an SBR rising at greater than 8.5 micromol / litre, per hour.
- Infants with clinical features of acute bilirubin encephalopathy.

Jaundice is a clinical sign, not a diagnosis. Neonatal jaundice may be normal ("physiological jaundice") or signify an underlying disease process. Interpretation of its significance and need for treatment depend upon both the bilirubin level and the clinical context. Always take a history and examine the baby.

2.2. Communication and Consent
Treatment and care of jaundiced infants should take parents' views and preferences into account. This depends upon good professional communication, through which parents are given the opportunity to make informed decisions about their babies’ care and treatment. Parents of babies who require treatment for neonatal jaundice should be offered our local parent information leaflet on jaundice in newborn babies (RCHT Doc 325). This document is located in the Nurses Office on the Neonatal Unit. Arrangements for verbal or written translation of parent information should be made where necessary.

2.3. Recognition of significant Jaundice
All babies should be examined carefully for jaundice at every contact with health care professionals in the neonatal period. Jaundice requiring treatment is more likely in the following groups:

- Gestational age under 38 weeks
- Previous sibling with neonatal jaundice requiring phototherapy
- Maternal intention to exclusively breast feed
- Visible jaundice within the first 24 hours of life.

Babies with risk factors for significant jaundice, should receive an additional inspection by a health care professional, within the first 48 hours of life. When visually assessing for jaundice, examine the naked baby in bright and preferably natural, light. Examination of the sclerae, gums and blanched skin increases the sensitivity of clinical examination and is useful across all skin tones. Do not rely on visual inspection alone to estimate the bilirubin level in a baby with jaundice.

2.4. Bilirubin measurement
Visible inspection cannot reliably exclude clinically important jaundice requiring treatment. The bilirubin level should be measured and plotted within 2 hours of suspecting jaundice in babies within the first 24 hours of life, and within 6 hours in babies with suspecting jaundice beyond the first 24 hours of life.

Non-invasive transcutaneous bilirubinometers (TCB), have sufficient diagnostic accuracy for assessing bilirubin levels in low risk clinical settings, at measured TCB level’s below 250 micromol/litre. Bilirubin measurement by
TCB screening is recommended beyond the first 24 hours of life in all visibly jaundiced babies of 35 week’s gestation or greater. Serum bilirubin level (SBR) should be assessed by blood sample if any of the following apply:

- Infant less than 35 completed week’s gestation.
- Jaundice in the first 24 hours of life.
- Infant aged 14 days or older
- Transcutaneous bilirubin measurement greater than 250 micromol/litre.
- Transcutaneous bilirubin measurement at or above relevant treatment threshold (and SBR should be used in place of Transcutaneous Bilirubinometer for all subsequent measurements).
- TCB result appears inconsistent with clinical context or anticipated result.
- Transcutaneous Bilirubinometer not available.
- SBR required as part of TCB device performance check.

The bilirubin level should be re-checked (by TCB or SBR as appropriate – see above) according to the following algorithm*:

*(Note: When a single bilirubin measurement does not meet the absolute criteria for a repeat, the trend in relation to previous measurements must be taken into account).

- **Baby of any gestation within the first 24 hours of life** – Measure bilirubin and plot result within 2 hours of suspecting jaundice.
- **Baby of any gestation beyond the first 24 hours of life** – Measure bilirubin and plot result within 6 hours of suspecting jaundice.
- **Baby of any gestation with bilirubin level closer than 50 micromol/litre to the age- and gestation-specific treatment threshold** – Re-check bilirubin in 6 hours.
- **Gestation 38 weeks or more and bilirubin is in the “Repeat Bilirubin Measurement” category of the “Threshold Table for management of babies 38 weeks or more gestational age”** – Re-check bilirubin in 6-12 hours.
- **Gestation 38 weeks or more and bilirubin is in the “Consider phototherapy” category in the “Threshold Table for management of babies 38 weeks or more gestational age”** – Re-check bilirubin in 4-6 hours, regardless of whether phototherapy has been started.
- **Baby of any gestation receiving phototherapy** – Re-check bilirubin 4-6 hours after starting phototherapy, and then every 6 hours until the SBR is stable or falling. Once the SBR is stable or falling, re-check every 6-12 hours.
- **Baby of any gestation after stopping phototherapy** – Re-check SBR for significant rebound SBR 12-18 hours after stopping phototherapy. Babies do not necessarily have to remain in hospital for this to be done.

2.5. Jaundice Treatment Thresholds
The thresholds for closer monitoring, commencement of phototherapy and
exchange transfusion are determined by the infant’s serum bilirubin level,
gestation at birth and postnatal age. Consensus-based recommended
treatment thresholds are shown in the NICE Guideline “Treatment Threshold
Table for Management of Babies 38 weeks or more Gestational Age with
Hyperbilirubinaemia” and NICE Gestation-Specific Treatment Threshold
Charts. The table and charts can be found at:
https://www.nice.org.uk/guidance/cg98/chapter/1-guidance#management-
and-treatment-of-hyperbilirubinaemia.

CARE MUST BE TAKEN TO ENSURE THAT THE CORRECT GESTATION
CHART IS USED.

Phototherapy should not be started in babies whose bilirubin does not exceed
the relevant phototherapy threshold level.
When interpreting SBR level against the threshold for phototherapy, use the
total SBR without subtracting any conjugated bilirubin fraction.

2.6. Investigation and Management - general
For the purposes of investigation, “significant” jaundice is defined as an SBR
above phototherapy threshold in babies greater than 24-hours old, or SBR
above threshold for repeat measurement in babies less than 24-hours old.

All infants with significant jaundice should have the following investigations as
part of an assessment for underlying disease:
- FBC (noting haematocrit) and Blood Film
- Blood Group (mother and infant)
- DAT (Coomb’s Test) (NB take into account strength of reaction and
  whether mother received Anti-D prophylaxis in pregnancy: can produce
  weak positive result)

The following tests should be considered:
- G-6PD levels, taking account of ethnic origin
- Cultures of blood, urine and CSF, if infection is suspected.

2.7. Investigation and Management - Jaundice in first 24-hours of life
Jaundice in first 24 hours of life is always clinically important. It may be the
first sign of life-threatening pathology – particularly haemolysis or infection. All
infants with significant jaundice in the first 24 hours require urgent
investigation and clinical management directed at the underlying cause.

Likely causes of jaundice in first 24 hours:
- Rhesus or ABO incompatibility
- Hereditary haemolytic disorder
- Bacterial sepsis
- Severe bruising or polycythemia

Rarer causes of jaundice in first 24 hours:
- Congenital infection, including cytomegalovirus (CMV) infection and,
  very rarely, Rubella, Toxoplasma and Herpes simplex.
**Actions:**
Measure and monitor bilirubin as per Section 2.4. Treat hyperbilirubinaemia as per Sections 3-4. Inform consultant immediately if SBR level at or above exchange transfusion threshold. If significant jaundice (SBR above threshold for repeat in 6-12 hours) investigate and treat underlying cause:
- Check maternal blood group, atypical antibodies, and Rubella serology at booking.
- Ask about family history of haematological disorders.
- Examine infant for signs of infection, bruising and hepatosplenomegaly.
- Take infant blood sample for FBC, Blood Group, and Coomb’s Test.

Consider the following additional infant investigations, taking into account other clinical indicators:
- Blood Culture, CRP
- Lumbar Puncture – mandatory if any other positive indicators of infection.
- Request G-6PDD screen in non-Caucasian infants.
- Obtain urine for CMV and blood for Toxoplasma serology if any of the following apply:
  - No laboratory evidence of immune-mediated haemolysis or bacterial sepsis.
  - Significant conjugated bilirubin component.
  - Other suggestive clinical markers.

Commence first line IV antibiotics immediately if infection screen undertaken.

**2.8 Investigation and Management - Jaundice onset from 24-hours to 7 days of age**
Physiological jaundice commonly presents in this period but should never be assumed in an unwell infant or if SBR above treatment threshold. All infants, who are unwell, or with SBR above treatment threshold, require medical investigation. Refer to separate guideline on investigation and management of infants with significant conjugated hyperbilirubinaemia.

Likely causes of unconjugated jaundice aged 1-7 days:
- Physiological
- Preterm-related liver immaturity
- Bacterial sepsis
- Severe bruising or polycythemia
- Rhesus or ABO incompatibility (beware: may occur with negative DAT)
- Hereditary haemolytic disorder

Rarer causes of unconjugated jaundice aged 1-7 days:
- Galactosaemia
- Congenital hypothyroidism
- Congenital CMV, HSV, Rubella or Toxoplasma infection
- Familial non-haemolytic hyperbilirubinaemia (Gilbert’s or Crigler-Najjar syndrome).
Actions:
Measure and monitor bilirubin as per Section 2.4. Treat hyperbilirubinaemia as per Sections 3.0-4.0. Inform consultant immediately if SBR level at or above exchange transfusion threshold. For infants requiring phototherapy, investigate and treat underlying cause:
- Check maternal blood group, atypical antibodies, and Rubella serology at booking.
- Take a full clinical history, including family history of haematological disorders.
- Conduct a full examination including signs of infection, bruising and hepatosplenomegaly.
- Take infant blood sample for FBC, Blood Group, and Coomb’s Test.
- Request G-6PDD screen in non-Caucasian infants.

Consider the following additional infant investigations, taking into account other clinical indicators:
- Blood Culture, Urine culture, CRP
- Lumbar Puncture – mandatory if any other positive indicators of infection.
- Request G-6PDD screen in non-Caucasian infants.
- Urine sugar chromatography (and blood for Galactose-1-Phosphate Uridyl Transferease (G-1-PUT) if abnormal or other suggestive features)
- Obtain urine for CMV and blood for Toxoplasma serology if any of the following apply:
  - No laboratory evidence of immune-mediated haemolysis or bacterial sepsis.
  - Significant conjugated bilirubin component
  - Other suggestive clinical markers.
- Investigate for Herpes Simplex infection and start IV acyclovir if infant unwell with liver dysfunction, unexplained neurological signs or suggestive skin, eye or mouth lesions.

Commence first line IV antibiotics immediately if infection screen undertaken.

2.9 Investigation and Management - Jaundice with onset beyond 7 days of age
Jaundice commencing after 7 days of age is always pathological and should be distinguished from jaundice which commenced earlier and has persisted. Refer to separate guideline on investigation and management of infants with significant conjugated hyperbilirubinaemia.
Likely causes of unconjugated jaundice with onset after 7 days:
- Urinary Tract Infection
- Septicaemia or other bacterial sepsis

Rarer causes of unconjugated jaundice with onset after 7 days:
- Congenital hypothyroidism
- Congenital non-immune haemolytic anaemia
- Hereditary Spherocytosis
- G-6PD
- Galactosaemia
- Causes of increased entero-hepatic circulation
- Hirschsprungs Disease
- Familial non-haemolytic hyperbilirubinaemias (Gilberts or Crigler-Najar Syndrome)

**Actions:**
Measure and monitor bilirubin as per Section 2.4. Treat hyperbilirubinaemia as per Sections 3.0-4.0. Inform consultant immediately if SBR level at or above exchange transfusion threshold. Investigate and treat underlying cause in all infants with new onset jaundice beyond 7 days of age:
- Take a full clinical history, weigh infant and conduct a full examination.
- Take infant blood sample for “split” Conjugated and Unconjugated Bilirubin, Urea, Electrolytes and Creatinine, LFT, Thyroid Function, Blood Culture, CRP, FBC, Reticulocyte Count, Blood Film, Blood Group, Coombs Test, and G-1-PUT.
- Request G6PDD screen in non-Caucasian infants.
- Obtain urine for culture and sugar chromatography by clean catch or supra-pubic aspiration.
- Commence first line IV antibiotics immediately after obtaining blood culture.
- Investigate for Herpes Simplex infection and start IV acyclovir if infant unwell with liver dysfunction, unexplained neurological signs or suggestive skin, eye or mouth lesions.

Infants presenting in the second week of life who require phototherapy for jaundice with onset before 7 days of age should be investigated and treated as per guideline.

### 2.10 Investigation and Management - Prolonged Jaundice
Prolonged jaundice is defined as jaundice persisting beyond 14 days of age in infants born at or beyond 37 weeks gestation, or persisting beyond 21 days in infants born at less than 37 weeks gestation. The commonest aetiology is physiological jaundice in a breast fed infant, but all infants with prolonged jaundice require assessment to exclude hepatobiliary disease, haemolysis, infection, endocrine and metabolic disorders. See separate locally agreed guideline for assessment of prolonged neonatal jaundice.

### 2.11 Use of Phototherapy - Information for parents
At the initiation of phototherapy, parents/carers should be given information about treatment of hyperbilirubinaemia and its anticipated duration of treatment, with reassurance that breastfeeding, nappy-changing and cuddles can usually continue. Mothers of breast fed babies with jaundice should be encouraged to breastfeed frequently, and to wake the baby for feeds if necessary. Lactation and feeding support should be provided for
breastfeeding mothers whose baby is visibly jaundiced. Information given to parents should include:

- Why phototherapy is being considered
- Possible short and long term adverse effects of phototherapy
- The need for eye protection and routine eye care
- Reassurance that short breaks for feeding, nappy changing and cuddles will be encouraged
- What might happen if phototherapy fails
- Rebound jaundice
- Potential impact on breastfeeding and how to minimise this

2.12 Starting phototherapy

The NICE Gestation-specific Neonatal Jaundice Treatment Threshold Charts should be used to determine the appropriate gestation and age-specific treatment level. In babies of 38 weeks gestation or greater, thresholds for further measurement and treatment are set out in the NICE “Threshold Table: Consensus-based bilirubin thresholds Table for management of babies 38 weeks or more gestational age with hyperbilirubinaemia”. The table and charts can be found at: https://www.nice.org.uk/guidance/cg98/chapter/1-guidance#management-and-treatment-of-hyperbilirubinaemia.

2.13 Types of Phototherapy

All phototherapy equipment should be maintained and used according to the manufacturers’ guidelines. Incubators or bassinets should be used according to clinical need and availability. White curtains should not be used routinely with phototherapy as they may impair observation of the baby.

**Single phototherapy treatment for term infants:** Conventional ‘blue light’ phototherapy should be used for infants with a gestational age of 37 weeks or more unless SBR levels are rising, at more than 8.5 micromol/litre per hour, or SBR level, is within 50 micromol/litre below the exchange transfusion threshold. Fibre optic (“Biliblanket”) phototherapy is inferior to conventional phototherapy in term infants and should not be used as exclusive first-line treatment for hyperbilirubinaemia in infants of 37 weeks gestation or more.

**Single phototherapy treatment in preterm infants:** Either fibre optic phototherapy or conventional ‘blue light’ phototherapy can be used in babies below 37 weeks gestation, unless SBR levels are rising faster than 8.5 micromol/litre per hour, or if SBR is within 50 micromol/l below the exchange transfusion threshold after 72 hours.

**Continuous multiple phototherapy treatment for term and preterm infants:** Multiple phototherapy is defined as phototherapy given using more than one light source simultaneously, for example, using two conventional units or a combination of one or more conventional fibre-optic units. Continuous multiple phototherapy should be used if any of the following apply:

- SBR is rising rapidly (more than 8.5 micromol/litre per hour)
- SBR is within 50 micromol/litre below exchange transfusion threshold, after 72 hours since birth.

- SBR continues to rise, or does not fall, within 6 hours of starting single phototherapy.

If SBR falls during continuous multiple phototherapy to a level 50 micromol/litre below the threshold for which exchange transfusion is indicated, step down to single phototherapy.

2.14 Care during Phototherapy - General
- Nurse the infant supine unless other clinical conditions prevent this, and ensure treatment is applied to the maximum area of skin.
- Monitor the infant’s temperature and ensure a thermo-neutral environment.
- Monitor hydration by assessing wet nappies and consider daily weighing.
- Support parents and carers and encourage them to interact with the baby.
- Ensure eye protection and routine eye care throughout overhead phototherapy. Tinted head boxes may be associated with lower risk of purulent eye discharge than head boxes but head-boxes reduce percentage skin exposure to overhead light. Tinted head boxes can be used as an alternative to eye protection in babies with a gestational age of 37 weeks or more undergoing conventional ‘blue light’ phototherapy.

2.15 Care during Phototherapy - Feeding and Parental care
During conventional ‘blue light’ phototherapy:
- Encourage short breaks (up to 30 minutes) for feeding, cares and cuddles
- Continue lactation/feeding support
- Do not give additional fluids or feeds routinely.
- When additional feeds are indicated, use maternal expressed milk if available.

During multiple phototherapy use:
- Do not interrupt phototherapy for feeding but continue with IV / enteral feeds
- Continue lactation support so breastfeeding can start again when treatment stops

When additional feeds are indicated, use maternal expressed milk if available

2.16 Adjunctive therapies
Intravenous immunoglobulin (IVIG) acts in by preventing the destruction of sensitised red blood cells. Clinical evidence suggests that IVIG is effective in reducing the need for exchange transfusion in Rhesus and ABO disease.
Cost-effectiveness has been established in Rhesus disease but is less certain in ABO incompatibility.

IVIG (500 mg/kg over 4 hours) should be used as an adjunct to continuous multiple phototherapy in cases of Rhesus haemolytic disease or ABO haemolytic disease when the SBR continues to rise by more than 8.5 micromol / litre per hour.

Parents should be given information on IVIG including:
- why IVIG is being considered
- possible adverse effects of IVIG
- when it will be possible for parents or carers to see and hold the baby.

IVIG is a pooled blood product. It is essential that documentation, registration and administration of IVIG comply with relevant policies within the Trust.

Current NICE Guidance states that other drugs or therapies including human albumin solution and phenobarbitone should not be used as adjunctive therapies for hyperbilirubinaemia. However, a NICE Clinical Guideline 98 Evidence update in 2012 reported limited evidence suggesting that an albumin infusion before exchange transfusion may be more effective in lowering total serum bilirubin than exchange transfusion alone.

2.17 Exchange Transfusion
Most research trials assessing risks and benefits of exchange transfusion have been of poor quality, poorly randomised, and conducted more than 30 years ago. SBR thresholds associated with deafness and/or neurological impairment are also poorly defined by current evidence.

Nevertheless, a double-volume exchange transfusion is recommended for all infants whose SBR exceeds the gestations and age appropriate thresholds, Treatment Threshold Tables and Charts (See Appendix 3), Table 1 and Figures x – y, and in any infant with clinical features and signs of acute bilirubin encephalopathy. Single-volume exchange transfusions should not be carried out.

Continuous multiple phototherapy must be continued during and after exchange transfusion. The infant should not be primed with human albumin solution. Intravenous calcium should not be routinely administered. SBR level should be measured two hours after completing an exchange transfusion.

3. Monitoring compliance and effectiveness
This part must provide information on the processes and methodology for monitoring compliance with, and effectiveness of, the policy using the table below.

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Key Changes to practice</th>
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Assessment and management of jaundice within the first two weeks of life – Neonatal Clinical Guideline
Page 10 of 17
Lead | Dr. Paul Munyard
---|---
Tool | Audit
Frequency | As dictated by audit findings
Reporting arrangements | Child Health Directorate Audit and Neonatal clinical Guidelines Group
Acting on recommendations and Lead(s) | Dr. Paul Munyard. Consultant Paediatrician and Neonatologist.
Change in practice and lessons to be shared | Required changes to practice will be identified and actioned within 3 months. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders

4. Equality and Diversity
1.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the ‘Equality, Diversity & Human Rights Policy’ or the Equality and Diversity website.

1.2. Equality Impact Assessment
The Initial Equality Impact Assessment Screening Form is at Appendix 2.

Appendix 1. Governance Information

<table>
<thead>
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<td>Date Issued/Approved:</td>
<td>NOVEMBER 2016</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>NOVEMBER 2016</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>NOVEMBER 2019</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Dr Andrew Collinson. Consultant Paediatrician and Neonatologist</td>
</tr>
<tr>
<td>Contact details:</td>
<td>(01872) 252667</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>This guideline outlines the clinical management of infants presenting with hyperbilirubinaemia within the first two weeks of life.</td>
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<tr>
<td>Date revised:</td>
<td>20:02:2016</td>
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<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Assessment and management of jaundice within the first two weeks of life– Neonatal Clinical Guideline</td>
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<td>Approval route (names of committees)/consultation:</td>
<td>Consultant approval. Child Health Directorate Audit. Neonatal Clinical Guidelines Group</td>
</tr>
<tr>
<td>Divisional Manager confirming approval processes</td>
<td>Tim Mumford</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not Required</td>
</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet Yes Intranet Only</td>
</tr>
<tr>
<td>Links to key external standards</td>
<td><a href="http://www.nice.org.uk/guidance">www.nice.org.uk/guidance</a></td>
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<tr>
<td>Training Need Identified?</td>
<td>Use of transcutaneous bilirubinometer.</td>
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Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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### Appendix 2. Initial Equality Impact Assessment Form

**Name of the strategy / policy / proposal / service function to be assessed (hereafter referred to as policy):**
Assessment and management of jaundice within the first two weeks of life – Neonatal Clinical Guideline

**Directorate and service area:** Child and Women’s Health. Neonatal

**Is this a new or existing Policy?** Existing

**Name of individual completing assessment:** Dr. Paul Munyard.

**Telephone:** (01872) 252667

1. **Policy Aim**
   - **Who is the strategy / policy / proposal / service function aimed at?**
   - This guideline is aimed at clinical staff responsible for the recognition, investigation and management of neonatal jaundice due to unconjugated hyperbilirubinaemia within the first two weeks of life.

2. **Programme / service development: what problems or issues does the strategy / policy / proposal / service function seek to address in any of the areas below?**

3. **Programme / service development: what benefits might the strategy / policy / proposal / service function bring to any of the groups below?**

4. **Programme / service development: what advice or guidance has been sought or will be sought from any other relevant stakeholders?**

5. **Programme / service development: what consultation has taken place to date and who has been consulted?**

6. **Programme / service development: has the strategy / policy / proposal / service function been piloted?**

7. **Programme / service development: have the implications for organisational change or resource implications been assessed?**

8. **Programme / service development: are there any significant opposition concerns to the strategy / policy / proposal / service function?**

9. **Programme / service development: how will the strategy / policy / proposal / service function be evaluated?**

10. **Programme / service development: are there any other matters that the assessment of the strategy / policy / proposal / service function should address?**
<table>
<thead>
<tr>
<th>2. Policy Objectives*</th>
<th>As above</th>
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</thead>
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<tr>
<td>3. Policy – intended Outcomes*</td>
<td>Audit</td>
</tr>
<tr>
<td>4. *How will you measure the outcome?</td>
<td>Audit</td>
</tr>
<tr>
<td>5. Who is intended to benefit from the policy?</td>
<td>Patients. Staff.</td>
</tr>
<tr>
<td>6a) Is consultation required with the workforce, equality groups, local interest groups etc. around this policy?</td>
<td>No. Consultant led Neonatal Guidelines Group approved document.</td>
</tr>
<tr>
<td>b) If yes, have these *groups been consulted?</td>
<td></td>
</tr>
<tr>
<td>c) Please list any groups who have been consulted about this procedure.</td>
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### 7. The Impact
Please complete the following table.

Are there concerns that the policy **could** have differential impact on:

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<th>Yes</th>
<th>No</th>
<th>Rationale for Assessment / Existing Evidence</th>
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<td>Age</td>
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<td>Sex (male, female, trans-gender / gender reassignment)</td>
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</table>
**Sexual Orientation,**
Bisexual, Gay, heterosexual, Lesbian

| x |

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:

- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation - this excludes any policies which have been identified as not requiring consultation. or
- Major service redesign or development

8. Please indicate if a full equality analysis is recommended.  
No

9. If you are not recommending a Full Impact assessment please explain why.

No area indicated

Signature of policy developer / lead manager / director  
Dr Paul Munyard  
16 Nov 2016

Names and signatures of members carrying out the Screening Assessment

1.  
2.

Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead, c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD  
A summary of the results will be published on the Trust’s web site.  
Signed _______ Kim Smith ____________  
Date ________ 16 NOV 2016 ___________

**Appendix 3: Use of the Drager JM-103 Transcutaneous Bilirubinometer**

1.0 TCB Measurement Procedure:

Before use, clean the measuring probe with an alcohol wipe.

1.1. Set the **Power** switch to the **ON** position. The measured value for a single measurement, \( n-1 \), appears on the display.

1.2. Ensure that the **Ready** lamp illuminates.

1.3. If the battery indicator blinks, charge the battery.

1.4. Place the measuring probe vertically against infant’s sternum. If measurement over the sternum is not possible, the forehead can be used, but care must be taken to avoid ocular injury. Inaccurate readings can occur if other sites are used. Avoid any bruises or discoloured areas of skin. Do not press the measuring probe when it is directed toward the infant’s or caregiver’s eyes.

1.5. Push the measuring probe gently until a click sounds. The instrument’s xenon lamp flashes momentarily, and the measured value appears on the display.
1.6. The upper limit of the TCB meter measurement range is 340 μmol/L (20mg/dl). Above this measured level, the display will show “---”. **Note:** If the instrument is inactive for more than 60 seconds, the background light on the display goes out.

1.7. To take another measurement, press **Reset** button, and continue from step 4.

1.8. To stop measuring, perform the following:

- Set the **Power** switch to the ‘Off’ position.
- Using medicinal alcohol, clean the measuring probe.
- Place the Jaundice Meter on the charger unit. When the Jaundice Meter is not in use, keep it in the charger unit with the display facing forward.

**Three measurements should be taken and an average of the 3 is used.**
See 5-5 of Instruction Booklet for how to take average measurements.

**Daily Light Output Check**

The light output of the device should be checked once daily, before the first usage in each 24 hour period. Refer to “Operational Checkout of the Jaundice Meter” on page 4-4 of Drager Jaundice Meter Manual.

Record light output check on TCB usage log table (Record date and time in Date column, write “Light Check” in place of patient ID label, and write “OK” in TCB result column, scoring through other columns).

If device fails light check, do not use. Report the fault immediately.

**3.0 Documentation and Audit**

Bilirubin results recorded in patients’ notes must specify the assessment technique used (TCB, Lab, or Blood Gas Analyser).

Every use of the transcutaneous bilirubinometer TCB should be recorded using the designated log sheet. This is kept in the folder labelled “TCB” in the Doctor’s office on the Neonatal Unit and in the equivalent folder with the device on Postnatal Ward.
Appendix 4.

**MANAGEMENT OF VISIBLE JAUNDICE IN THE FIRST 2 WEEKS OF LIFE**

- **Jaundice in first 24hrs**
  - Visible jaundice within 24 hours of birth
    - **YES**
      - Urgent referral for SBR and review within 2 hours. Urgent contact NNU ANNP/SHO on call
    - **NO**
      - Action: Start single or double phototherapy whilst lab result awaited, send SBR, FBC+film, urgent Group and DAT, U&Es. Consider CRP, blood culture, IV antibiotics. Repeat SBR after 3 hours, consider need for umbilical lines/moisten cord. Rising trend ≥8μmol/l per hour→ increase phototherapy, optimise hydration, order blood for exchange transfusion via Blood Bank urgently. Consider IVIG infusion. Check SBR 6 hourly until stable/falling. (Exchange blood from Bristol/Plymouth, 160ml/kg volume needed)

- **Over 24hrs**
  - TCB eligible if:
    - Over 24hrs old AND
    - Over 35 weeks AND
    - No phototherapy given AND
    - TCB monitor available
  - **YES**
    - Check TCB as average of 3 readings, accurately plot result on correct NICE jaundice chart for gestational age. NOTE major difference in 37 to 38 week charts, baby stays on same chart for 14 days. TCB Over treatment threshold?
    - TCB over 250μmol/l?
      - **YES**
        - Urgent referral for SBR within 6 hours via ANNP/SHO on call
      - **NO**
        - SBR at or above treatment level
          - **YES**
            - Start phototherapy
          - **NO**
            - Urgent referral for SBR within 4-6 hours

  - **NO**
    - Over 14 days old (21days pre term) refer for prolonged jaundice screen

- **Jaundice in the first 2 weeks of life**
  - Over 14 days old (21days pre term) refer for prolonged jaundice screen

**HIGHER RISK FACTORS:**
- Known antibodies
- Rhesus negative mother
- Bruising
- IUGR/ Premature <38/40
- Sepsis
- Previous baby treated for jaundice
- Poor feeding
- Exclusively breastfed
- Family History of Spherocytosis

**ALL JAUNDICED BABIES:**
- Check baby for symptoms of being unwell: feeding, activity, colour and amount of stool/urine passed
- Monitor baby’s weight
- If baby sleepy advise to wake for feeds 8 times daily.
- May need feed support – cup/syringe/NG Tube/Bottle
- Avoid prolonged feeding/cares/handling time when on phototherapy.
- Keep family updated

**ALL BABIES ON PHOTOTHERAPY:**
- Check plotted on correct gestation jaundice chart
- Send FBC, Group and DAT
- Repeat SBR after 4-6hrs
- Rising trend, consider double phototherapy, repeat SBR 6-8hrly
- Trend rising ≥8μmol/hr increase phototherapy to double/triple and discuss with senior urgently
- Falling trend SBR 6-12hrly
- Stop phototherapy when SBR ≥ 50μmol/l under treatment line. Check REBOUND SBR in 12-18hrs

**SEEN BODY OF GUIDELINE FOR ADDITIONAL INFORMATION**

**References and abbreviations:** NICE Clinical Guideline Management of neonatal jaundice CG 98 (May 2016)** TCB=Transcutaneous bilirubin SBR= Serum Bilirubin Assessment and management of jaundice within the first two weeks of life – Neonatal Clinical Guideline