



*National Institute for  
Health and Clinical Excellence*

**Quick reference guide**

Issue date: May 2010

**Neonatal jaundice**

Open for a table on bilirubin thresholds for managing hyperbilirubinaemia

Treatment threshold graphs showing bilirubin thresholds for phototherapy and exchange transfusion in babies with hyperbilirubinaemia for different gestational ages are available in a separate file from

[www.nice.org.uk/guidance/CG98](http://www.nice.org.uk/guidance/CG98)

## Threshold table

Consensus-based bilirubin thresholds for management of babies 38 weeks or more gestational age with hyperbilirubinaemia

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
84	–	> 275	> 325	> 450
90	–	> 287	> 337	> 450
96+	–	> 300	> 350	> 450
Action	↓	↓	↓	↓
	Repeat bilirubin measurement in 6–12 hours	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

## About this booklet

This is a quick reference guide that summarises the recommendations NICE has made to the NHS in 'Neonatal jaundice' (NICE clinical guideline 98).

### Who should read this booklet?

This quick reference guide is for all healthcare professionals and other staff who care for newborn babies with jaundice.

### Who wrote the guideline?

The guideline was developed by the National Collaborating Centre for Women's and Children's Health, which is linked with the Royal College of Obstetricians and Gynaecologists. The Collaborating Centre worked with a group of healthcare professionals (including consultants, GPs, midwives, and specialist and community nurses), parent members and technical staff, who reviewed the evidence and drafted the recommendations. The recommendations were finalised after public consultation.

For more information on how NICE clinical guidelines are developed, go to [www.nice.org.uk](http://www.nice.org.uk)

### Where can I get more information about the guideline?

The NICE website has the recommendations in full, reviews of the evidence they are based on, a summary of the guideline for parents and carers, and tools to support implementation (see back cover for more details).






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NICE clinical guidelines are recommendations about the treatment and care of people with specific diseases and conditions in the NHS in England and Wales.

This guidance represents the view of NICE, which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer, and informed by the summary of product characteristics of any drugs they are considering.

Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.

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## Introduction

Jaundice is one of the most common conditions needing medical attention in newborn babies. Jaundice refers to yellow colouration of the skin and the sclerae and is caused by a raised level of bilirubin in the circulation, a condition known as hyperbilirubinaemia.

Approximately 60% of term and 80% of preterm babies develop jaundice in the first week of life, and about 10% of breastfed babies are still jaundiced at 1 month of age. In most babies early jaundice is harmless. However, a few babies will develop very high levels of bilirubin, which can be harmful if not treated.

Clinical recognition and assessment of jaundice can be difficult, particularly in babies with dark skin tones. Once jaundice is recognised, there is uncertainty about when to treat, and there is widespread variation in the use of phototherapy and exchange transfusion. This guideline provides guidance on the recognition, assessment and treatment of neonatal jaundice in babies from birth to 28 days.

## Patient-centred care

Treatment and care should take into account parents' preferences. Good communication is essential, supported by evidence-based information, to allow parents to reach informed decisions about their baby's care. Follow advice on seeking consent from the Department of Health or Welsh Assembly Government if needed. Families and carers should have the opportunity to be involved in decisions about treatment and care.

## Key to terms

**Conventional phototherapy** Phototherapy given using a single light source (not fibreoptic) that is positioned above the baby

**Direct antiglobulin test (DAT)** Also known as the direct Coombs' test; this test is used to detect antibodies or complement proteins that are bound to the surface of red blood cells

**Fibreoptic phototherapy** Phototherapy given using a single light source that comprises a light generator, a fibreoptic cable through which the light is carried and a flexible light pad, on which the baby is placed or that is wrapped around the baby

**Multiple phototherapy** Phototherapy that is given using more than one light source simultaneously; for example two or more conventional units, or a combination of conventional and fibreoptic units

**Preterm** Less than 37 weeks gestational age

**Prolonged jaundice** Jaundice lasting more than 14 days in term babies and more than 21 days in preterm babies

**Significant hyperbilirubinaemia** An elevation of the serum bilirubin to a level requiring treatment

**Term** 37 weeks or more gestational age

**Visible jaundice** Jaundice detected by visual inspection

## Key priorities for implementation

### Information

- Offer parents or carers information about neonatal jaundice that is tailored to their needs and expressed concerns. This information should be provided through verbal discussion backed up by written information. Care should be taken to avoid causing unnecessary anxiety to parents or carers. Information should include:
  - factors that influence the development of significant hyperbilirubinaemia
  - how to check the baby for jaundice
  - what to do if they suspect jaundice
  - the importance of recognising jaundice in the first 24 hours and of seeking urgent medical advice
  - the importance of checking the baby's nappies for dark urine or pale chalky stools
  - the fact that neonatal jaundice is common, and reassurance that it is usually transient and harmless
  - reassurance that breastfeeding can usually continue.

### Care for all babies

- Identify babies as being more likely to develop significant hyperbilirubinaemia if they have any of the following factors:
  - gestational age under 38 weeks
  - a previous sibling with neonatal jaundice requiring phototherapy
  - mother's intention to breastfeed exclusively
  - visible jaundice in the first 24 hours of life.
- In all babies:
  - check whether there are factors associated with an increased likelihood of developing significant hyperbilirubinaemia soon after birth
  - examine the baby for jaundice at every opportunity especially in the first 72 hours.
- When looking for jaundice (visual inspection):
  - check the naked baby in bright and preferably natural light
  - examination of the sclerae, gums and blanched skin is useful across all skin tones.

### Additional care

- Ensure babies with factors associated with an increased likelihood of developing significant hyperbilirubinaemia receive an additional visual inspection by a healthcare professional during the first 48 hours of life.

### Measuring bilirubin in all babies with jaundice

- Do not rely on visual inspection alone to estimate the bilirubin level in a baby with jaundice.

*continued*

## Key priorities for implementation *continued*

### How to measure the bilirubin level

- When measuring the bilirubin level:
  - use a transcutaneous bilirubinometer in babies with a gestational age of 35 weeks or more and postnatal age of more than 24 hours
  - if a transcutaneous bilirubinometer is not available, measure the serum bilirubin
  - if a transcutaneous bilirubinometer measurement indicates a bilirubin level greater than 250 micromol/litre check the result by measuring the serum bilirubin
  - always use serum bilirubin measurement to determine the bilirubin level in babies with jaundice in the first 24 hours of life
  - always use serum bilirubin measurement to determine the bilirubin level in babies less than 35 weeks gestational age
  - always use serum bilirubin measurement for babies at or above the relevant treatment threshold for their postnatal age, and for all subsequent measurements
  - do not use an icterometer.

### How to manage hyperbilirubinaemia

- Use the bilirubin level to determine the management of hyperbilirubinaemia in all babies (see threshold table<sup>1</sup> and treatment threshold graphs<sup>2</sup>).

### Care of babies with prolonged jaundice

- Follow expert advice about care for babies with a conjugated bilirubin level greater than 25 micromol/litre because this may indicate serious liver disease.

<sup>1</sup> The threshold table is on the foldout page at the front of this quick reference guide.

<sup>2</sup> The treatment threshold graphs are available in a separate file from [www.nice.org.uk/guidance/CG98](http://www.nice.org.uk/guidance/CG98)



## Information and support for parents and carers

- Offer parents or carers information about neonatal jaundice that is tailored to their needs and expressed concerns. This information should be provided through verbal discussion backed up by written information. Care should be taken to avoid causing unnecessary anxiety to parents or carers. Information should include:
  - factors that influence the development of significant hyperbilirubinaemia
  - how to check the baby for jaundice
  - what to do if they suspect jaundice
  - the importance of recognising jaundice in the first 24 hours and of seeking urgent medical advice
  - the importance of checking the baby's nappies for dark urine or pale chalky stools
  - the fact that neonatal jaundice is common, and reassurance that it is usually transient and harmless
  - reassurance that breastfeeding can usually continue.
- Encourage mothers of breastfed babies with jaundice to breastfeed frequently, and to wake the baby for feeds if necessary.
- Provide lactation/feeding support to breastfeeding mothers whose baby is visibly jaundiced.

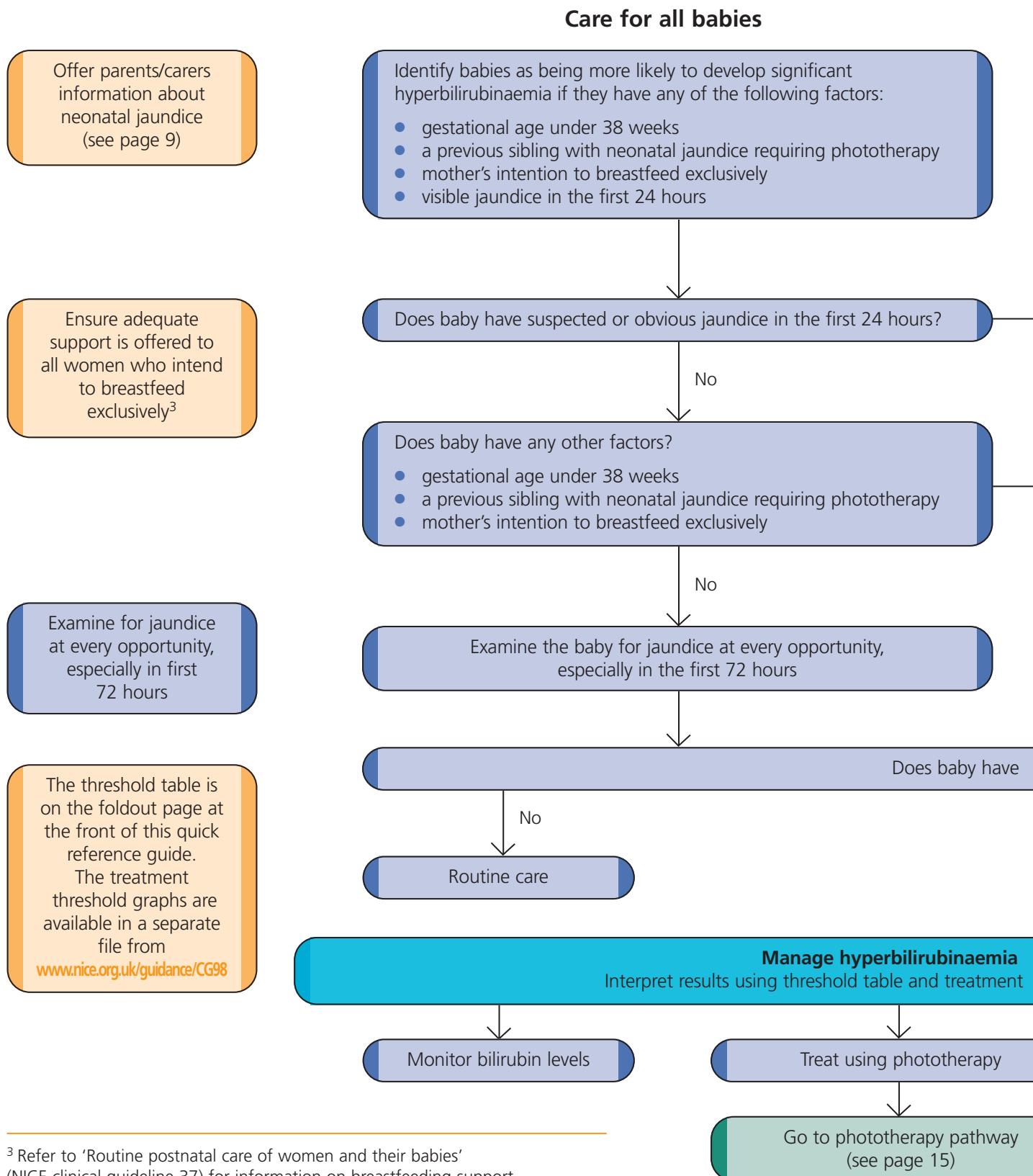
## Investigation

See the investigation pathway on pages 10–11.

### Inspection for jaundice

- Parents, carers and healthcare professionals should all look for jaundice (visual inspection):
  - check the naked baby in bright and preferably natural light
  - examination of the sclerae, gums and blanched skin is useful across all skin tones.
- Do not rely on visual inspection alone to estimate the bilirubin level in a baby with jaundice.
- Do not use any of the following to predict significant hyperbilirubinaemia:
  - umbilical cord blood bilirubin level
  - end-tidal carbon monoxide (ETCOc) measurement
  - umbilical cord blood direct antiglobulin test (DAT).

## Investigation pathway



**Care for babies with signs of acute bilirubin encephalopathy**

Check for signs of acute bilirubin encephalopathy

Go to exchange transfusion pathway (see page 16)

**Urgent additional care for babies with jaundice in the first 24 hours**

Yes

Measure and record serum bilirubin level within 2 hours

Yes

Ensure babies receive an additional visual inspection by a healthcare professional within 48 hours

**Additional care for babies who are more likely to develop hyperbilirubinaemia**

Continue to measure the serum bilirubin level every 6 hours until the level is both:

- below the treatment threshold
- stable and/or falling

Arrange a referral to ensure that an urgent medical review is conducted (as soon as possible and within 6 hours) to exclude pathological causes of jaundice

visible jaundice?

Yes

Measure and record bilirubin level within 6 hours

threshold graphs

Treat using exchange transfusion

Go to exchange transfusion pathway (see page 16)

### How to measure the bilirubin level

- When measuring the bilirubin level:
  - use a transcutaneous bilirubinometer in babies with a gestational age of 35 weeks or more and postnatal age of more than 24 hours
  - if a transcutaneous bilirubinometer is not available, measure the serum bilirubin
  - if a transcutaneous bilirubinometer measurement indicates a bilirubin level greater than 250 micromol/litre check the result by measuring the serum bilirubin
  - always use serum bilirubin measurement to determine the bilirubin level in babies:
    - ◆ with jaundice in the first 24 hours of life
    - ◆ less than 35 weeks gestational age
  - always use serum bilirubin measurement for babies at or above the relevant treatment thresholds for their postnatal age, and for all subsequent measurements
  - do not use an icterometer.
- Do not measure bilirubin levels routinely in babies who are not visibly jaundiced.

See the threshold table on the foldout page at the front of this quick reference guide and the treatment threshold graphs (available from [www.nice.org.uk/guidance/CG98](http://www.nice.org.uk/guidance/CG98)) when managing hyperbilirubinaemia.

## Phototherapy

See the phototherapy pathway on page 15.

### Information for parents or carers on phototherapy

- Offer parents or carers verbal and written information on phototherapy including:
  - why phototherapy is being considered
  - why phototherapy may be needed to treat significant hyperbilirubinaemia
  - anticipated duration of treatment
  - the possible adverse affects of phototherapy including potential long-term adverse effects
  - 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.

### General care of the baby during phototherapy

- Place the baby in a supine position unless other clinical conditions prevent this.
- Give the baby eye protection and routine eye care.
- Use tinted headboxes as an alternative to eye protection in term babies undergoing conventional 'blue light' phototherapy.
- Ensure treatment is applied to the maximum area of skin.
- Monitor the baby's temperature and ensure the baby is kept in a thermoneutral environment.
- Monitor hydration by daily weighing of the baby and assessing wet nappies.
- Support parents and carers and encourage them to interact with the baby.

### Starting phototherapy

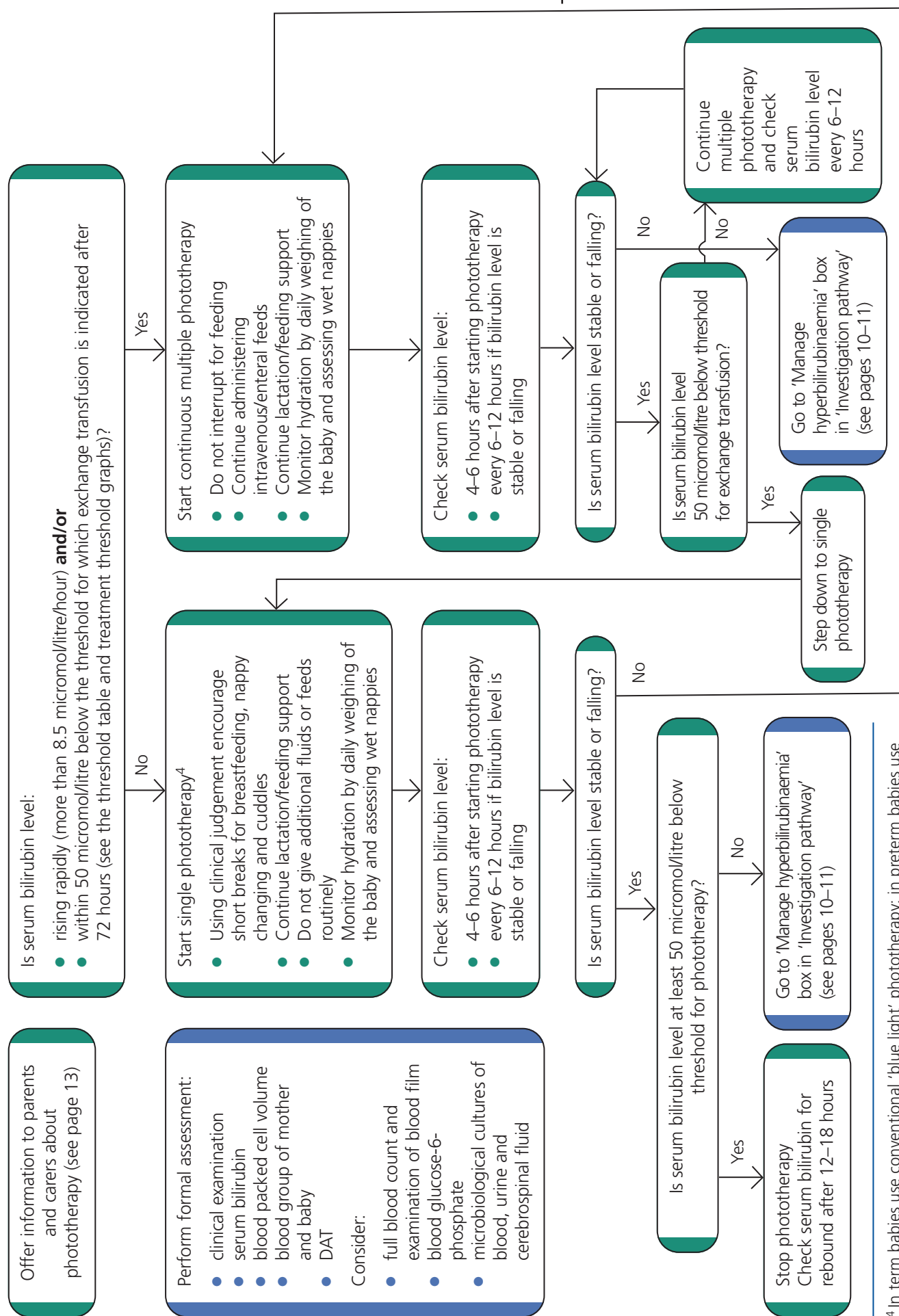
- Use serum bilirubin measurement and the treatment thresholds in the threshold table and treatment threshold graphs when considering the use of phototherapy.
- In babies with a gestational age of 38 weeks or more whose bilirubin is in the 'repeat bilirubin measurement' category in the threshold table, repeat the bilirubin measurement in 6–12 hours.
- In babies with a gestational age of 38 weeks or more whose bilirubin is in the 'consider phototherapy' category in the threshold table, repeat the bilirubin measurement in 6 hours regardless of whether or not phototherapy has subsequently been started.
- Do not use phototherapy in babies whose bilirubin does not exceed the phototherapy threshold levels in the threshold table and treatment threshold graphs.

### Phototherapy equipment

- Ensure all phototherapy equipment is maintained and used according to the manufacturers' guidelines.
- Use incubators or bassinets according to clinical need and availability.
- Do not use white curtains routinely with phototherapy.

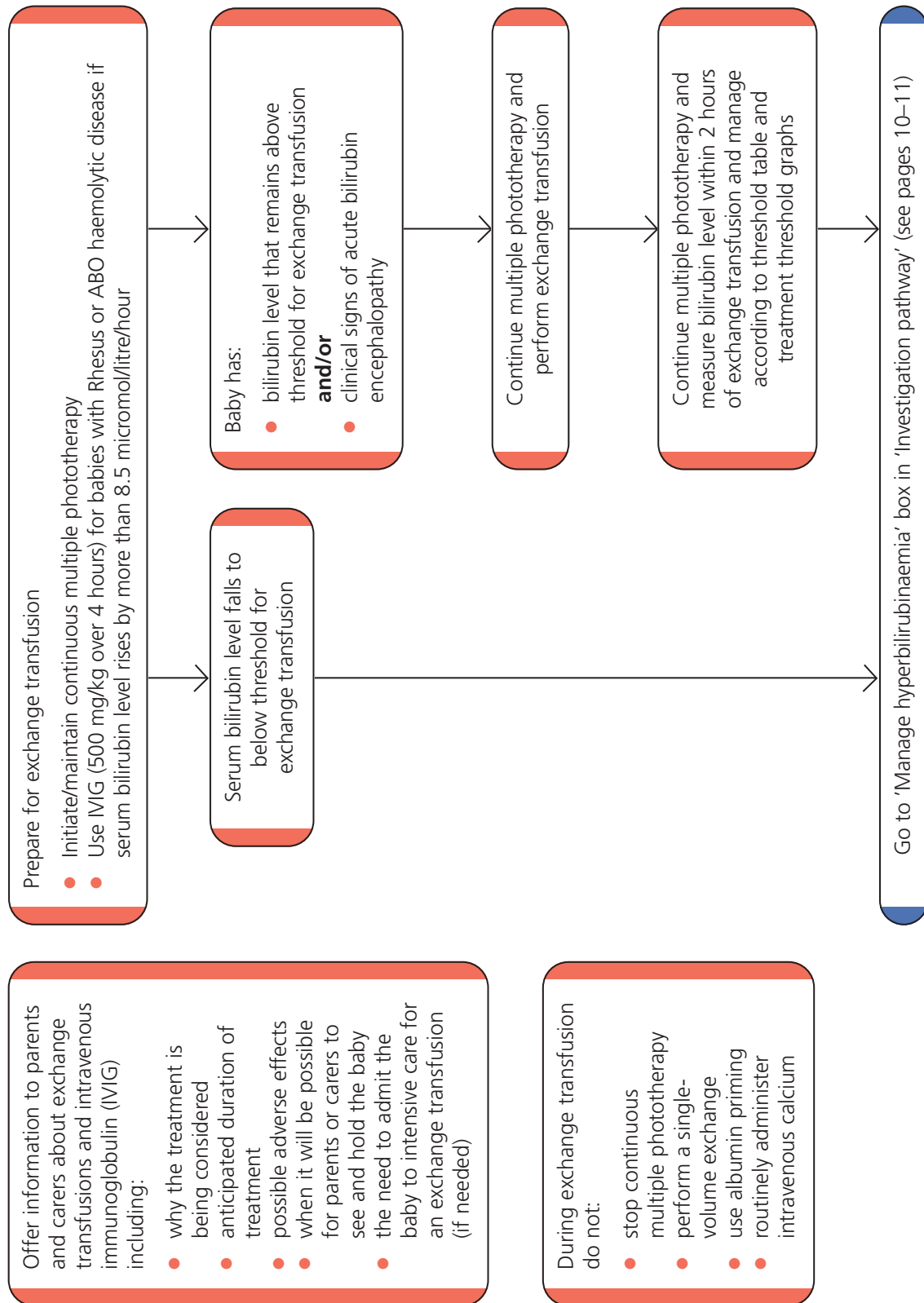
See the threshold table on the foldout page at the front of this quick reference guide and the treatment threshold graphs (available from [www.nice.org.uk/guidance/CG98](http://www.nice.org.uk/guidance/CG98)) when managing hyperbilirubinaemia.

## Phototherapy pathway



<sup>4</sup> In term babies use conventional 'blue light' phototherapy; in preterm babies use fibreoptic or conventional 'blue light' phototherapy.

## Exchange transfusion pathway





## Further issues on treatment and management

### Management of hyperbilirubinaemia

- When making decisions about the management of hyperbilirubinaemia:
  - do not use the albumin/bilirubin ratio
  - do not subtract conjugated bilirubin from total serum bilirubin.

### Other therapies

- Do not use any of the following to treat hyperbilirubinaemia:
  - sunlight
  - agar
  - albumin
  - barbiturates
  - charcoal
  - cholestyramine
  - clofibrate
  - D-penicillamine
  - glycerin
  - manna
  - metalloporphyrins
  - riboflavin
  - traditional Chinese medicine
  - acupuncture
  - homeopathy.

### Factors that influence the risk of kernicterus

- Identify babies with hyperbilirubinaemia as being at increased risk of developing kernicterus if they have any of the following:
  - a serum bilirubin level greater than 340 micromol/litre in term babies
  - a rapidly rising bilirubin level of greater than 8.5 micromol/litre per hour
  - clinical features of acute bilirubin encephalopathy.

### Care for babies with prolonged jaundice

- In preterm and term babies with prolonged jaundice (see page 6 for definitions):
  - look for pale chalky stools and/or dark urine that stains the nappy
  - measure the conjugated bilirubin
  - carry out a full blood count, blood group determination, DAT and urine culture
  - ensure that routine metabolic screening has been performed.
- Follow expert advice about care for babies with a conjugated bilirubin level greater than 25 micromol/litre.

## Further information

### Ordering information

You can download the following documents from [www.nice.org.uk/guidance/CG98](http://www.nice.org.uk/guidance/CG98)

- The NICE guideline – all the recommendations.
- A quick reference guide (this document) – a summary of the recommendations for healthcare professionals.
- ‘Understanding NICE guidance’ – a summary for parents and carers.
- The full guideline – all the recommendations, details of how they were developed, and reviews of the evidence they were based on.

For printed copies of the quick reference guide or ‘Understanding NICE guidance’, phone NICE publications on 0845 003 7783 or email [publications@nice.org.uk](mailto:publications@nice.org.uk) and quote:

- N2143 (quick reference guide)
- N2144 (‘Understanding NICE guidance’).

### Implementation tools

NICE has developed tools to help organisations implement this guidance (see [www.nice.org.uk/guidance/CG98](http://www.nice.org.uk/guidance/CG98)).

### Related NICE guidance

For information about NICE guidance that has been issued or is in development, see [www.nice.org.uk](http://www.nice.org.uk)

#### Published

- Diabetes in pregnancy: management of diabetes and its complications from pre-conception to the postnatal period. NICE clinical guideline 63 (2008). Available from: [www.nice.org.uk/guidance/CG63](http://www.nice.org.uk/guidance/CG63)
- Antenatal care: routine care for the healthy pregnant woman. NICE clinical guideline 62 (2008). Available from: [www.nice.org.uk/guidance/CG62](http://www.nice.org.uk/guidance/CG62)
- Intrapartum care: care of healthy women and their babies during childbirth. NICE clinical guideline 55 (2007). Available from: [www.nice.org.uk/guidance/CG55](http://www.nice.org.uk/guidance/CG55)
- Routine postnatal care of women and their babies. NICE clinical guideline 37 (2006). Available from: [www.nice.org.uk/guidance/CG37](http://www.nice.org.uk/guidance/CG37)

### Updating the guideline

This guideline will be updated as needed, and information about the progress of any update will be available at [www.nice.org.uk/guidance/CG98](http://www.nice.org.uk/guidance/CG98)

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