



## CLINICAL PATHWAY MANUAL *for*

# Midwifery Hyperbilirubinemia Screening and Management of Phototherapy

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## PURPOSE

This clinical pathway has been developed to provide midwives with guidance on hyperbilirubinemia screening and phototherapy management for infants in their care. It is meant to be used in conjunction with the Association of Ontario Midwives (AOM) clinical practice guideline (CPG) **No. 18: Management of Hyperbilirubinemia in Healthy Term and Late Preterm Neonates**. The CPG contains pertinent information that contextualizes the guidance in this pathway. Midwives should familiarize themselves with the CPG, to ensure a full understanding of the guidance and its appropriate application. As with the CPG, the information in this clinical pathway is not intended to dictate a course of action, but rather to serve as a tool to support clinical decision-making.

Midwives should consider this clinical pathway in relation to their scope of practice, midwifery standards, available resources and the communities within which they practice. This clinical pathway should not replace professional skill and judgment. Midwives should use their clinical judgment when interpreting and applying this clinical pathway to individual client and practice circumstances.

## KEY 2025 UPDATES

- New neurotoxicity and hyperbilirubinemia risk factors (see [Table 1](#) and [Table 2](#)).
- New hour-specific treatment thresholds based on gestational age at birth and the presence of neurotoxicity risk factors.
- Infants with neurotoxicity risk factors, other than gestational age (GA) < 38 weeks at birth, excluded from midwifery clinical pathway.
  - » Physician consult to address the increased risk of toxic effects from bilirubin on the newborn brain.
- Hour-specific nomogram and follow-up algorithms replaced with calculation of the delta TSB ( $\Delta$ TSB). The  $\Delta$ TSB better predicts development of clinically significant hyperbilirubinemia requiring treatment.
  - »  $\Delta$ TSB used to guide care planning and recommended time frame to follow up.
  - » Transcutaneous bilirubin (TcB) values can be used to calculate the  $\Delta$ TSB if a total serum bilirubin (TSB) is not required.
- A TSB should be collected when the TcB is within 50  $\mu$ mol/L of the hour-specific phototherapy threshold or if the TcB is above 250  $\mu$ mol/L.
- Discontinue phototherapy if TSB is > 30  $\mu$ mol/L below the phototherapy threshold for GA  $\geq$  38 weeks or > 60  $\mu$ mol/L for GA 35-37 weeks.
- Repeat TSB for rebound hyperbilirubinemia  $\geq$  12 to 24 hours after stopping phototherapy.
  - » TcB can be used for follow-up, provided a minimum of 18 hours has elapsed since phototherapy was discontinued.

## REVISIONS TO THIS CLINICAL PATHWAY

The AOM has revised this clinical pathway based on new guidance from the Canadian Paediatric Society (CPS) 2025 position statement [Guidelines for detection and management of hyperbilirubinemia in term and late preterm newborns \( \$\geq 35\$  weeks' gestational age\)](#). The hour-specific treatment thresholds for infants born at  $\geq 35$  weeks' GA, with or without neurotoxicity risk factors, are adopted from the CPS 2025 position statement for use in this pathway. Importantly, this revised pathway no longer uses the hour-specific nomogram and follow-up algorithms previously described. Instead, it reflects new CPS guidance, which uses the  $\Delta$ TSB to guide care planning for infants who do not reach the treatment thresholds. Additional key aspects have been adapted to incorporate midwifery philosophy and model of care, and to reflect guidance in the AOM's CPG [No. 18: Management of Hyperbilirubinemia in Healthy Term and Late Preterm Neonates](#).

## KEY OBJECTIVES

The key objectives of this clinical pathway are to:

- Provide midwives with a clinical pathway for hyperbilirubinemia screening, following recommendations from CPG No. 18: Management of Hyperbilirubinemia in Healthy Term and Late Preterm Neonates.
- Provide midwives with a clinical pathway for midwifery management of phototherapy, if applicable to the individual midwife's practice.

## POPULATION DEFINITION

**This clinical pathway for midwifery screening and management of phototherapy is intended for healthy infants born  $\geq 35$  weeks' gestation.**

**This clinical pathway is not applicable to:**

- Infants born  $< 35$  weeks' gestation;
- Infants who develop visible jaundice  $< 24$  hours of age;
- Infants with the following neurotoxicity risk factors ([Table 1](#)), other than gestational age  $< 38$  weeks at birth, including:
  - » hypoalbuminemia (serum albumin  $< 30$  g/L)
  - » suspected or diagnosed hemolytic condition
  - » suspected or culture-proven sepsis
  - » significant hemodynamic and/or respiratory instability in the previous 24 hours
- Infants born to a birthing parent with known red cell antibodies (isoimmunization) identified during the prenatal or intrapartum period;
  - » For infants born to an isoimmunized birthing parent, a pediatric consultation is warranted, because of the higher risk of bilirubin encephalopathy.

**In these instances, midwives should refer to local community standards and initiate a physician consult when indicated.**

# SCREENING – SPECIAL CONSIDERATIONS

## TYPE O BIRTHING PARENTS

One common underlying condition that can cause or worsen the severity of neonatal hyperbilirubinemia is hemolytic disease of the newborn (HDN) because of an ABO blood group incompatibility. Most commonly, this occurs when a group O birthing parent gives birth to an infant who is group A or B. O blood type is the most common: about 46% of the Canadian population has this blood type. A direct anti-globulin test (DAT), also referred to as a direct Coombs test, can be performed on cord blood or blood drawn by heel prick to detect the presence of parental antibodies on the infant's red blood cells. While a positive DAT indicates the presence of antibodies, it does not diagnose or measure the degree of hemolysis, if present. Hemolysis is best confirmed using the DAT in conjunction with other investigations that are beyond the scope of the CPG and this clinical pathway.

### ***Special considerations: Type O birthing parents***

For type O birthing parents, consider collecting and storing cord blood for potential processing if jaundice presents in the first 24 hours or if a TSB is later required. Knowing the infant's blood group and DAT may support risk assessment for hemolysis and identify infants at greater risk of developing severe hyperbilirubinemia.

When a TSB is drawn for infants of type O birthing parents, midwives may order blood group and DAT:

- i on cord blood stored from birth, or
- ii by drawing a tube of blood in addition to TSB by heel prick.

If the newborn's TSB level is below treatment thresholds and no further testing is required, cord blood will not need to be tested for blood group and DAT.

If the TSB level is elevated, cord blood may be processed by the lab to help identify the underlying cause of hyperbilirubinemia and determine the need for follow-up.

# TRANSCUTANEOUS BILIMETERS (TCB) AND TOTAL SERUM BILIRUBIN (TSB)

## *Special considerations: use of TcB*

- For screening, TcB should be used preferentially over TSB (if available), as it is painless, less invasive and provides point-of-care testing.
- TcB tends to overestimate bilirubin levels in infants with darker skin tones; however, use of bilimeters is still appropriate for darker-skinned infants.
- TcB has good correlation with TSB but is less accurate at higher bilirubin concentrations. Therefore, **if TcB is within 50  $\mu\text{mol/L}$  of the hour-specific phototherapy threshold, or if TcB is above 250  $\mu\text{mol/L}$ , a TSB should be collected.**
  - » If TcB is at or above the phototherapy threshold, midwives should use clinical judgment in determining whether to initiate phototherapy before the TSB result is available. In making this decision, midwives should take into account the TcB measurement's proximity to the phototherapy threshold, the newborn's general well-being and gestational age, the presence of any hyperbilirubinemia risk factors and timing considerations for availability of the TSB result.
  - » Once available, the TSB should be used as the baseline bilirubin value to guide ongoing management, replacing the initial TcB screen.
- When assessing the need for repeat bilirubin testing, TcB values can be used to calculate the  $\Delta\text{TSB}$  if a TSB is not required.
- TcB should not be used to reassess bilirubin levels during phototherapy, but it may be used for follow-up if phototherapy has been discontinued for 18 hours or more.

## REPEAT BILIRUBIN TESTING

For infants who do not require phototherapy but whose  $\Delta\text{TSB}$  indicates the need for repeat bilirubin testing, ongoing surveillance should be guided by the subsequent TSB or TcB result and the recalculated  $\Delta\text{TSB}$  value.

When evaluating serial TSB or TcB measurements, assess the direction of change in the  $\Delta\text{TSB}$  and the rate of rise (TSB trajectory) over time, taking into account:

- the newborn's GA at birth and age in hours,
- any hyperbilirubinemia risk factors ([Table 2](#)), and
- the overall clinical picture.

If two or more consecutive measurements demonstrate a stable or decreasing  $\Delta\text{TSB}$  trend and no hyperbilirubinemia risk factors are present, further bilirubin monitoring may be discontinued at the midwife's discretion, following an informed choice discussion with the client. Alternatively, midwives and clients may opt to continue monitoring until the  $\Delta\text{TSB}$  is  $> 90 \mu\text{mol/L}$ .

### Special considerations: TSB trajectory

The TSB trajectory is calculated by its rate of rise, or the difference between two sequential TSB values at least three hours apart, divided by the time elapsed between the two samples.

Example: An infant born at 40 weeks' gestation has a TSB of 180  $\mu\text{mol/L}$  at 24 hours of age. By 48 hours of age, the TSB has risen to 250  $\mu\text{mol/L}$ . The rate of rise is  $(250 \mu\text{mol/L} - 180 \mu\text{mol/L}) \div 24 \text{ hours} = 2.9 \mu\text{mol/L/h}$ .

**If the rate of rise is  $\geq 5 \mu\text{mol/L/h}$  in the first 24 hours of age or  $\geq 3.5 \mu\text{mol/L/h}$  thereafter, hemolysis (a neurotoxicity risk factor) can be suspected,** and additional investigations – such as hemoglobin level, peripheral blood smear and reticulocyte count – should be considered. In these cases, a physician should be consulted for prompt testing and treatment considerations.

## HYPERBILI ONLINE TOOL

*Hyperbili* is a free, user-friendly online tool that supports clinicians in the care and management of newborns with jaundice. Developed by pediatrician Dr. Michael Hill, and based on the 2025 position statement from the CPS, the tool provides evidence-based guidance for hyperbilirubinemia screening, treatment and follow-up.

With the introduction of *hyperbili*, the AOM Bili-Tool app (which was based on earlier CPS hyperbilirubinemia management guidelines) has been retired. Although *hyperbili* is not designed specifically for midwives and was not created by the AOM, it utilizes similar clinical prompts, and it can serve as a valuable aid for all practitioners who provide care to newborns.

The tool allows users to input TSB or TcB values and other pertinent clinical information to support decision-making. It provides automated recommendations, such as:

- If TcB is within 50  $\mu\text{mol/L}$  of the phototherapy threshold or above 250  $\mu\text{mol/L}$ , obtain a TSB; and
- If TSB reaches or exceeds the phototherapy threshold, initiate phototherapy.

Midwives are encouraged to interpret results within their scope of practice, exercising their knowledge, skills and clinical judgment, while taking into consideration local community standards and protocols. They should continue to follow local guidelines and consult a physician when appropriate.

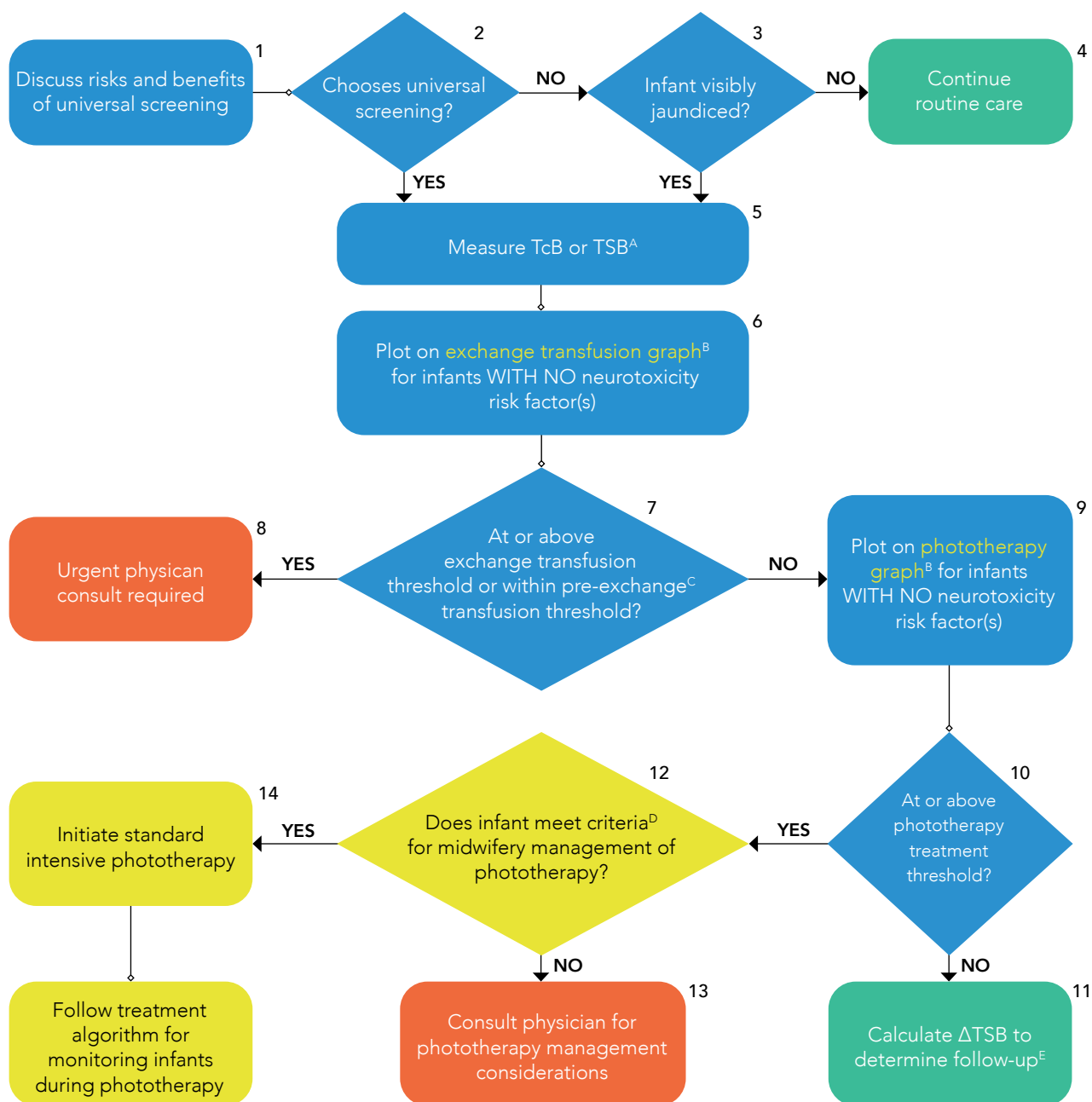
Midwives can use the *hyperbili* tool alongside this care pathway for screening purposes. Alternatively, they may choose to interpret results by plotting them manually on the exchange transfusion (Figure 1) and phototherapy (Figure 2) graphs.

# CLINICAL PATHWAY FOR MIDWIFERY HYPERBILIRUBINEMIA SCREENING AND MANAGEMENT OF PHOTOTHERAPY

This clinical pathway does not apply in the following circumstances:

- Infants who are < 35 weeks' gestation
- Infants with visible jaundice < 24 hours
- Infants with neurotoxicity risk factors, other than GA < 38 weeks at birth (Table 1)
- Infants born to a birthing parent with isoimmunization during the prenatal or intrapartum period

TSB=Total Serum Bilirubin (unconjugated/indirect bilirubin plus conjugated/direct bilirubin)  
 TcB=Transcutaneous Bilirubin  
 DAT=Direct Anti-Globulin Test (i.e., Coombs)  
 $\Delta$ TSB=Delta TSB (age-in-hours specific phototherapy threshold minus the measured TSB or TcB)



$\Delta$ TSB <sup>1</sup> (μmol/L)	Age (hours)	Recommended actions for follow-up
≤ 30	< 24	Delay discharge <sup>2</sup> and consider starting phototherapy
≤ 30	≥ 24	Delay discharge, <sup>2</sup> repeat TSB within 4 to 12 hours <sup>3</sup> and consider phototherapy if TSB increases
31 to 60	Any age	Repeat TSB within 12 to 24 hours <sup>3</sup> and reassess need for phototherapy
61 to 90	Any age	Repeat TSB within 24 to 48 hours
> 90	Any age	Routine follow-up with primary healthcare provider

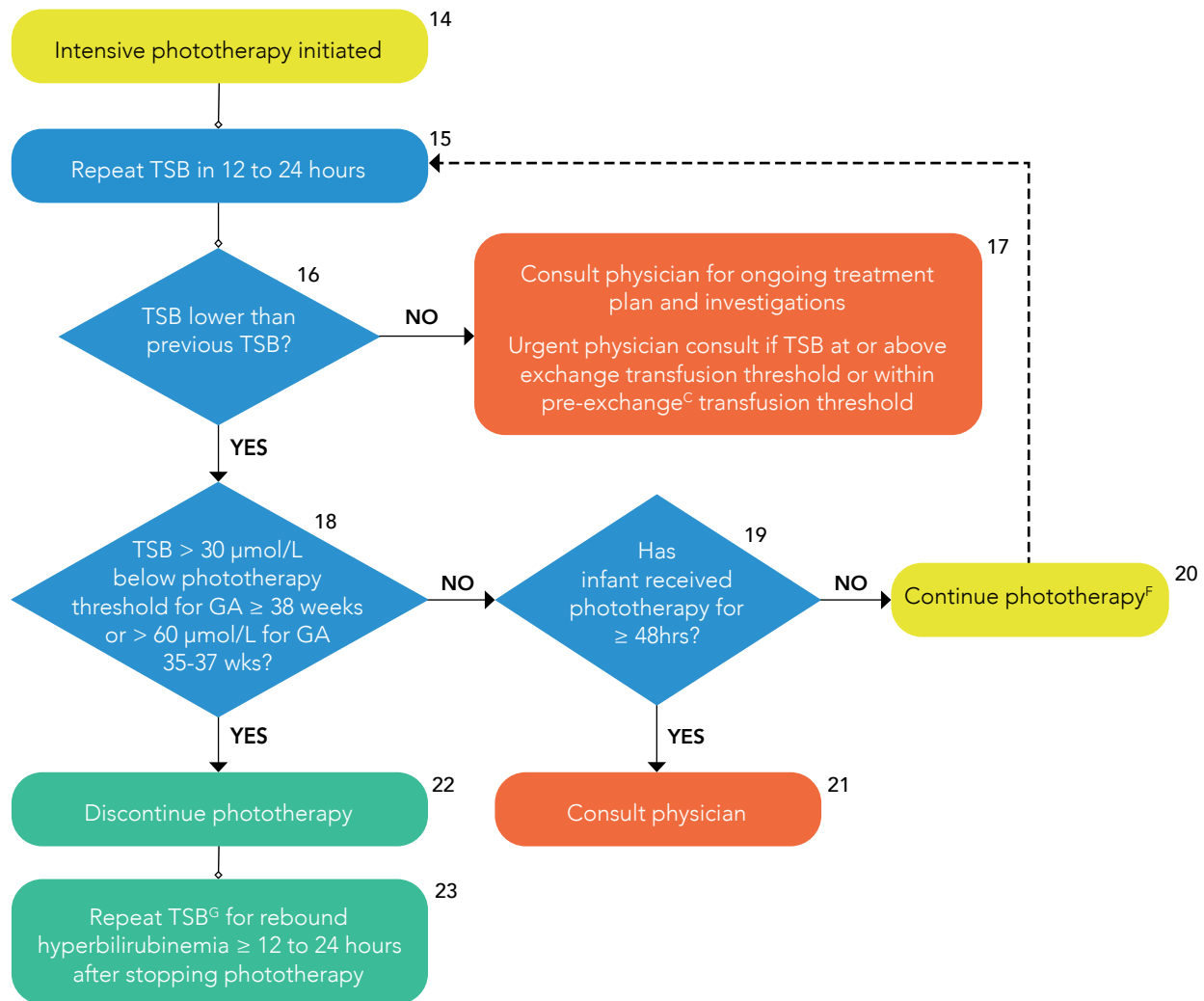
<sup>1</sup> TcB values can be used to calculate the  $\Delta$ TSB if a TSB is not indicated.

<sup>2</sup> For infants born out-of-hospital or discharged home early, consider the need for reassessment in-hospital based on midwifery resources and local community standards.

<sup>3</sup> Use clinical judgment and shared decision making to determine when to repeat the TSB within 4 to 24 hour time frame.

Table reproduced with permission from the Canadian Paediatric Society. Ng E, Altit G, Joynt C, Radziminski N, Narvey M; Canadian Paediatric Society, Fetus and Newborn Committee. Guidelines for detection and management of hyperbilirubinemia in term and late preterm newborns (≥ 35 weeks' gestational age). March 18, 2025: <https://cps.ca/en/documents/position/hyperbilirubinemia-newborns>

# ALGORITHM FOR MONITORING INFANTS DURING PHOTOTHERAPY



## CONSIDERATIONS

- <sup>A</sup> For infants of birthing parents with type O blood, if a TSB is required, midwives may order blood group and DAT:
  - i. on cord blood stored from birth; or
  - ii. by drawing a tube of blood in addition to TSB by heel prick.
- <sup>B</sup> There is generally good correlation between TcB and TSB. However, if TcB is within 50 µmol/L of the hour-specific phototherapy threshold or if the TcB is above 250 µmol/L, a TSB should be performed immediately and the result re-plotted on the graph.
- <sup>C</sup> Pre-exchange transfusion threshold is defined as a TSB ≤ 30 µmol/L of the exchange transfusion threshold.
- <sup>D</sup> Midwives who maintain care for infants requiring phototherapy should reference local standards, as criteria for midwifery management of phototherapy may vary between communities.
- <sup>E</sup> For infants who develop visible jaundice after initial screening, use clinical judgment in determining the need to re-screen; consider the presence or absence of risk factors and clinical signs of hyperbilirubinemia.
- <sup>F</sup> Frequency of TSB monitoring is determined by newborn's age, presence of risk factor(s) and TSB trajectory.
- <sup>G</sup> TcB can be used for follow-up, provided that at least 18 hours have elapsed since phototherapy was discontinued.

# CLINICAL PATHWAY INSTRUCTIONS AND SPECIAL CONSIDERATIONS

STEP	INSTRUCTIONS
<b>SCREENING</b>	
1	<p>Discuss the risks and benefits of universal screening with all clients as part of an informed choice discussion. This discussion may include:</p> <ul style="list-style-type: none"> <li>• What is known about risk factors for significant hyperbilirubinemia (<a href="#">Table 2</a>);</li> <li>• How visible jaundice, poor feeding, dehydration and weight loss can increase an infant’s risk of hyperbilirubinemia;</li> <li>• The limitations of relying on visual assessment alone to detect jaundice;</li> <li>• Timing of screening;</li> <li>• Barriers to and facilitators of screening within client’s community context; and</li> <li>• The client’s values, preferences and risk tolerance.</li> </ul> <p>Following this discussion, the client may choose:</p> <ul style="list-style-type: none"> <li>• <b>A universal screening approach</b>, with screening within the recommended time frame; or</li> <li>• <b>A wait-and-see approach</b>, with screening only if visible jaundice develops. If visible jaundice develops, screening is recommended. (Refer to <a href="#">CPG No. 18</a> recommendations 1, 9, 12 and 13 for more information on screening and associated risk factors.)</li> </ul> <p>Advise parents to contact their midwife if their newborn:</p> <ul style="list-style-type: none"> <li>• Appears visibly jaundiced in the first 24 hours after birth; or</li> <li>• Develops other signs associated with severe hyperbilirubinemia at any time, including: <ul style="list-style-type: none"> <li>» poor suck and/or reduced feeding</li> <li>» lethargy</li> <li>» dark urine or pale, chalky stools</li> <li>» high-pitched cry</li> </ul> </li> </ul> <p><b>Consult with a physician if signs of severe hyperbilirubinemia are observed at any time. For infants who develop visible jaundice &lt; 24 hours of age, refer to local community standards and initiate a physician consult when indicated.</b></p>
2	<p>Does the client choose universal screening?</p> <ul style="list-style-type: none"> <li>• If no, proceed to step 3.</li> <li>• If yes, proceed to step 5.</li> </ul>
3	<p>If the client does not choose universal screening, assess the newborn for visible jaundice.</p> <p><b>Signs of visible jaundice may include:</b></p> <ul style="list-style-type: none"> <li>• Yellowing of the skin, sclera (whites of the eyes), gums, tongue and/or mucous membranes. <ul style="list-style-type: none"> <li>» Yellowing of the skin may be more noticeable in infants with lighter skin tones, or in infants with darker skin tones when assessing their palms and soles or performing a skin blanch test.</li> </ul> </li> </ul> <p>Is the newborn visibly jaundiced?</p> <ul style="list-style-type: none"> <li>• If no, proceed to step 4.</li> <li>• If yes, proceed to step 5.</li> </ul>
4	<p>If the newborn is <b>not</b> visibly jaundiced, continue providing routine care.</p>
5	<p>Measure TSB or TcB.</p> <p>See <a href="#">Special considerations: Type O birthing parents</a></p>

STEP	INSTRUCTIONS
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### TSB/TcB MEASUREMENT

6	<p>Plot TSB or TcB on the <b>exchange transfusion graph</b> for infants without neurotoxicity risk factors (Figure 1), first, using age in hours at the time the bilirubin was taken.</p> <p>Plotting first on the exchange transfusion graph (Figure 1), rather than on the phototherapy graph (Figure 2), will quickly determine whether the infant's ongoing care should be managed by a physician or a midwife.</p> <p><b>Remember:</b> Treatment thresholds depend on the gestational age at birth.</p> <p>See <i>Special considerations: use of TcB</i> for guidance on TcB interpretation.</p>
7	<p>Is the TSB or TcB at or above the exchange transfusion threshold or within the pre-exchange transfusion threshold (defined as a TSB <math>\leq 30 \mu\text{mol/L}</math> of the exchange transfusion threshold) for infants without neurotoxicity risk factors (Figure 1)?</p> <ul style="list-style-type: none"><li>• If no, proceed to step 9.</li><li>• If yes, proceed to step 8.</li></ul>
8	<p>If TSB or TcB is at or above the exchange transfusion threshold or within the pre-exchange transfusion threshold, <b>consult urgently with a physician and transfer care.</b></p>
9	<p>If TSB or TcB is below the pre-exchange transfusion threshold for infants without neurotoxicity risk factors, plot value on the <b>phototherapy graph</b> for infants without neurotoxicity risk factors (Figure 2), using age in hours at the time the bilirubin was taken.</p> <p><b>If TcB is within <math>50 \mu\text{mol/L}</math> of, at or above the phototherapy treatment threshold, or if the TcB is above <math>250 \mu\text{mol/L}</math>, a TSB should be drawn promptly and replotted on the graph (Figure 2).</b></p> <ul style="list-style-type: none"><li>• If the initial TcB is above the phototherapy threshold, use clinical judgment to decide whether to start phototherapy before the TSB result is available.<ul style="list-style-type: none"><li>» Consider the TcB proximity to the phototherapy threshold, the newborn's general well-being, gestational age, the presence of hyperbilirubinemia risk factors and timing for availability of the TSB result.</li></ul></li></ul> <p><b>Remember:</b> Treatment thresholds depend on the gestational age at birth.</p>
10	<p>Is the TSB at or above the phototherapy treatment threshold for infants without neurotoxicity risk factors (Figure 2)?</p> <ul style="list-style-type: none"><li>• If no, proceed to step 11.</li><li>• If yes, proceed to step 12.</li></ul>

## FOLLOW-UP FOR INFANTS WHO PLOT BELOW THE PHOTOTHERAPY THRESHOLD

**11** If TSB or TcB is below the phototherapy treatment threshold, **calculate the delta-TSB ( $\Delta$ TSB)** to determine follow-up.  
*Note: TcB values can be used to calculate the  $\Delta$ TSB if a TSB is not required.*

The  $\Delta$ TSB is calculated by subtracting the phototherapy threshold at the infant's age, in hours, from the measured TSB or TcB level.

*Example: A 24-hour-old infant born at 37 weeks' gestation has a TSB screen of 150  $\mu$ mol/L. The phototherapy threshold at 24 hours for this infant (Figure 2) is 200  $\mu$ mol/L. Therefore, the  $\Delta$ TSB is 200  $\mu$ mol/L – 150  $\mu$ mol/L = 50  $\mu$ mol/L.*

See **Special considerations: use of TcB** for guidance on TcB interpretation.

**Use the  $\Delta$ TSB to guide clinical decision-making:**

- First, to determine whether the infant requires close monitoring or if phototherapy should be considered; and if not,
- To guide the timing of follow-up.

*Note: Measuring the  $\Delta$ TSB for screening purposes is intended for newborns who are at least 12 hours old and have not received phototherapy.*

**Provide follow-up care according to  $\Delta$ TSB (Table 3).**

**Repeat Bilirubin Testing: Evaluating Serial TSB or TcB Measurements**

When evaluating serial TSB or TcB measurements, assess the direction of change in the  $\Delta$ TSB and the rate of rise (TSB trajectory) over time, taking into account the newborn's gestation at birth and age in hours, any hyperbilirubinemia risk factors (Table 2) and the overall clinical picture.

**If two or more consecutive measurements demonstrate a stable or decreasing  $\Delta$ TSB trend and no hyperbilirubinemia risk factors are present, further bilirubin monitoring may be discontinued at the midwife's discretion, following an informed choice discussion with the client. Alternatively, midwives and clients may opt to continue monitoring until the  $\Delta$ TSB is > 90  $\mu$ mol/L.**

**TSB Trajectory**

The TSB trajectory is calculated by its rate of rise, or the difference between two sequential TSB values at least three hours apart, divided by the time elapsed between the two samples.

*Example: An infant born at 40 weeks' gestation has a TSB of 180  $\mu$ mol/L at 24 hours of age. By 48 hours of age, the TSB has risen to 250  $\mu$ mol/L. The rate of rise is (250  $\mu$ mol/L – 180  $\mu$ mol/L)  $\div$  24 hours = 2.9  $\mu$ mol/L/h.*

**If the TSB rate of rise is  $\geq$  5  $\mu$ mol/L/h in the first 24 hours of age or  $\geq$  3.5  $\mu$ mol/L/h beyond 24 hours of age, hemolysis (a neurotoxicity risk factor – Table 1) can be suspected, and a physician consult should be initiated.**

*If the newborn develops visible jaundice after discontinuation of follow-up measurements, use clinical judgment to determine the need to re-screen for hyperbilirubinemia.*

*Consider the presence or absence of other clinical risk factors, including suboptimal feeding, lethargy, dark urine or pale, chalky stools.*

STEP	INSTRUCTIONS
<b>PHOTOTHERAPY MANAGEMENT</b>	
12	<p>Assess whether the newborn meets local criteria for midwifery management of phototherapy.</p> <p><b>Midwives who maintain care for infants requiring phototherapy should reference local standards, as criteria for midwifery management of phototherapy may vary between communities.</b></p> <p>Does the newborn meet these criteria?</p> <ul style="list-style-type: none"> <li>• If no, proceed to step 13.</li> <li>• If yes, proceed to step 14.</li> </ul>
13	<p>If the newborn does not meet local criteria for midwifery management of phototherapy, <b>consult with a physician.</b></p> <p><i>Note: If, following a physician consult, a decision is made for the midwife to continue managing phototherapy, the midwife may do so based on the criteria agreed upon by both the physician and the midwife.</i></p>
14	<p>If the TSB is at or above phototherapy threshold, <b>commence standard intensive phototherapy</b> (see instructions below):</p> <p><b>Conventional phototherapy (narrow-spectrum lights)</b></p> <ul style="list-style-type: none"> <li>• Ensure unit is set to the correct irradiance: <ul style="list-style-type: none"> <li>» 460 to 490 nm wavelength, with an irradiance of at least 30 <math>\mu\text{W}/\text{cm}^2/\text{nm}</math> (standard intensive phototherapy).</li> </ul> </li> <li>• Diaper can remain on the newborn; expose maximum skin surface.</li> <li>• Ensure that the newborn's eyes are protected from lights.</li> <li>• Use clinical judgment regarding interruptions of infant's exposure to lights, considering timing and length of infant feeding or other required care (e.g., TSB level, presence of hyperbilirubinemia risk factors).</li> </ul> <p><b>Fibre optic phototherapy</b></p> <ul style="list-style-type: none"> <li>• Ensure unit is set to the correct irradiance: <ul style="list-style-type: none"> <li>» 460 to 490 nm wavelength, with an irradiance of at least 30 <math>\mu\text{W}/\text{cm}^2/\text{nm}</math> (standard intensive phototherapy).</li> </ul> </li> <li>• Ensure fibre optic blanket is in direct contact with skin; clothing may be worn over the blanket, if feasible.</li> <li>• Diaper can remain on the newborn; expose maximum skin surface.</li> <li>• Do not remove blanket from the newborn when feeding. <ul style="list-style-type: none"> <li>» Remind parents that they may also keep a blanket on the newborn when providing other routine care, such as during diaper changes.</li> </ul> </li> </ul>
15	<p>Repeat TSB 12 to 24 hours after standard intensive phototherapy was initiated. Use clinical judgment to determine appropriate timing for this follow-up testing.</p>
16	<p>Assess TSB: is the repeat TSB lower than the previous TSB?</p> <ul style="list-style-type: none"> <li>• If no, proceed to step 17.</li> <li>• If yes, proceed to step 18.</li> </ul>
17	<p>If TSB has not decreased since initiation of phototherapy, <b>consult a physician</b> for ongoing treatment plan and investigations.</p> <p>Prior to physician consult, <b>calculate the TSB trajectory</b> to help determine whether phototherapy can be continued or if treatment escalation is required.</p> <p><b>Urgent physician consult required if TSB at or above exchange transfusion threshold or within pre-exchange transfusion threshold (defined as a TSB <math>\leq</math> 30 <math>\mu\text{mol}/\text{L}</math> of the exchange transfusion threshold).</b></p>

STEP	INSTRUCTIONS
18	<p>If TSB has decreased since initiation of phototherapy, is TSB &gt; 30 µmol/L below phototherapy threshold for GA ≥ 38 weeks or &gt; 60 µmol/L for GA 35-37 weeks?</p> <ul style="list-style-type: none"> <li>• If no, proceed to step 19.</li> <li>• If yes, proceed to step 22.</li> </ul>
19	<p>Determine duration of phototherapy since onset. Has the newborn received phototherapy for ≥ 48 hours?</p> <ul style="list-style-type: none"> <li>• If no, proceed to step 20.</li> <li>• If yes, proceed to step 21.</li> </ul>
20	<p><b>Continue phototherapy.</b></p> <p>The frequency of TSB measurements during phototherapy is determined based on:</p> <ul style="list-style-type: none"> <li>• the newborn's age;</li> <li>• presence of neurotoxicity risk factors (Table 1);</li> <li>• presence of hyperbilirubinemia risk factors (Table 2); and</li> <li>• TSB trajectory.</li> </ul> <p>Except for infants whose TSB is within the pre-exchange transfusion threshold (defined as a TSB ≤ 30 µmol/L of the exchange transfusion threshold), <b>repeating the TSB within 12 to 24 hours is recommended.</b></p>
21	<p>If the newborn requires phototherapy for ≥ 48 hours, <b>consult with a physician.</b></p>
22	<p>If TSB is &gt; 30 µmol/L below the phototherapy threshold for GA ≥ 38 weeks or &gt; 60 µmol/L for GA 35-37 weeks, <b>discontinue phototherapy.</b></p> <p>If administering phototherapy in hospital, the midwife may discharge the newborn at this point. Use clinical judgment to determine timing of discharge.</p>
23	<p>Repeat TSB for rebound hyperbilirubinemia ≥ 12 to 24 hours after stopping phototherapy.</p> <ul style="list-style-type: none"> <li>• Re-measuring TSB no sooner than 12 to 24 hours after stopping phototherapy will detect rebound hyperbilirubinemia if it occurs. <ul style="list-style-type: none"> <li>» Note: TcB can be used for follow-up, provided that a minimum of 18 hours has elapsed since phototherapy was discontinued.</li> </ul> </li> </ul>

# APPENDIX

**TABLE 1: NEUROTOXICITY RISK FACTORS**

• Lower gestational age at birth (< 38 weeks)
• Hypoalbuminemia (serum albumin < 30 g/L)
• Suspected or diagnosed hemolytic condition*
• Suspected or culture-proven sepsis
• Significant hemodynamic and/or respiratory instability in the previous 24 hours

\* Hemolysis may be suspected based on a rapid rate of increase in TSB  $\geq 5 \mu\text{mol/L/h}$  (within 24 hours post-birth) or  $\geq 3.5 \mu\text{mol/L/h}$  (beyond 24 hours post-birth).

Table reproduced with permission from the Canadian Paediatric Society. Ng E, Altit G, Joynt C, Radziminski N, Narvey M; Canadian Paediatric Society, Fetus and Newborn Committee. Guidelines for detection and management of hyperbilirubinemia in term and late preterm newborns ( $\geq 35$  weeks gestational age). March 18, 2025: <https://cps.ca/en/documents/position/hyperbilirubinemia-newborns>

**TABLE 2: HYPERBILIRUBINEMIA RISK FACTORS**

• Lower gestational age at birth (< 38 weeks)
• Appearance of jaundice noted in the first 24 hours post-birth
• Evidence of hemolysis, with suspicion based on positive results from specific testing (e.g., DAT, peripheral blood smear, hemoglobin levels, G6PD assay, pyruvate kinase assay or others)
• Need for phototherapy in the first 72 hours of age
• Parent or sibling with a history of hyperbilirubinemia requiring phototherapy or exchange transfusion
• Family history or genetic predisposition to inherited red blood cell disorders causing hemolysis
• Suboptimal oral feeding volume or excessive weight loss (or both)
• Significant bruising or cephalohematoma
• Polycythemia

Table reproduced with permission from the Canadian Paediatric Society. Ng E, Altit G, Joynt C, Radziminski N, Narvey M; Canadian Paediatric Society, Fetus and Newborn Committee. Guidelines for detection and management of hyperbilirubinemia in term and late preterm newborns ( $\geq 35$  weeks gestational age). March 18, 2025: <https://cps.ca/en/documents/position/hyperbilirubinemia-newborns>

**TABLE 3: FOLLOW-UP FOR INFANTS WHO PLOT BELOW THE PHOTOTHERAPY THRESHOLD**

$\Delta\text{TSB}^1$ ( $\mu\text{mol/L}$ )	Age (hours)	Recommended actions for follow-up
$\leq 30$	< 24	Delay discharge <sup>2</sup> and consider starting phototherapy
$\leq 30$	$\geq 24$	Delay discharge, <sup>2</sup> repeat TSB within 4 to 12 hours <sup>3</sup> and consider phototherapy if TSB increases
31 to 60	Any age	Repeat TSB within 12 to 24 hours <sup>3</sup> and reassess need for phototherapy
61 to 90	Any age	Repeat TSB within 24 to 48 hours
> 90	Any age	Routine follow-up with primary healthcare provider

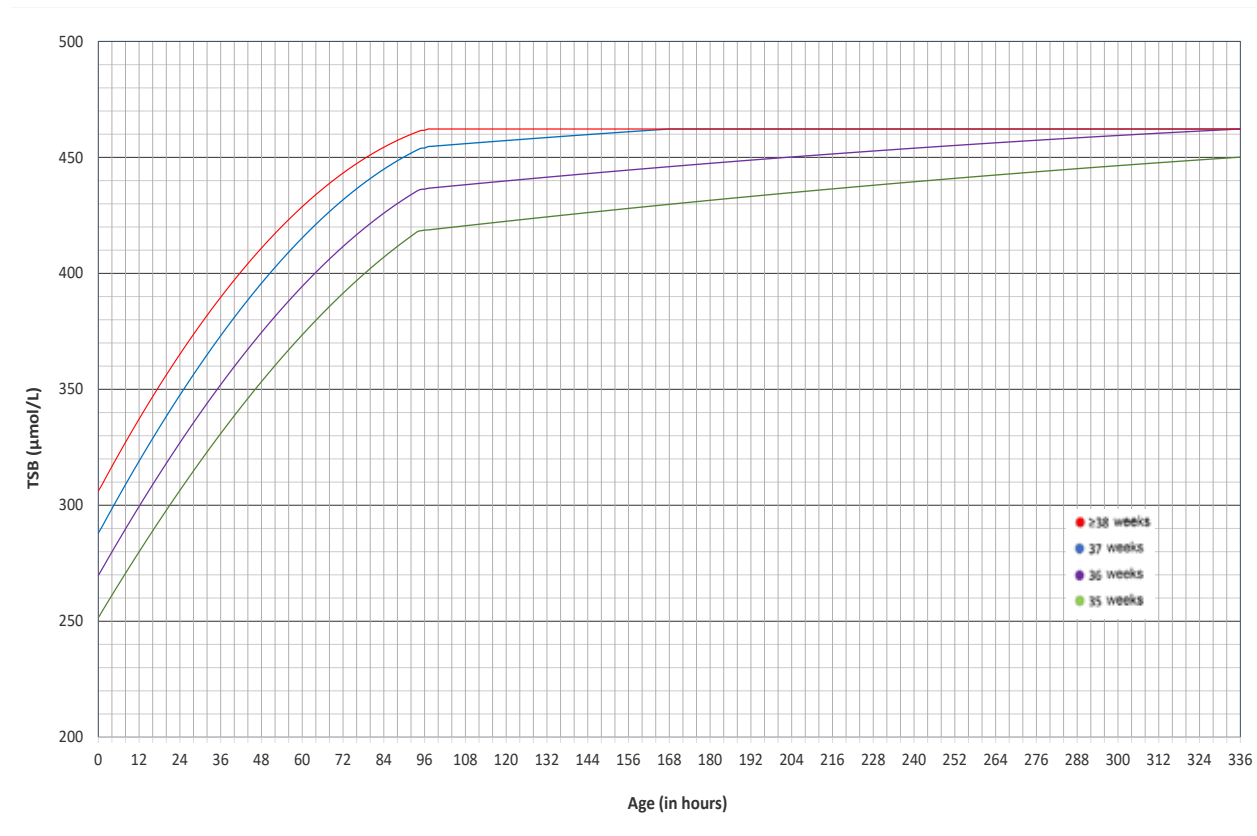
<sup>1</sup> TcB values can be used to calculate the  $\Delta\text{TSB}$  if a TSB is not indicated

<sup>2</sup> For infants born out-of-hospital or discharged home early, consider the need for reassessment in-hospital based on midwifery resources and local community standards.

<sup>3</sup> Use clinical judgment and shared decision making to determine when to repeat the TSB within 4 to 24 hour time frame.

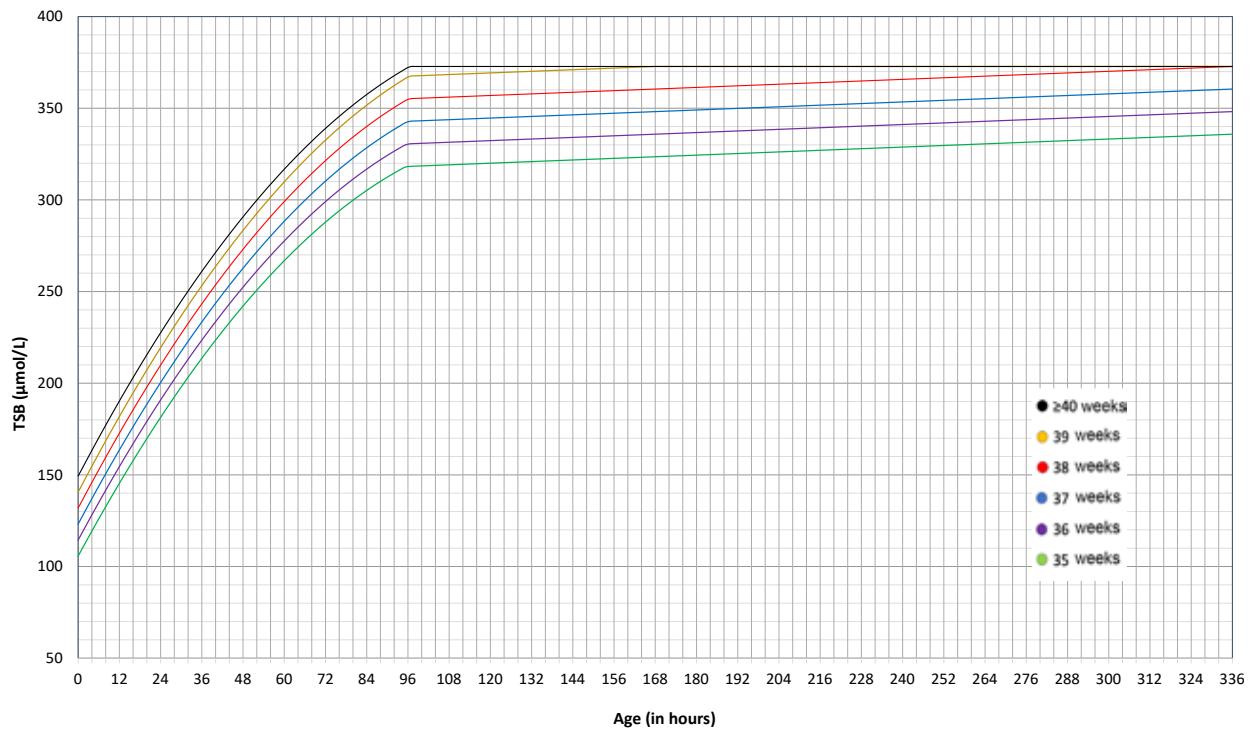
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**FIGURE 1: EXCHANGE TRANSFUSION THRESHOLDS FOR INFANTS WITH NO NEUROTOXICITY RISK FACTOR(S)**



**Source:** Guidelines for detection and management of hyperbilirubinemia in term and late preterm newborns, Canadian Paediatric Society, 2025.  
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**FIGURE 2: PHOTOTHERAPY THRESHOLDS FOR INFANTS WITH NO NEUROTOXICITY RISK FACTOR(S)**



**Source:** Guidelines for detection and management of hyperbilirubinemia in term and late preterm newborns, Canadian Paediatric Society, 2025.  
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