CLINICAL PRACTICE 18 GUIDELINE

MANAGEMENT OF HYPERBILIRUBINEMIA

IN HEALTHY TERM AND LATE PRETERM NEONATES

2026

Association *of* Ontario **Midwives**
Delivering what matters.

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The AOM is committed, through our statement on Gender Inclusivity and Human Rights, to reflect and include trans, genderqueer and intersex communities in all aspects of our work.

In this document, there are references to sources that use gendered language to refer to populations of pregnant and birthing people. In order to accurately represent these sources, we may have maintained gendered language.

We support research and knowledge translation that engages and reflects the entire childbearing population.

This document may be cited as: Association of Ontario Midwives. Management of Hyperbilirubinemia in the Healthy Term and Late Preterm Neonate. 2026; (Clinical Practice Guideline No. 18)

ABOUT THIS CPG

This CPG has been developed by and for midwives, contextualized within the midwifery model and philosophy of care and designed to provide information for midwives and clients engaged in complex decision-making. The information in this CPG is consistent with the best evidence available as of the date of publication, which is subject to change. The information in this guideline is not intended to dictate a course of action, but inform clinical decision-making. Midwives should use their clinical judgment on how to interpret and apply the recommendations to individual circumstances. Local standards may cause clinical practice to diverge from the suggestions within this guideline. If practice groups protocols depart from a guideline, it is advisable to document the rationale for the departure.

Midwives recognize that client expectations, preferences and interests are an essential component in clinical decision-making. Informed choice discussions involve explaining community standards, which may include applicable CPGs, hospital and practice protocols (if available) used in the community to guide provision of care. For clients to make a fully informed decision, midwives need to make clients aware of recommendations from their own profession (e.g., CPGs, CMO standards), related professions (e.g., SOGC, CPS) and those used in their community (e.g., hospital, regional guidelines). Clients may choose a course of action that may differ from the recommendations in this guideline, within the context of informed choice. When clients choose a course of action that diverges from a clinical practice guideline and/or practice group protocol the details of the discussion, the evidence shared and the client's choice should be well documented in their chart.

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AIM OF THE GUIDELINE

Statement of purpose

The goal of this document is to provide an evidence-based clinical practice guideline (CPG) on the prevention and management of neonatal hyperbilirubinemia that is consistent with the midwifery philosophy and model of care. Midwives in Ontario are encouraged to use this CPG as a tool in clinical decision-making.

Objectives

The objective of this CPG is to provide a critical review of the research literature on the management of hyperbilirubinemia in the otherwise healthy term or late preterm neonate (gestational age ≥ 35 weeks) within the context of provision of midwifery care in Ontario. Evidence relating to the following will be discussed:

- definition and incidence
- risk factors
- prevention
- screening
- treatment
- client experiences

Outcomes of interest

The following outcomes were rated as either "critical" or "important" following the GRADE process for each research question addressed in the guideline.

Critical:
- Neonatal mortality
- Chronic bilirubin encephalopathy
- Acute bilirubin encephalopathy
- Need for exchange transfusion
- Severe hyperbilirubinemia

Important:
- Significant hyperbilirubinemia
- Need for phototherapy
- Duration of phototherapy
- Bilirubin levels
- Hospital readmission
- Readmission length of stay
- Diagnostic accuracy of screening tests
- Adverse treatment effects
- Human milk feeding

Methods

This CPG uses the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) methodology for guideline development. The GRADE process determines the certainty of the evidence (how certain we should be in the results) as well as the strength of the recommendation. Certainty of evidence in this CPG is rated from very low to high, according to five GRADE domains: risk of bias, inconsistency, indirectness, imprecision and publication bias. Methodological concerns about the included studies, variability across results, applicability of the evidence to our context, precision of the results and completeness of the evidence base are considered as part of these domains.

The work group's judgments about the certainty of evidence reflect the work group's confidence that available evidence correctly reflects the true effect of the intervention and is sufficient to support decision-making.

CERTAINTY OF EVIDENCE	How certain we ought to be about an estimate of effect or association
High	Further research is very unlikely to change confidence in the estimate of effect. • This evidence provides a very good basis for decision-making.
Moderate	Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate. • This evidence provides a good basis for decision-making.
Low	Further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change the estimate. • This evidence provides some basis for decision-making.
Very low	Any estimate of effect is very uncertain. • This evidence does not provide much of a basis for decision-making.

Based on: (1–3)

Recommendations in this CPG are based on formal ratings of the certainty of evidence and are described as either strong or weak according to the GRADE approach. The strength of recommendation reflects the extent to which the Hyperbilirubinemia CPG Work Group (WG) is confident that the benefits of a recommended intervention outweigh its harms, or vice versa. The strength of recommendation is influenced by the certainty of supporting evidence, the balance between desirable and undesirable effects and the perceived variability or uncertainty in clients' values and preferences with respect to the intervention. (1–5) It is for these reasons that weak recommendations use the terminology "may" and strong recommendations use the terminology "should" within this CPG.

Good practice statements in this CPG represent guidance that the WG deemed important but that were not appropriate for formal ratings of certainty of evidence. Good practice statements are made when the WG is confident that the action has net benefit to the client and that sensible alternatives do not exist. (6)

Complete GRADE evidence tables used to summarize research and inform the recommendations in this guideline are available on the AOM website. A full description of the AOM's approach to clinical practice guideline development using GRADE is also available on the AOM website.

TYPES OF STATEMENTS IN THIS CPG

- **Recommendations:** Action statements about the intervention based on the certainty of the evidence, clinical considerations, preferences and values.
- **No recommendation:** WG has deemed that there is insufficient evidence available to make a recommendation about the intervention.
- **Good practice statements:** Statements whereby the net benefit of the intervention is large and unequivocal and the WG has considered it useful to provide guidance to clinicians in this area. The evidence for good practice statements is typically difficult to collect and summarize and therefore no formal rating of the certainty of evidence is undertaken.
- **Summary statements:** WG has deemed a recommendation unnecessary according to standards of care.

STRENGTH OF RECOMMENDATION	The extent to which the CPG Work Group is confident that benefits of the recommended intervention outweigh its harms (or vice versa)
Strong	Benefits clearly outweigh risks and burdens (or vice versa). *Can be interpreted as:* • Most clients should be offered the intervention, assuming that they have been informed about and understand its benefits, harms and burdens. • Most clients would want the recommended course of action and only a small proportion would not.
Weak	Benefits, risks and burdens are closely balanced. *Can be interpreted as:* • The majority of clients would want the suggested course of action, but an appreciable proportion would not. • Values and preferences vary widely.

Based on: (1–4)

Literature search

A search of the PubMed and CINAHL databases and Cochrane library from 2001-2018 was conducted using a defined search strategy. Additional search terms and hand searching were used to provide more detail on individual topics as they related to hyperbilirubinemia. Older studies were accessed in cases of commonly cited statistics or significant impact on clinical practice. Systematic reviews were prioritized; if no systematic reviews were found, randomized controlled trials and observational studies were retrieved.

We included any English-language publications that contained data related to the prevention, screening and/or management of hyperbilirubinemia in healthy term and late preterm (gestational age ≥ 35 weeks) infants. We excluded research articles with a primary focus on pathologic jaundice, conjugated hyperbilirubinemia and neonates with comorbidities, including but not limited to sepsis, cholestasis, G6PD deficiency or hemolytic disease. The management of infants with these complex conditions is not within the scope of midwifery care in Ontario.

Review

The 2019 CPG was reviewed using a modified version of the AGREE instrument and the AOM Values Based Approach to CPG Development, as well as a consensus among the Hyperbilirubinemia Work Group; the CPG Committee; the Quality, Insurance and Risk Management Committee; the AOM Board of Directors; and member consultation.

Updating this CPG

This CPG was partially updated in 2025, after publication of the 2025 position statement from the Canadian Paediatric Society (CPS), *Guidelines for detection and management of hyperbilirubinemia in term and late preterm newborns (≥ 35 weeks gestational age)* and the American Academy of Pediatrics 2022 *Clinical Practice Guideline Revision: Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation.* Based on the revised guidance and targeted research searches, substantive changes were made to the sections of this CPG about definitions, risk factors, prolonged jaundice and timing of universal screening.

Recommendations, good practice and summary statements in this updated CPG are labelled [new 2025] or [2025] or [2019]. See the table below for an explanation. Appendix A provides a detailed list of the updated or new recommendations and good practice statements in this guideline, along with an explanation of the changes. The 2025 update was reviewed by the Clinical Knowledge Translation (CKT) Committee and approved by the AOM Board of Directors.

Key to partial update labelling for recommendation, good practice and summary statements	
Label	**Meaning**
[new 2025]	**New recommendation or good practice or summary statement as of 2025:** • Indicates that the recommendation, good practice statement or summary statement is new as of 2025. • New evidence has prompted a change to or the addition of a recommendation, good practice or summary statement. • An explanation of this change is provided in the Appendix
[2025]	**Reaffirmed recommendation/summary statement as of 2025** • Indicates that the recommendation or summary statement is consistent with new evidence as of 2025. New evidence has not prompted a change to the original statement. • Small changes may have been made to the wording of this statement, but these wording changes do not affect the meaning of the statement.
[2019]	**Unchanged recommendation/summary statement from 2019** • Indicates that the recommendation or summary statement has not been updated since 2019. New evidence has not been reviewed. • Small changes may have been made to the wording of this statement, but these wording changes do not affect the meaning of the statement.

INTRODUCTION

It is estimated that 60% of term and 80% of preterm newborns develop visible jaundice in the first week of life, with roughly 10% of babies fed with human milk still jaundiced at one month of life. (7–9) Neonatal hyperbilirubinemia is often benign; however, prevention, detection and management of hyperbilirubinemia in newborns remains a priority, because of the potential short- and long-term neurotoxic effects of bilirubin. (7,8)

Definitions

Hyperbilirubinemia of the neonate is a condition caused by an excess of bilirubin in the blood and tissues of an infant's body. (9) Typically, the buildup of bilirubin presents as yellowing of the skin and the whites of the eyes, called **jaundice**. (9) For simplicity, the terms **hyperbilirubinemia** and **jaundice** are used interchangeably throughout this document.

The definition of **severe neonatal hyperbilirubinemia** is a total serum bilirubin (TSB) concentration greater than 425 μmol/L or a need for blood exchange transfusion. (7) **Significant hyperbilirubinemia** is defined as an elevation of the serum bilirubin to a level requiring treatment. (9)

High levels of bilirubin may lead to **acute bilirubin encephalopathy**, defined as the clinical manifestation of bilirubin toxicity. (7) Clinical presentation can progress from lethargy, hypotonia and poor suck to hypertonia of extensor muscles (with opisthotonus, rigidity, retrocollis), high-pitched cry, fever and irritability and eventually seizures, coma or apnea. (7,10)

An infant with severe hyperbilirubinemia is at greater risk of developing **kernicterus**, a condition of yellow staining of the brain by bilirubin and evidence of neuronal injury. (11) However, bilirubin toxicity varies in different clinical scenarios, which makes it challenging to define normal and abnormal bilirubin concentrations. (10)

Classification

Physiologic jaundice is the most common form of hyperbilirubinemia, and it typically becomes apparent between 24 to 72 hours of life. (9) There are no underlying pathological causes of physiologic jaundice, although some infants will receive phototherapy to manage high bilirubin levels. (9)

Conversely, **pathologic jaundice** typically manifests as a symptom of an existing underlying condition, such as hemolysis, blood extravasation, sepsis, and metabolic disorders. (12) The appearance of jaundice within the first 24 hours may be an indication of pathologic jaundice, although not all pathologic jaundice presents early. (10) Physiologic and pathologic jaundice may also occur simultaneously. (12)

Pathologic jaundice requires intervention, consistent follow-up, and treatment at lower thresholds. Once identified, the underlying condition must be addressed in a timely manner with the appropriate intervention, or an infant may be at a higher risk of serious, debilitating and/or life-threatening complications. (9,10)

Prolonged jaundice is defined as clinically significant jaundice in term or late preterm infants, where TSB levels are within 35 μmol/L of the phototherapy threshold, persisting for more than 14 days. (7) More information on prolonged jaundice can be found in the "What Factors Are Associated with Jaundice beyond 14 Days of Life?" section of this guideline.

Incidence of severe hyperbilirubinemia

There has been no new Canadian data since 2013 on the incidence of severe hyperbilirubinemia. A 2006 Canadian study estimated the incidence of having a TSB concentration > 425 μmol/L or the need for exchange transfusion in the first 60 days of life to be 0.04% (one in 2480 live births). (11) An updated investigation conducted after the implementation of Canadian universal screening guidelines from 2011-2013 found that the same incidence had declined to one in 8600 live births. (13)

The incidence of acute and chronic encephalopathy remains uncertain. The Canadian Paediatric Surveillance Program (CPSP) reported that from 2002-2004, 258 term infants required exchange transfusion or had a TSB concentration greater than 425 μmol/L (excluding neonates with Rh isoimmunization). (11) Among these infants, the mean peak TSB was 471 μmol/L; 20% had at least one abnormal neurological sign at presentation, and 5% had documented hearing loss or significant neurological sequelae at discharge. During this time, the live birth rate was 330 000 per year, corresponding to an incidence of approximately four in 10 000 live births. (11) An updated report from 2007-2008 reported an incidence of chronic bilirubin encephalopathy of one in 44 000 live births. (14)

Complications of severe hyperbilirubinemia

In Canada, hyperbilirubinemia requiring treatment is the most common reason for neonates' readmission to

hospital. (7,11) When acute bilirubin encephalopathy goes untreated, infants may develop **kernicterus**, sometimes referred to as **chronic bilirubin encephalopathy**: the clinical sequelae of acute bilirubin encephalopathy, which includes athetoid cerebral palsy, hearing deficits, developmental delay and oculomotor disturbances. (10)

WHAT RISK FACTORS ARE ASSOCIATED WITH SIGNIFICANT HYPERBILIRUBINEMIA?

Risk factors alone provide limited diagnostic ability to predict significant hyperbilirubinemia, because the risk factors are common and the risk of severe hyperbilirubinemia is low. (7,8) However, understanding factors that may increase the baseline risk that an infant develops hyperbilirubinemia at thresholds requiring treatment allows for timely, appropriate follow-up.

Table 1 lists risk factors for significant hyperbilirubinemia, based on the National Institute for Health and Clinical Excellence (NICE) guideline on neonatal jaundice. (9) The WG highlighted these risk factors, because they are based on consistent, good-quality evidence, which showed an independent, significant association between the factor and the development of significant hyperbilirubinemia. These risk factors, along with any additional factors that may be of particular relevance to Ontario midwives, are described below.

TABLE 1: RISK FACTORS FOR SIGNIFICANT HYPERBILIRUBINEMIA

Risk factor	Reported odds ratios	Number of studies in NICE evaluation
Gestational age under 38 weeks	0.6-20.79	6
Previous sibling with neonatal jaundice requiring phototherapy	2.3-6.0	3
Visible jaundice in the first 24 hours of life	2.9-10.1	2
Suboptimal feeding *(defined below)*	0.4-10.75	6

Source: (9,15)

Gestational age under 38 weeks

Gestational age less than 38 weeks is considered a noteworthy independent risk factor for significant hyperbilirubinemia. (7–9) Reduced enzyme function in earlier-term infants is a major contributing factor for increased risk of developing significant hyperbilirubinemia, as it can produce:

- reduced ability to conjugate bilirubin, because of a deficiency of the enzyme glucuronyl transferase and lower albumin binding capacity
- shorter survival time for red blood cells (16)

Six studies included in the NICE guideline found that an infant's gestational age may be a strong predictor of an increased risk for significant hyperbilirubinemia (OR 0.62-0.79). (15)

Previous sibling with neonatal jaundice requiring phototherapy

The link between a familial history of jaundice and a newborn's increased risk for hyperbilirubinemia is thought to relate to a number of genetic and environmental factors. (17–21) Three studies summarized in the NICE guideline explored the association between a previous sibling with jaundice and an infant's increased risk for significant hyperbilirubinemia. Each of these studies reported a statistically significant association between the two factors, suggesting that not only is having a previous sibling with jaundice a strong predictor of an infant's increased risk for hyperbilirubinemia, but that the severity of an infant's hyperbilirubinemia is associated with that of their sibling (OR 2.3-6.0). (15)

The CPS also identifies a family history of hyperbilirubinemia requiring phototherapy or exchange transfusion in a parent or sibling as a risk factor.

Visible jaundice in the first 24 hours of life

Jaundice that appears within the first 24 hours of life may be abnormal and therefore require further assessment. (22) Two studies included in the NICE guideline found that an infant's elevated serum bilirubin level (OR 10.1) and visible jaundice within the first 24 hours (OR 2.9) are predictors of a higher risk of developing significant hyperbilirubinemia. (15) Although visible jaundice within the first 24 hours may occur with no known cause, once a cause is identified it is most often attributed to an underlying hemolytic condition.

Suboptimal feeding

Six studies summarized in the NICE guideline found a positive association between an infant's risk for significant hyperbilirubinemia and exclusive breastfeeding (OR 0.4-10.75). (15)

However, the factors that underlie the association between hyperbilirubinemia and human milk are not well understood. Suboptimal intake of human milk, rather than exclusive feeding of human milk, may play an important role in increasing a newborn's risk for hyperbilirubinemia. First, suboptimal feeding can result in poor intake, and this may delay the expulsion of meconium, which stores a large amount of bilirubin. Delayed expulsion can lead to bilirubin reabsorption from the meconium back into the newborn's bloodstream, thereby increasing levels of unconjugated serum bilirubin. (19,23,24) Second, poor intake of human milk resulting in dehydration may lead to lethargy in the newborn, resulting in fewer feeding sessions and less efficient sucking. (23,25,26) Third, human milk itself may be implicated in higher levels of unconjugated serum bilirubin. (19,26) One enzyme component of human milk, βglucuronidase, deconjugates intestinal bilirubin conjugates, which in turn facilitates intestinal absorption of bilirubin via enterohepatic circulation. (26)

While the role of human milk feeding in the development of hyperbilirubinemia is still not well understood, the risks of complications from hyperbilirubinemia are small compared with the many benefits of human milk. Protective measures against hyperbilirubinemia include early initiation of feeding and skin-to-skin contact. In the midwifery context, clients receive an average of six visits during the first six weeks postpartum (27), with three visits in the first week after the birth, in the client's preferred setting, usually at home. Parents interested in exclusively nursing receive support from their midwives in optimally feeding their newborns. Furthermore, clinical assessments for signs of visible jaundice, weight gain or loss, output levels and/or testing of bilirubin levels are components of each midwifery postpartum visit, and parents are informed about important risk factors and symptoms of jaundice. It is likely that newborns of midwifery clients would be at lower risk for significant hyperbilirubinemia, provided the parents receive consistent follow-up care in the community setting, with adequate lactation support and teaching about jaundice.

Evidence of hemolysis, with suspicion based on positive test results

Glucose-6-phosphate dehydrogenase (G6PD) deficiency

G6PD deficiency is an inherited red cell enzyme defect that is considered an important risk factor for acute bilirubin encephalopathy and hyperbilirubinemia neurotoxicity. (11,13)

It can cause an infant's red blood cells to become increasingly vulnerable to hemolysis and subsequently, severe hyperbilirubinemia that is difficult to manage, even with phototherapy. (11,12,28) Most affected infants have no significant family history; however, genetic ancestry from regions where this condition is prevalent (e.g., sub-Saharan Africa, the Middle East, the Mediterranean and Southeast Asia) may contribute to the assessment of G6PD deficiency risk. (8)

G6PD testing should be considered for any infant with significant or severe hyperbilirubinemia who does not respond to treatment or presents without identifiable risk factors. If a G6PD deficiency is suspected, particularly in the context of hyperbilirubinemia, prompt testing is important, as bilirubin levels can rise quickly and affected infants require treatment at lower thresholds. (7,8)

Newborns can be checked for G6PD deficiency with a blood test. G6PD is not screened for by the Newborn Screening Ontario panel; nor may midwives request the test in Ontario under R.R.O. 1990, Reg. 682, the *Laboratory and Specimen Collection Centre Licensing Act*. If midwives suspect a G6PD deficiency, a pediatrician should be consulted for prompt testing and treatment.

Direct anti-globulin (Coombs) test

A direct anti-globulin test (DAT, or direct Coombs) can be done on an infant's cord blood or freshly collected capillary sample to identify isoimmunization. (29) Information about the infant's blood group and DAT may facilitate risk assessment for hemolysis and identify

infants at greater risk of significant hyperbilirubinemia caused by immune-mediated hemolysis. While a positive DAT indicates the presence of antibodies on the surface of red blood cells, it does not diagnose or measure the degree of hemolysis, if present. A false positive DAT may occur in infants born to birthing parents who received Rh immune globulin, and a false negative can result after significant hemolysis or clearance of parental antibodies. Hemolysis is best confirmed using the DAT in combination with other laboratory investigations. (7)

Hemoglobin level, peripheral blood smear and others
When hemolysis is suspected because of an early, rapidly rising TSB or severe hyperbilirubinemia, additional investigations – such as hemoglobin level, peripheral blood smear, reticulocyte count – should be considered. (7) Hemolysis may be suspected based on a rapid rate of increase in TSB ≥ 5 µmol/L/h (within 24 hours post-birth) or ≥ 3.5 µmol/L/h (beyond 24 hours post-birth). (7) In these cases, a pediatrician should be consulted for prompt testing and treatment considerations.

Other risk factors for significant hyperbilirubinemia

The 2025 CPS guideline (7) further identifies the following risk factors that increase a newborn's baseline risk of developing significant hyperbilirubinemia:

- need for phototherapy in the first 72 hours of life
- family history or genetic predisposition to inherited red blood cell disorders that cause hemolysis
- significant bruising or cephalohematoma
- polycythemia

Good Practice Statements:

1. Identification of risk factors for significant hyperbilirubinemia typically occurs in an ongoing manner throughout the course of the prenatal and postpartum period in the context of Ontario midwifery care.

   For all clients, include the following as part of an informed choice discussion:
   - Jaundice is common, short-lived and usually harmless; however, a small number of babies will develop significant hyperbilirubinemia, which can be harmful if not treated.
   - Provide instruction on how to detect visible jaundice, particularly within the first 24 hours: in lighter-skinned infants, visibly yellow tone and/or yellow sclera; in darker-skinned infants, yellow under blanched skin and/or yellow sclera.
   - Describe additional signs of hyperbilirubinemia, including poor suck, lethargy and reduced feeding, dark urine and pale, chalky stools.
   - Review how to contact their midwife if jaundice is suspected in the newborn. **[2025]**

2. Share with clients how risk factors, if present, may impact considerations for screening and management of significant hyperbilirubinemia. **[2019]**

3. For birthing parents in the O blood group, midwives should consider collecting and storing cord blood for processing, in the event that jaundice presents in the first 24 hours or if a TSB is later required for the infant.
   - 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. **[2025]**

   Good practice statements
   These good practice statements recognize the client as the primary decision-maker, midwives' ability to identify emerging risk factors and the need for timely decision-making.

WHAT FACTORS ARE ASSOCIATED WITH JAUNDICE BEYOND 14 DAYS OF LIFE?

Most cases of jaundice persisting beyond 14 days of life are because of **breast milk jaundice**, a benign condition in which infants who are primarily fed with human milk experience elevated bilirubin levels, despite being otherwise healthy. (30) Breast milk jaundice typically appears in the late first or second week after birth, and it resolves spontaneously in the first 12 weeks of life without increasing the risk of acute or chronic bilirubin encephalopathy. (9,30–32) Affected infants typically feed well, gain weight appropriately, have frequent urine output and yellow stools, and do not require treatment for hyperbilirubinemia or supplementation with formula. (30)

Prolonged jaundice is defined as clinically significant jaundice in term or late preterm infants where TSB levels are within 35 μmol/L of the phototherapy threshold and persist for more than 14 days. (7) Prolonged jaundice may result from pathologic causes associated with elevated *unconjugated* bilirubin levels, such as hemolytic diseases, infection, congenital hypothyroidism and inborn errors of metabolism. However, it can also occur in the presence of elevated *conjugated* bilirubin levels from underlying cholestatic liver diseases, such as biliary atresia. (33) Pathologic cholestasis should be suspected in any infant with prolonged jaundice, pale (acholic) stools and dark urine. (33)

A conjugated (direct) bilirubin level greater than 17 μmol/L is considered abnormal and warrants further investigation. (7) Early detection and timely treatment of conditions associated with conjugated hyperbilirubinemia are essential to reducing the risk of associated morbidity. However, the differential diagnoses, investigations and treatment of conjugated hyperbilirubinemia are beyond the scope of this guideline.

Good Practice Statement

4. In the otherwise well, human milk–fed infant with persistent visual jaundice, midwives may consider drawing a TSB, including the conjugated fraction, to determine whether further investigation is needed.

   A conjugated bilirubin level above 17 μmol/L warrants consultation with a physician for further investigation of potential underlying causes. [**new 2025**]

   Good practice statement
   This good practice statement recognizes continuity of care and midwives' ability to assess the need for interprofessional collaboration as the neonate's clinical picture requires.

WHAT FACTORS ARE ASSOCIATED WITH SEVERE HYPERBILIRUBINEMIA AND/OR ACUTE BILIRUBIN ENCEPHALOPATHY?

While the exact mechanisms underlying some of the neurotoxicity risk factors listed below are not well understood, they are believed to increase the risk of acute bilirubin encephalopathy by increasing the toxic effects of bilirubin on the newborn brain: (7)

- lower gestational age at birth (< 38 weeks)
- hypoalbuminemia (serum albumin < 30 g/L)
- a suspected or diagnosed hemolytic condition; hemolysis may be suspected based on a rapid rate of increase in TSB ≥ 5 μmol/L/h (within 24 hours post-birth) or ≥ 3.5 μmol/L/h (beyond 24 hours post-birth)
- suspected or culture-proven sepsis
- significant hemodynamic or respiratory instability (or both) in the preceding 24 hours

Apart from lower gestational age at birth, many of these risk factors reflect a pathologic form of jaundice. If a pathologic cause is suspected, further investigation is indicated to determine the underlying condition. In most cases, these risk factors would require midwives to consult with a physician, as they would necessitate more intensive monitoring, management and/or treatment by a specialist in a hospital setting.

Hemolytic disease of the newborn

Hemolytic disease of the newborn (HDN), also known as isoimmune hemolytic disease, is the most common pathological cause of severe hyperbilirubinemia. It typically occurs as a result of an Rh or ABO blood group incompatibility between birthing parent and fetus/newborn. (29)

HDN should be considered in the newborn when there is:

- rapidly developing or severe hyperbilirubinemia not predicted by maternal antibody screening
- a positive DAT
- prolonged hyperbilirubinemia
- hemolysis detected on blood film examination (34)

Infants affected by Rh-induced hemolysis, including those whose birthing parents have declined or have not otherwise received Rh prophylaxis, do not typically appear jaundiced at birth. However, hyperbilirubinemia can develop quickly, as the infants' livers and spleens work to destroy red blood cells adhered to parental antibodies. (12,29) Routine postnatal prophylactic anti-D immunoglobulin for RhD-negative birthing parents has significantly reduced this form of HDN. (34)

Hemolysis as a result of an ABO incompatibility is seen more commonly in infants, but it is typically milder than hemolysis from Rh incompatibility. Hyperbilirubinemia from ABO incompatibility typically presents within 12 to 24 hours after birth, and it is a leading cause of significant neonatal hyperbilirubinemia in Canada. (11,13)

Good Practice Statement

5. If midwives suspect a pathologic cause of hyperbilirubinemia, further investigation, which may include physician consultation, is required to determine the underlying condition. [**new 2025**]

Good practice statement
This good practice statement recognizes midwives' ability to identify emerging risk factors and assess the need for interprofessional collaboration as the neonate's clinical picture requires.

WHICH INTERVENTIONS PREVENT THE DEVELOPMENT OF SIGNIFICANT HYPERBILIRUBINEMIA?

Interventions to prevent significant hyperbilirubinemia aim to manage bilirubin levels and avoid the need for phototherapy or other treatments.

Infant formula supplementation

One observational study (*very low certainty of evidence*) was identified that addressed formula supplementation to prevent significant hyperbilirubinemia. (35) This study of 313 healthy term infants included two comparisons:

1. *mixed feeding* (human milk and formula) vs. *exclusive breastfeeding*

2. *exclusive formula supplementation* vs. *exclusive breastfeeding*

Among mixed-fed infants, this research showed that the use of formula may reduce the incidence of **hyperbilirubinemia**, defined in the study as a peak TSB concentration greater than 256.5 μmol/L (RR 0.40, 95% CI 0.19-0.87, p = 0.02), may reduce the **need for phototherapy** (RR 0.39, 95% CI 0.18-0.84, p = 0.02) and may result in lower **bilirubin levels on day four** (184.69 μmol/L vs. 225.72 μmol/L; MD −41.04, 95% CI −65.67 to −16.41, p = 0.001), although we are uncertain of these results.

Among infants who received *formula exclusively*, the study showed that the use of formula may reduce the incidence of **hyperbilirubinemia** (RR 0.19, 95% CI 0.06-0.60, p = 0.005), may reduce the **need for phototherapy** (RR 0.19, 95% CI 0.06-0.59, p = 0.004), and may result in lower **bilirubin levels on day four** (167.58 μmol/L vs. 225.72 μmol/L; MD −58.14, 95% CI −87.46 to −28.82), although we are uncertain of these results.

Work group remarks, clinical considerations, values and preferences

The results from this research study are not applicable to practice in Canada. The bilirubin levels used to initiate phototherapy were lower than current Canadian guidance on phototherapy management. Because of these differences in treatment thresholds, the association between formula supplementation and prevention of hyperbilirubinemia cannot be elucidated.

The following recommendation is strong, although the available evidence was of very low certainty. The WG balanced the rare risk that an infant develops hyperbilirubinemia requiring treatment against the substantial benefits of exclusive human milk feeding, such as a reduced risk of gastrointestinal infection (36) and improved immunologic status. (37) This recommendation recognizes that midwives support human milk as the optimal nutrition for infants.

Recommendation:

6. Midwives should not recommend formula supplementation to prevent significant hyperbilirubinemia in the otherwise well, healthy neonate fed with human milk. [**2019**]

   Strong recommendation: very low certainty of evidence
   This recommendation recognizes midwifery support of human milk as the optimal physiological nutrition for infants.

Lactation support

We identified one cluster-randomized study (*moderate certainty of evidence*) that addressed the effects of lactation support among participants intending to breastfeed. (38) In this trial, lactation support consisted of four core components: extended skin-to-skin, frequent breastfeeding, good positioning and acknowledgement of both parents as equal partners with different roles. At seven days, fewer infants in the lactation support group **required phototherapy** (n = 27/1657) vs. the usual care group (n = 42/1143; RR 0.44, 95% CI 0.28-0.71, p = 0.0008).

Work group remarks, clinical considerations, values and preferences

Lactation support programs were identified as an important intervention to prevent significant hyperbilirubinemia, which may be associated with dehydration, weight loss and reduced caloric intake subsequent to suboptimal human milk intake. (19,24,39) Maintaining a frequency of eight to 12 daily feedings has also been identified as an important practice. (40) The WG acknowledged the role lactation support may play in improving human milk intake, with moderate certainty of evidence that lactation support programs likely reduce the need for phototherapy among infants fed with human milk.

Timing of cord clamping

Two systematic reviews, which included three relevant meta-analyses, were found that examined the timing of cord clamping. They compared delayed cord clamping (after 60 seconds or when cord pulsation stopped) with early cord clamping (within 60 seconds of birth) among healthy term infants.

A meta-analysis of seven randomized controlled trials (*high certainty of evidence*), with 2324 healthy term infants enrolled, showed that delayed cord clamping increases the **need for phototherapy**. Sixteen more infants (from one more to 40 more) per 1000 would require phototherapy after delayed cord clamping (RR 1.59, 95% CI 1.03-2.46, p = 0.04). (41)

A meta-analysis of six randomized controlled trials (*moderate certainty of evidence*), with 2098 healthy term infants enrolled, showed that delayed cord clamping likely increases the incidence of **clinical jaundice**, with 16 more infants (from 10 fewer to 49 more) per 1000 receiving a diagnosis of clinical jaundice (RR 1.16, 95% CI 0.90-1.49, p = 0.15). (41)

A meta-analysis of two randomized controlled trials (*high certainty of evidence*), with 91 infants enrolled, showed

that delayed cord clamping does not result in an clinically important increase in **bilirubin levels** at or after 72 hours of life (140.86 μmol/L vs. 122.59 μmol/L; MD 18.27 μmol/L higher, 95% CI −2.47 to 39.0, p = 0.08). (42)

A recent observational study that investigated the timing of cord clamping among a cohort of caesarean-delivered late preterm and term infants with ABO isoimmunization (n = 336) found similar effects. In this high-risk population, delayed cord clamping may increase **bilirubin levels**, the **need for phototherapy** and **hospital readmission rates** but we are very uncertain of these results because of the small sample size. (43)

Work group remarks, clinical considerations, values and preferences
In making the following recommendation, the WG balanced the finding that delayed cord clamping results in an increased need for phototherapy yet poses no increased risk of chronic or permanent harms, and it has several benefits, such as improved long-term iron stores, hematocrit values and hemoglobin concentrations. (41)

Recommendation

7. Midwives may offer delayed cord clamping to all clients, taking into consideration hyperbilirubinemia risk factors.

   Informed choice discussions should include:
   - the risks and benefits of delayed cord clamping compared with early cord clamping
   - how risk factors for hyperbilirubinemia, if present, increase the infant's risk of jaundice
   - the client's values and preferences **[2019]**

   Weak recommendation: moderate certainty of evidence
   This recommendation recognizes the preference for and health benefits of delayed cord clamping while balancing the client's values and preferences.

Postpartum home visits

The body of evidence exploring the impact of one or more postpartum home visits vs. none on outcomes related to hyperbilirubinemia is drawn from three studies, conducted in Canada, (44) the United States (45) and Syria. (46)

One randomized controlled trial (*low certainty of evidence*), with 175 parent-infant dyads enrolled, showed that

there may be a slightly lower incidence of **significant hyperbilirubinemia** (undefined) with home visits than without: 25 fewer cases (from 46 fewer to 82 more) per 1000 (RR 0.52, 95% CI 0.10-2.59, p = 0.42). However, these results lack precision, as very few participants had received a diagnosis of significant hyperbilirubinemia. (44)

One observational study (*very low certainty of evidence*), with 2967 infants enrolled, showed that postpartum

home visits may reduce **hospital readmissions** (RR 0.22, 95% CI 0.05-0.9, p = 0.04). (45) However, we are uncertain of the applicability of these results, because participants in the intervention group received only one home visit. In Ontario, where midwifery clients typically receive three visits in the first week, the strength of the association may be even greater.

Evidence from one randomized controlled trial (*very low certainty of evidence*) conducted in Syria, with 573 infants enrolled, showed that postpartum home visits may make little to no difference in the **incidence of jaundice** (RR 0.97, 95% CI 0.77-1.23, p = 0.81), although a lack of blinding among study personnel and participants, differences in health-care settings between Ontario and Syria and wide confidence intervals limit our certainty about these results. (46)

Two randomized controlled trials (*moderate certainty of evidence*) showed that postpartum home visits likely increase rates of **exclusive breastfeeding**: 103 more participants (from 34 more to 187 more) per 1000

exclusively breastfeeding (RR 1.42, 95% CI 1.14-1.76, p = 0.001). (44,46) This evidence is not directly applicable to the Ontario midwifery context, because the research was conducted in Syria, where the care received and the scheduling of home visits differs from Ontario's.

Work group remarks, clinical considerations, values and preferences
Postpartum home visits are an essential component of midwifery care in Ontario and are highly valued by midwives and clients. Although the evidence about home visits and hyperbilirubinemia is limited (*low and very low certainty*), there is moderate certainty of evidence that home visits increase rates of exclusive breastfeeding. As suboptimal feeding may increase rates of jaundice, home visits with lactation support have the potential to play an important role in establishing and maintaining a healthy nursing relationship. This outcome was highly valued by the WG, as it identified the association between feeding difficulties and an increased risk of significant hyperbilirubinemia. (19,23,25,26)

Summary Statement:

As a standard of midwifery care, early postpartum visits, along with home visiting, are an important component of how midwives monitor for and detect neonatal hyperbilirubinemia. **[2019]**

Sunlight
Important research from the 1950s discovered that when the unconjugated bilirubin molecule was exposed to light, it converted into a water-soluble form (via a process of photo-oxidation) and became easily excretable in the urine. (47) Nurses from the same period also reported that visible jaundice would fade more quickly in infants who were exposed to direct sunlight. (48) Based on these observations, research was undertaken to investigate how light influences bilirubin levels in infants with hyperbilirubinemia, marking the first known use of phototherapy lamps. (48)

This research from the 1950s was the only study found that investigated the use of sunlight compared with conventional phototherapy. The observational study (*very low certainty of evidence*) included 22 preterm infants from one to 13 days old. It showed that the **need for exchange transfusion** was lower among infants who received sunlight compared with phototherapy (RR 0.17, 95% CI 0.01-3.23, p = 0.24). More specifically, none of the infants exposed to sunlight and only two of the infants exposed to conventional phototherapy required an exchange transfusion. The two infants

exposed to phototherapy had severe jaundice, because of Rh isoimmunization, and failed to respond to the light treatment, whereas none of the infants exposed to sunlight had any risk factors. The same study suggests that sunlight may result in a smaller mean decrease in **bilirubin levels** (65.8 μmol/L vs. 75.6 μmol/L; MD −9.80 μmol/L, 95% CI −40.03 to 20.43, p = 0.53), although we are very uncertain of these results. (48)

Work group remarks, clinical considerations, values and preferences
The evidence for these outcomes is of very low certainty, as this study did not control for confounding risk factors. The need for an exchange transfusion for the two infants in the phototherapy group was likely related to the presence of Rh isoimmunization and not a result of the phototherapy itself. Furthermore, exchange transfusion is a rare outcome and would require large sample sizes to provide precise results; this study had a small sample size (n = 24). The research was also conducted with preterm infants only, which is not the focus of the current guideline.

Midwives considered this research in both historical and present contexts. Phototherapy replaced the routine use of

exchange transfusion and is now the standard treatment for hyperbilirubinemia. However, phototherapy is not without its own risks, such as temperature instability, intestinal hypermotility and interference with the parent-child dyad. (7,8,49) The risks associated with phototherapy extend to treatment with sunlight, which is further compounded by exposure to UV radiation. Moreover, and in contrast to phototherapy, sunlight exposure cannot be measured accurately, and a consistent level of intensity cannot be maintained over time or across all contexts. Therefore, the WG agreed that there was insufficient evidence to support the use of sunlight as a form of prevention.

Recommendation:

8. There is insufficient evidence to support the use of sunlight as a means of preventing significant hyperbilirubinemia. [2019]
    No recommendation: very low certainty of evidence

Infant massage

Infant massage appears to be associated with increased bowel movements, which may prevent hyperbilirubinemia by increasing the volume of bilirubin excreted. (50–53) We identified three trials (*low certainty of evidence*), with 135 infants enrolled, that examined infant massage for the prevention of hyperbilirubinemia. (52–54)

Two of the three studies were meta-analyzed; pooled data showed that infant massage may slightly reduce **bilirubin levels on day four** (163.31 µmol/L vs. 194.60 µmol/L; MD −31.55, 95% CI −43.48 to −19.63, p < 0.00001). (52,54) Data from a third study (n = 43) could not be meta-analyzed, but results are consistent with the pooled data, suggesting that bilirubin levels on day four were slightly lower among infants who received massage than for those who did not.

(53) Our confidence in these results is low, because all three studies demonstrated serious methodological flaws related to randomization, allocation and blinding.

Work group remarks, clinical considerations, values and preferences
Infant massage may slightly lower bilirubin levels, but the levels in the studies for all infants on day four were not clinically concerning. Little significance should be placed on these findings, as we do not know if massage would result in fewer infants' requiring phototherapy in accordance with established treatment thresholds. However, infant massage provides many peripheral benefits, such as an increase in parental-infant bonding through skin-to-skin contact, as well as potential improvements in oxytocin production and parental and newborn stress levels. (50)

Summary Statement:

Further research is required before the use of infant massage for the prevention of significant hyperbilirubinemia is recommended. [2019]

WHAT ARE EFFECTIVE SCREENING TOOLS FOR HYPERBILIRUBINEMIA?

The TSB measurement obtained from a blood sample is considered the gold standard for diagnosing significant hyperbilirubinemia. Midwives may also use other screening methods, such as transcutaneous bilimeter (TcB) measurements and clinical assessments, which may include both visual and risk-factor assessments.

Visual assessment

Four observational studies were identified that explored visual assessment for detecting jaundice. It is important to note that none of these studies examined the downstream consequences of a false positive or false negative. In other words, they provide no information to quantify the risks if an infant's condition is missed by visual assessment

(i.e., they belonged to a treatment zone and necessary treatment was delayed).

In one study, neonatologists visually assessed infants as appearing clinically jaundiced by answering yes or no. For infants with low bilirubin levels (< 68 µmol/L and < 204 µmol/L), neonatologists often visually assessed them as appearing clinically jaundiced (63% and 29% false positive rates, respectively). Conversely, 19% of infants with higher bilirubin levels (> 204 µmol/L) were assessed as not clinically jaundiced (false negative rate). (55)

A second study examined nurses' ability to visually detect jaundice using cephalocaudal progression compared with actual TSB concentrations. Of the 102 infants included,

8.1% were incorrectly assessed as jaundiced by nurses' visual assessment (false positive rate). Conversely, 28.5% of infants assessed as not jaundiced actually were (false negative rate). (56)

In a third study, TSB tests were performed when a nurse determined that jaundice had reached the infant's mid-abdomen, representing a bilirubin concentration at or above the 75th percentile. For infants with a TSB ≥ 75th percentile, almost all were correctly identified by the nurses; there was, however, a small percentage of false negatives (1.5%), representing 4/263 infants assessed as not jaundiced. (57)

The fourth study asked providers to visually assess the severity of jaundice by categorizing infants into four risk zones (Zones A to D, whereby A is the lowest risk zone and D is the highest). Each infant's bilirubin level was then verified by a TSB measurement. The agreement between the zone the infant was placed in by visual assessment and the one that matched their actual TSB was assessed. About 8% (230/2857) of infants who were visually categorized into the lowest risk zone (Zone A) should have been categorized into one of three higher zones (Zone B, C or D), according to their actual TSB levels. Conversely, 86% (13/15) of infants whose TSB concentrations placed them in the highest risk zone (Zone D) were visually categorized into lower zones (Zone A,

B or C), which could result in many infants being missed, introducing the potential for serious consequences. (58)

Work group remarks, clinical considerations, values and preferences
Our confidence in these results is limited by concerns about the variability in accuracy for visual assessment of jaundice. The above studies suggest that visual assessment cannot detect all babies with higher bilirubin levels; however, practitioners in some of the studies performed relatively better than others. For example, in the one study that asked nurses to visually detect jaundice at the mid-abdomen (cephalocaudal progression), only 1.5% of infants were missed by visual assessment, suggesting that practitioners can see a progression of jaundice. (57) In light of the evidence, the WG affirmed that visual assessment is an important component of midwives' clinical assessment, but it should not be used in isolation to discern an infant's risk for hyperbilirubinemia. Importantly, because changes in skin pigmentation may be more difficult to discern in infants with darker skin tones, midwives should assess for yellowing where it may be more noticeable, including the sclera (whites of the eyes), tongue, gums, mucous membranes, palms and soles, and/or conduct a skin blanch test. (9)

Recommendation:

9. Visual assessment *alone* is not recommended when screening for significant hyperbilirubinemia. **[2019]**

   Weak recommendation: very low certainty of evidence
   This recommendation recognizes that visual assessment for hyperbilirubinemia is an important part of the overall clinical assessment of a newborn, but it should not be solely relied upon to determine a newborn's risk of significant hyperbilirubinemia.

Risk factor scoring system
One diagnostic cohort study (*low certainty of evidence*), with 884 infants enrolled examined how accurately different thresholds on a clinical risk factor scoring system identified infants with a significant risk for hyperbilirubinemia (confirmed with TSB). (59) The system assigned each identified risk factor (birth weight, gestational age < 38 weeks, oxytocin use during delivery, vacuum extraction, breastfeeding and combination breast and bottle feeding) a score, then an overall score was determined based on the number of risk factors present and their severity. Lower scores suggested that the infant had fewer risk factors. Higher scores suggested that the infant had more, or more

serious, risk factors assumed to be associated with a greater risk of developing significant hyperbilirubinemia. (59)

Using the lowest threshold (≥ 8) to determine a clinical risk factor score, 87% of infants were incorrectly classified as at risk for significant hyperbilirubinemia (false positives). These infants all had bilirubin concentrations ≤ 342 μmol/L and may have been treated unnecessarily because this scoring system was used. (59) Conversely, when practitioners used a threshold of ≥ 24 was used, almost all infants at significant risk were missed (false negative); and 98% of those who had a TSB ≥ 342 μmol/L were incorrectly classified as not at risk. (59) The use of a high threshold on this scoring system could result in many infants being missed, introducing the potential for serious consequences.

Work group remarks, clinical considerations, values and preferences
While identifying risk factors is an important part of midwives' overall clinical assessment, the use of this risk factor scoring system has been shown to be highly inaccurate. It is not typical practice for midwives in Ontario to limit their assessment of risk factors to this clinical scoring system and rely on the resulting score alone when determining a course of action. Moreover, this particular scoring system could result in harm, as it incorrectly identified infants' condition, resulting in large numbers of false positives and false negatives.

Recommendation:

10. The use of risk factor scoring systems is not recommended when screening for significant hyperbilirubinemia. **[2019]**

   Weak recommendation: low certainty of evidence
   This recommendation recognizes that midwives routinely assess for hyperbilirubinemia risk factors as part of an infant's clinical assessment in the postpartum period, but they should not use a scoring system.

Transcutaneous bilimeter

One systematic review of 11 diagnostic cohort studies (*very low certainty of evidence*) contributed results to this body of evidence on the use of transcutaneous bilimeters that measure TcB. In the systematic review, hyperbilirubinemia was expressed in two ways:

1. value based
2. percentile based

The sensitivity and specificity of the TcB measurement compared with a TSB was reported. The sensitivity of a test correlates to its ability to correctly identify people with a disease; a highly sensitive test (sensitivity 100%) would identify all people with the disease. The specificity also correlates to the test's ability to correctly identify all people without the disease; a highly specific test (specificity 100%) would identify all people who do not have the disease. (60)

To effectively detect significant hyperbilirubinemia, a test should maximize **sensitivity**, to ensure that all infants with the condition are correctly identified.

Predicting TSB value–based hyperbilirubinemia
Six studies (n = 1946 participants) reported on the TcB thresholds necessary to ensure that all infants with a TSB concentration > 256.5 μmol/L were identified. The results were variable: the TcB thresholds necessary to achieve 100% **sensitivity** (the identification of *all* infants with a TSB > 265 μmol/L) ranged from 136.8 μmol/L to 205.2 μmol/L. (61)

Predicting TSB percentile–based hyperbilirubinemia
Five studies (n = 1935 participants) reported the sensitivity and specificity of using a TcB cut-off of the 75th percentile to predict a TSB concentration greater than the 95th percentile of hour-specific values. The **sensitivity** of a TcB cut-off of the 75th percentile ranged from 87% to 100%. These results suggest that using a TcB cut-off of the 75th percentile may fail to identify all infants with a TSB concentration ≥ the 95th percentile, introducing the potential for serious consequences. (61)

Work group remarks, clinical considerations, values and preferences
The research evidence demonstrates that TcB measurements obtained from bilimeters will not provide an exact estimation of an infant's bilirubin level. In general, TcB shows good correlation with TSB measurements, (62) but it does have some important limitations, including a tendency for overestimation among infants with darker skin tones (63–67) and underestimation with higher serum bilirubin levels. (62,68) In light of this evidence, TSB measurements should be performed if the TcB level is within 50 μmol/L of the hour-specific phototherapy threshold or above 250 μmol/L. TcB measurements may also be inaccurate during or soon after phototherapy treatment; therefore TcB measurements should only be used for follow-up if phototherapy has been discontinued for at least 18 hours. (7,69)

Although bilimeters cannot replace TSB testing, they can effectively allow midwives to perform efficient preventive care in the home and the community. In contrast to TSB tests, bilimeters enable midwives to obtain bilirubin measurements immediately at point of care, without further lab analysis. In cases where clients are required to visit a hospital if they wish to receive TSB screening, a bilimeter can spare them the stress and costs associated with travel. This is particularly important for families in rural and remote settings, who may have limited access to labs and hospitals; and for those who may lack transportation.

Research has also shown that a TcB test reduces the need for blood sampling, thereby sparing infants invasive TSB testing and associated harms, including pain and repeat testing. (62) These factors will likely increase clients' acceptance of hyperbilirubinemia screening, and they may reduce midwives' workload associated with

drawing and processing TSB samples.

Despite the many benefits of bilimeters, the primary barrier to their widespread adoption among Ontario midwives is the initial expense plus further costs for maintenance and calibration.

Recommendation:

11. Where screening for hyperbilirubinemia is requested and/or recommended and bilimeters are available, midwives should offer TcB screening. **[2019]**

   Strong recommendation: very low certainty of evidence
   This recommendation recognizes the uneven access to bilimeters across practice groups and the province. However, it affirms the bilimeter as an effective screening tool to prompt TSB testing when required and as a promising way to improve community-based care.

Universal bilirubin screening

Eight observational studies were identified that compared a universal screening program (described as screening all infants in the first 72 hours of life) vs. no universal screening program. In each study, all infants born after the implementation of a universal TcB and/or TSB screening program received screening, whereas infants born before universal screening received selective bilirubin testing on the basis of clinical judgment.

Two retrospective-cohort studies (*very low certainty of evidence*), with 49 726 infants enrolled, showed that universal TSB or TcB bilirubin measurement may increase the **need for exchange transfusion** (RR 1.31, 95% CI 0.35-4.86, p = 0.69), although the results are limited by the small number of infants who required an exchange transfusion. (70,71)

Three observational studies (*very low certainty of evidence*) limited by indirect evidence showed a lower incidence of **bilirubin concentration ≥ 513 μmol/L** among infants (n = 1 418 759) born after the implementation of universal bilirubin measurement (RR 0.35, 95% CI 0.19-0.65, p = 0.0009). These results were considered indirect, because the population included did not represent healthy term or late-preterm neonates. (71–73)

Pooled results from four observational studies (*very low certainty of evidence*), which included 1 510 040 infants, showed a lower incidence of **bilirubin concentrations ≥ 427 μmol/L** among those born after the implementation of universal bilirubin measurement (RR 0.42, 95% CI 0.25-0.70, p = 0.0009). However, we are uncertain of these results, because they were not consistent across

all studies; some reported a higher incidence of bilirubin concentrations ≥ 427 μmol/L among universally screened infants. (71–74)

Three observational studies (*very low certainty of evidence*), with 481 223 infants enrolled, examined the incidence of **bilirubin concentrations ≥ 342 μmol/L**. Results were inconsistent across studies, although meta-analysis showed a lower incidence of bilirubin concentration ≥ 342 μmol/L among infants born after the implementation of universal bilirubin screening (RR 0.58, 95% CI 0.47-0.71, p < 0.00001). (71,73,74)

Six observational studies (*very low certainty of evidence*), with 942 405 infants enrolled, showed that universal screening programs may make little to no difference in the **need for phototherapy** (RR 1.10, 95% CI 0.64-1.90, p = 0.73). However, we are very uncertain of these results, because of inconsistent findings across studies, as well as methodological flaws in all three studies, including lack of control for confounding factors, such as infants' age, presence of risk factors and rates of human milk feeding. (70,71,75,76)

Three retrospective-cohort studies (*very low certainty of evidence*), which included 649 305 infants, reported on hospital readmissions. Results were inconsistent across studies; pooled data from two studies showed that implementation of universal screening programs may make little to no difference on **hospital readmission** rates (RR 0.58, 95% CI 0.30-1.12, p = 0.10) (73,77), whereas the third study reported an increase in hospital readmission after implementation of universal screening (RR 1.21, 95% CI not reported). (78)

Work group remarks, clinical considerations, values and preferences

In making this weak recommendation, the WG considered the lack of high-certainty evidence for the effectiveness of universal screening, as well as the limitations of visual assessment, such as variability in recognizing the presence or severity of jaundice. The WG also considered evidence from the Canadian Paediatric Surveillance Program, which demonstrated that after the introduction of the 2007 Canadian-specific guideline recommending universal bilirubin screening, the incidence of severe hyperbilirubinemia among newborns declined significantly, from one in 2400 live births in 2002-2004 to one in 8600 live births in 2011-2013. (13) This indicates that universal screening may prevent severe hyperbilirubinemia.

However, within the context of regular, timely and close follow-up care, the WG recognized limited potential benefits from universal screening, particularly for the approximately 40% of healthy term infants who do not develop visible jaundice and who meet developmental and feeding milestones. For these infants, the WG recognized the small harms associated with TSB sampling, including infant pain and additional stress on parents in the early postpartum period.

Midwives also face structural and systemic barriers to offering screening. First, they do not have access to specific funding for the ongoing maintenance and replacement of bilimeters. Second, they face barriers when submitting blood samples to community- and hospital-based labs, which in some cases will not accept samples drawn in the community. Labs must be instructed to accept and process midwifery samples in a timely manner. Third, midwives have not been adequately compensated for the increased workload associated with screening, including the time required to deliver samples from the home to a lab or clinic. Universal midwifery access to bilimeters and labs would help facilitate equitable access to bilirubin screening for infants born in midwifery care and between midwifery and non-midwifery cohorts.

These barriers also impact midwifery clients in many ways. Clients who give birth at home or in a birth centre, and who choose screening but are unable to receive it at home, will need to travel to the nearest outpatient clinic or emergency room. This problem is exacerbated in rural and remote communities, where access to labs and hospitals may be severely limited by distance, and for families who may be limited by unstable housing and lack of adequate transportation. Research has demonstrated that universal screening in Ontario appears to have the unintended consequence of increasing health disparities when barriers to health-care access for disadvantaged populations are left unaddressed. (79)

For clients who have a hospital birth, midwives may be more inclined to recommend a 24-hour postpartum stay, to facilitate screening. This extends midwifery discharge times, increasing nursing workload and the overall financial burden on the health-care system. Given these considerations, the WG recognized that the values, preferences and risk tolerance for screening among midwifery clients may differ.

Recommendations:

12. The risks and benefits of universal screening should be discussed with all clients as part of an informed choice discussion.

    This discussion may include:
    - what is known about risk factors for significant hyperbilirubinemia, if present
    - how visible jaundice, poor feeding, dehydration and weight loss can increase an infant's risk
    - the limitations of relying on visual assessment alone to detect jaundice
    - timing of screening
    - barriers to and enablers of screening within the client's community context
    - the client's values and preferences and risk tolerance **[2025]**

    Weak recommendation: very low certainty of evidence
    This recommendation recognizes the lack of high-certainty evidence for the effectiveness of universal screening, the uniqueness of the midwifery context, and structural barriers that impact midwives' ability to offer community-based bilirubin screening.

13. If visible jaundice develops, obtaining a bilirubin measurement is recommended.

    For neonates who have previously had a TcB or TSB result that required no repeat testing or treatment and in whom visible jaundice subsequently develops, midwives may use their clinical judgment in determining the need for re-screening. Consider presence or absence of other clinical factors associated with significant or pathologic hyperbilirubinemia (e.g., suboptimal feeding, lethargy, dark urine, pale chalky stools). **[2025]**

    Weak recommendation: very low certainty of evidence
    This recommendation recognizes that the timely, frequent and close follow-up of neonates as a standard of midwifery care limits the benefits associated with universal screening, while acknowledging the importance of a clinical manifestation of hyperbilirubinemia.

Research Gap:

- Midwives may be unique among health-care providers in the extent to which they provide ongoing, timely in-person clinical assessment throughout the first days and weeks postpartum, including home visits. Studies of the efficacy of universal screening within this model are lacking; more information would be useful to inform midwifery practice.

Timing of universal bilirubin screening

It is widely accepted that peak bilirubin concentrations typically occur between 72 and 120 hours of age. (7,80,81) However, there is no research specifically examining the *optimal timing* of universal bilirubin screening to predict significant hyperbilirubinemia in healthy newborns.

Given this lack of evidence, recommended time frames for universal bilirubin screening are based on expert opinion, and they vary among international guideline groups. Historically, both the CPS and AAP recommended a timed TSB between 18 and 72 hours of age, to guide care decisions and follow-up. (7,8) In clinical practice, bilirubin screening has commonly been coordinated with dried blood spot screening to minimize painful procedures for the newborn.

The 2025 CPS position statement expands the screening window to 12 to 120 hours of age, and it recommends that all newborns undergo a thorough clinical assessment within 24 hours of birth. When there is no clinical concern for early jaundice, the CPS recommends that a pre-discharge TcB or TSB be performed in all infants no earlier than 12 hours of age. For home births or discharges before 12 hours of age, the CPS advises that bilirubin screening be completed within the recommended time frame. In keeping with previous guidance, this continues to be interpreted as within the first 72 hours of life, as the updated position statement does not suggest a change in this clinical practice. (7)

Summary Statement:

Universal bilirubin screening may be offered between 12 and 120 hours of age, but it is often done between 24 and 72 hours of age to align with routine newborn screening. **[new 2025]**

Considerations for Bilirubin Transport:

As midwives perform TSB screening in community settings, there are important considerations for the proper transport and handling of samples, to preserve integrity:

Optimal microtainers
- Optimal microtainers for bilirubin samples include lithium heparin (green) and the SST-serum separator gel (gold) amber microtainers (as suggested by Sunnybrook Hospital in Toronto and the Department of Pathology and Laboratory Medicine at the University of California). (82,83)

Protection from light
- To ensure that bilirubin samples are protected from light degradation, they may be wrapped in aluminum foil, stored in an opaque box or placed in a brown paper bag. (84,85) Amber-coloured microtubes may also be used to protect samples. (86)

Protection from hot or cold temperatures
- Research has tested bilirubin samples at temperatures between 3°C and 35°C and found this entire range acceptable, with light protection, for maintaining bilirubin level stability. (87–89) To ensure sample integrity, midwives may consider transporting samples with ice or cold packs, depending on weather and transport conditions. (85)

Time for transportation
- Where possible, samples should be delivered to a lab within two hours of the blood draw.

WHAT INTERVENTIONS EFFECTIVELY MANAGE AND TREAT SIGNIFICANT HYPERBILIRUBINEMIA?

Such interventions as phototherapy aim to manage hyperbilirubinemia, so as to avoid more serious consequences of bilirubin toxicity.

Fibreoptic phototherapy
One Cochrane review was identified that addressed the use of fibreoptic phototherapy vs. conventional phototherapy for treatment of hyperbilirubinemia. (90) This review found evidence about the effects of fibreoptic phototherapy on **duration of phototherapy** (four randomized or quasi-randomized trials), **change in bilirubin concentration over total treatment period** (five randomized trials) and **change in bilirubin levels at 24 hours** (four randomized trials).

A meta-analysis of four randomized or quasi-randomized controlled trials (*low certainty of evidence*), with serious methodological flaws related to randomization, allocation and blinding, showed that fibreoptic phototherapy may increase the **duration of phototherapy** (73.4 hours vs. 53.8 hours; MD 21.45 hours, 95% CI 16.92-25.99, p < 0.00001) in a population of 330 healthy term infants. (90)

A meta-analysis of five randomized controlled trials (*moderate certainty of evidence*), with 345 healthy infants enrolled, examined **change in bilirubin concentration over the total treatment period**, calculated as the percentage change per day. Results were inconsistent across studies, although the change in bilirubin concentration was 4.82% (p < 0.0005) greater in the conventional phototherapy group. (90)

A meta-analysis of four randomized controlled trials (*high certainty of evidence*), with 183 healthy infants enrolled, showed that fibreoptic phototherapy is slightly less effective at lowering bilirubin **concentrations within 24 hours** of starting treatment. The percentage change in bilirubin concentration was 4.35% (p = 0.002) greater in the conventional phototherapy group; however, these differences are not clinically significant. (90)

Work group remarks, clinical considerations, values and preferences
The WG balanced the benefits of fibreoptic phototherapy, such as skin-to-skin contact and more frequent human milk feeding, against the finding that fibreoptic therapy is slower at lowering bilirubin concentrations, which may increase treatment duration. The WG recognized that

fibreoptic phototherapy may be less acceptable to clients who would prefer a shorter duration of treatment, but more acceptable those who value the opportunity for skin-to-skin contact and/or the potential for less disruption of human milk feeding.

The WG further identified fibreoptic phototherapy as the preferred method of treatment in the home and community setting. Home phototherapy may prevent prolonged hospitalization, promote the parent-child dyad and provide cost savings to the health-care system. (91) The WG discussed the use of fibreoptic phototherapy in the home, balancing the potential for longer treatment duration with the benefits of supporting the parent-infant bond and client values regarding treatment at home. In-

home phototherapy could also reduce the burden on rural and remote clients of travelling for treatment.

Importantly, management of conventional phototherapy in many communities remains hospital based, and access to fibreoptic phototherapy varies across the province. Although midwives support community- and home-based care, home phototherapy treatment is largely unavailable because of the inaccessibility of equipment and the potential time constraints on midwives. The WG valued offering this intervention in communities where fibreoptic phototherapy is available, as part of an informed choice discussion, recognizing variability in clients' access, preferences and values.

Recommendations

14. Where available, midwives may offer fibreoptic phototherapy using their clinical experience and the clinical context of the client to guide decision-making. **[2019]**

    Weak recommendation: low certainty of evidence
    This recommendation recognizes that fibreoptic phototherapy may increase the duration of treatment and therefore may not be appropriate in all cases, but that it has benefits such as an increase in skin-to-skin contact.

15. Midwives may offer fibreoptic phototherapy in the home as an option for treatment where community-based health infrastructure exists. **[2019]**

    Weak recommendation: low certainty of evidence
    This recommendation recognizes midwives' scope of practice to manage phototherapy, provided they have the knowledge, skills, experience and community-based health infrastructure to do so.

Considerations for implementation: Midwifery management of phototherapy

Improvements to community-based health-care infrastructure that would facilitate midwifery management of phototherapy include but are not limited to:
- Funding that allows midwifery practice groups to purchase home phototherapy equipment (fibreoptic phototherapy units, e.g., bili blankets).
- Development of continuing education specific to midwives managing phototherapy.
- Increased access to community-based laboratories for processing blood samples (intake of blood samples from the community, laboratories that operate on weekends and overnight).
- Seamless consultation or transfer of care, if necessary.
- Change in reimbursement policies that reflect additional daily assessments, laboratory sampling and travel costs required during phototherapy.

Formula supplementation during phototherapy

One observational study (*very low certainty of evidence*) was identified that explored formula supplementation during phototherapy. Fifty-three healthy term neonates were enrolled and divided into two groups according to feeding type at time of readmission to hospital: mixed fed (supplemented with 75 mL/kg/d of formula) and exclusively human milk fed.

The study showed that mixed feeding may reduce the **duration of phototherapy** (26.8 hours vs. 38.6 hours; MD −11.8 hours, 95% CI −17.75 to −5.85, p = 0.0001) and may result in a faster average decrease of **bilirubin levels** within a 24 hour period (92.34 µmol/L/24 hours vs. 68.40 µmol/L/24 hours; MD 23.94 µmol/L, 95% CI 7.05-40.83, p = 0.005), but we are uncertain of these results. (92)

Work group remarks, clinical considerations, values and preferences

Formula supplementation may reduce the duration of phototherapy, but we are very uncertain about these results, as the study did not control for confounding factors. In making the following recommendation, the WG balanced a longer duration of phototherapy against the substantial benefits of exclusive human milk feeding, such as improved bonding between parent and newborn, (36,93) reduced risk of gastrointestinal infection (36) and improved immunologic status. (37) Clients should not be deterred from nursing while an infant is undergoing phototherapy. Rather than supplementing with formula, nursing parents should be encouraged to feed their infant frequently and receive ongoing lactation support, as indicated by the clinical picture.

Recommendation

16. Midwives should not routinely recommend formula supplementation for otherwise healthy infants undergoing phototherapy, discussing the risks and benefits with clients. **[2019]**

    Strong recommendation: very low certainty of evidence
    This recommendation recognizes midwifery support of human milk as the optimal physiological nutrition for infants.

Infant massage during phototherapy

We identified two randomized controlled trials (*moderate certainty of evidence*) that examined infant massage as an adjunct to phototherapy. A meta-analysis of the two studies (n = 142) showed that infant massage likely results in lower **bilirubin levels on day three** (MD −31.03, 95% CI −41.1 to −20.96, p < 0.00001). (94,95)

Work group remarks, clinical considerations, values and preferences

Available evidence on massage and phototherapy includes moderate certainty of evidence that massage may result in lower bilirubin levels on day three of phototherapy, although this difference is not clinically significant. Confidence in the results is limited by uncertainty about the randomization process and a small, inadequately powered sample size. The WG considered the other potential benefits of infant massage, such as improved elimination and weight gain; better sleep patterns, growth and development; lower rates of colic, constipation and stress; and the promotion of parent-infant bonding. (50,94,96)

Summary Statement:

Infant massage as an adjunct to phototherapy is unlikely to affect bilirubin levels in a clinically meaningful way. **[2019]**

Skin-to-skin contact

We identified one observational study (*very low certainty*) and one randomized controlled trial (*moderate certainty of evidence*) that examined the use of skin-to-skin contact in conjunction with phototherapy.

Results showed that skin-to-skin done for one hour three times daily may reduce the **duration of phototherapy** (68.14 hours vs. 100.86 hours; MD −32.72 hours, 95% CI −52.54 to −12.9, p = 0.001). However, it may make little to no difference in peak serum **bilirubin levels** (261.6 µmol/L vs. 263.6 µmol/L; MD −2 µmol/L, 95% CI −20.14 to 16.14, p = 0.83). (97)

Results from the randomized controlled trial, in which intermittent skin-to-skin was done every three hours,

showed shorter **duration of hospitalization** (2.09 days vs. 3.03 days, p = < 0.001). Small sample sizes and wide confidence intervals, as well as missing outcome data, limit our confidence in these results. (98)

Work group remarks, clinical considerations, values and preferences

Research suggests that continuous skin-to-skin contact (> 20 hours/day) reduces infant mortality and risk of hypothermia, hypoglycemia and sepsis, and it increases weight, length and head circumference gain. (99) The certainty of evidence for intermittent skin-to-skin is very low; we are uncertain whether this intervention reduces the duration of phototherapy and/or is more effective at lowering bilirubin levels. It is important to note that the peak serum bilirubin levels in this study were not clinically meaningful, and skin-to-skin may not always be possible to maintain if the infant's bilirubin levels are more critical. While there are no known harms from intermittent skin-to-skin contact, it provides a number of benefits, including lactation support, reduction of parental anxiety, and improvement of the infant's respiration and oxygen saturation. (97,100,101)

Summary Statement:

Midwives support skin-to-skin contact as a standard component of normal, physiologic postpartum care for infants, including those undergoing standard phototherapy treatment. **[2019]**

Other treatments: intravenous immunoglobulin infusion

Intravenous immunoglobulin (IVIG) infusion is the process of administering a blood product made of antibodies to treat autoimmune conditions. It has been used in infants who demonstrate Rh, ABO or other blood group incompatibilities, and it is particularly indicated for infants with pathologic jaundice from underlying hemolytic disease.

Results from an updated Cochrane review published in 2018 (n = 189), on IVIG as an adjunct to phototherapy among infants experiencing significant hyperbilirubinemia from isoimmune hemolytic disease, suggest potential benefits of IVIG for reducing the need for exchange transfusion, but the results are very uncertain. (102) While routine use of IVIG is not recommended, it may be considered in settings where blood exchange transfusion cannot be performed readily. (7)

Midwifery Clinical Pathway for Screening and Management:

Screening for hyperbilirubinemia and management of phototherapy, as required, is within the midwifery scope of practice. The *Clinical Pathway for Midwifery Screening (≥ 35 weeks) and Management of Phototherapy in Term Infants (≥ 37 weeks)* has been updated to complement this CPG and the updated CPS guidance.

The midwifery pathway reflects midwifery scope of practice and it integrates midwifery values, philosophy and model of care. It provides practitioners with a clinical pathway for:

- hyperbilirubinemia screening, following recommendations from this CPG
- management of phototherapy, if applicable to the individual midwife's practice

To access the clinical pathway, visit the AOM website.

EXPERIENCES OF CLIENTS WHOSE NEWBORNS REQUIRE MANAGEMENT OF SIGNIFICANT HYPERBILIRUBINEMIA

Perspectives and needs of clients whose newborns require phototherapy treatment

Compared with clinical management of hyperbilirubinemia, less information is available to guide midwives in providing care to meet the psychosocial needs of clients whose infants require treatment for jaundice.

Research involving families whose newborns required phototherapy suggests that phototherapy can be an uncomfortable experience for parents, both physically and emotionally. (103–106) Many parents feel anxious about the immediate and long-term implications of significant hyperbilirubinemia for their newborns,

particularly as the timing of this diagnosis can seem sudden, leaving parents feeling unprepared. (103,106,107) Some parents may be disproportionately affected by the stress associated with phototherapy, including those with limited social support and/or inadequate access to transportation to and from the hospital.

Research about the parental experience with neonatal jaundice provides important insights into the ways that health-care providers can support parents' physical, emotional and learning needs. Through consistent guidance and support, health-care providers can address parents' concerns about significant hyperbilirubinemia and help them navigate the phototherapy experience and mediate potential difficulties. (103–107) Parents also benefit greatly from the support and information received from health-care providers, which enables them to best meet their newborns' nutritional needs during this period. (37,105,106)

For more information on Ontario midwifery client experiences, see the client-directed resources: *What Is Jaundice?* and *What Is Phototherapy and Why Does My Baby Need It?*

Practice points for communication during management of significant hyperbilirubinemia

The practice points in **Figure 1** can lessen the psychosocial impacts of phototherapy and other methods for managing significant hyperbilirubinemia.

FIGURE 1: PRACTICE POINTS FOR COMMUNICATION AND CARE BEFORE, DURING AND AFTER MANAGEMENT OF SIGNIFICANT HYPERBILIRUBINEMIA

Prenatally	• Educate clients about newborn jaundice, including how to identify jaundice and when and how to contact the midwife. • Provide information about testing and treatment options.
Jaundice suspected	• Discuss relevant risk factors with the client. • Discuss available testing and treatment options.
Upon diagnosis	• Interpret the newborn's test results and explain what they mean. • Allow time to answer any questions about the diagnosis. • Explain possible next steps and how clients can best prepare for their infant's phototherapy. • If phototherapy is managed by a physician or nurse, consider checking in with clients by phone or in person during treatment, for continuity of care and the opportunity to ask questions.
During phototherapy	• Support exclusive human milk feeding, when and if possible. • Advocate for optimal skin-to-skin time, when and if possible. • Relay relevant information about treatment to clients. • If treatment takes place in hospital, assess and provide support for clients' emotional and physical needs (e.g., access to a bed, private/semi-private room, supplies such as sanitary napkins and breast pads). • Clients indicate that they would have appreciated peer-to-peer support and information sharing. • Facilitate access to their newborn if they require intensive care. • Otherwise, if clients cannot be with their newborns, provide updates about their treatment progress, when possible.
Upon discharge/ follow-up	• Offer clients and their support people the opportunity to discuss their experience, and ensure flexible timing for these discussions, as some clients may be ready sooner than others. • Relay important information about symptoms (in case serum bilirubin levels rebound), and help clients feel prepared should their newborn require further management. • Offer counselling or refer clients and their support people, to address any long-lasting mental health impacts.

17. Midwifery clients would benefit from discussions with their midwife about:
    - results of bilirubin testing and their clinical significance, if any
    - treatment options and alternatives, including what to expect regarding the impact of treatment on skin-to-skin and feeding
    - how to access psychosocial and emotional support during and after their experience of treatment **[2019]**

Strong recommendation: very low certainty of evidence

This good practice statement recognizes continuity of care and the skill of midwives in providing health information to clients.

SUMMARY OF GOOD PRACTICE STATEMENTS & RECOMMENDATIONS

1. Identification of risk factors for significant hyperbilirubinemia typically occurs in an ongoing manner throughout the course of the prenatal and postpartum period in the context of Ontario midwifery care.

   For all clients, include the following as part of an informed choice discussion:
   - Jaundice is common, short-lived and usually harmless; however, a small number of babies will develop significant hyperbilirubinemia, which can be harmful if not treated.
   - Provide instruction on how to detect visible jaundice, particularly within the first 24 hours: in lighter-skinned infants, visibly yellow tone and/or yellow sclera; in darker-skinned infants, yellow under blanched skin and/or yellow sclera.
   - Describe additional signs of hyperbilirubinemia, including poor suck, lethargy and reduced feeding, dark urine and pale, chalky stools.
   - Review how to contact their midwife if jaundice is suspected in the newborn. [**2025**]

   ### Good practice statement
   This good practice statement recognizes the client as the primary decision-maker, the midwives' ability to identify emerging risk factors and the need for timely decision-making.

2. Share with clients how risk factors, if present, may impact considerations for screening and management of significant hyperbilirubinemia. [**2019**]

   ### Good practice statement
   This good practice statement recognizes the client as the primary decision-maker, the midwives' ability to identify emerging risk factors and the need for timely decision-making.

3. For birthing parents in the O blood group, midwives should consider collecting and storing cord blood for processing, in the event that jaundice presents in the first 24 hours or if a TSB is later required for the infant.
   - 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. [**2025**]

   ### Good practice statement
   This good practice statement recognizes the client as the primary decision-maker, the midwives' ability to identify emerging risk factors and the need for timely decision-making.

4. In the otherwise well, human milk-fed infant with persistent visual jaundice, midwives may consider drawing TSB, including the conjugated fraction, to determine whether further investigation is needed.

   A conjugated bilirubin level above 17 µmol/L warrants consultation with a physician for further investigation of potential underlying causes. [**new 2025**]

   ### Good practice statement
   This good practice statement recognizes continuity of care and midwives' ability to assess the need for interprofessional collaboration as the neonate's clinical picture requires.

5. If midwives suspect a pathologic cause of hyperbilirubinemia, further investigation, which may include physician consultation, is required to determine the underlying condition. [**new 2025**]

   ### Good practice statement
   This good practice statement recognizes midwives' ability to identify emerging risk factors and assess the need for interprofessional collaboration as the neonate's clinical picture requires.

6   Midwives should not recommend formula supplementation to prevent significant hyperbilirubinemia in the otherwise well, healthy neonate fed with human milk. **[2019]**

Strong recommendation: very low certainty of evidence

This recommendation recognizes midwifery support of human milk as the optimal physiological nutrition for infants.

7   Midwives may offer delayed cord clamping to all clients, taking into consideration hyperbilirubinemia risk factors.

Informed choice discussions should include:
- the risks and benefits of delayed cord clamping compared with early cord clamping
- how risk factors for hyperbilirubinemia, if present, increase the infant's risk of jaundice
- the client's values and preferences **[2019]**

Weak recommendation: moderate certainty of evidence

This recommendation recognizes the preference for and health benefits of delayed cord clamping while balancing the client's values and preferences.

8   There is insufficient evidence to support the use of sunlight as a means of preventing significant hyperbilirubinemia. **[2019]**

No recommendation: very low certainty of evidence

9   Visual assessment ***alone*** is not recommended when screening for significant hyperbilirubinemia. **[2019]**

Weak recommendation: very low certainty of evidence

This recommendation recognizes that visual assessment for hyperbilirubinemia is an important part of the overall clinical assessment of a newborn, but it should not be solely relied upon to determine a newborn's risk of significant hyperbilirubinemia.

10 The use of risk factor scoring systems is not recommended when screening for significant hyperbilirubinemia. **[2019]**

Weak recommendation: low certainty of evidence

This recommendation recognizes that midwives routinely assess for hyperbilirubinemia risk factors as part of an infant's clinical assessment in the postpartum period, but they should not use a scoring system.

11 Where screening for hyperbilirubinemia is requested and/or recommended and bilimeters are available, midwives should offer TcB screening. **[2019]**

Strong recommendation: very low certainty of evidence

This recommendation recognizes the unequal access to bilimeters across practice groups and the province but affirms the use of bilimeters as an effective screening tool to prompt TSB testing when required and as a promising way to increase community-based care.

12 The risks and benefits of universal screening should be discussed with all clients as part of an informed choice discussion.

This discussion may include:
- what is known about risk factors for significant hyperbilirubinemia, if present
- how visible jaundice, poor feeding, dehydration and weight can increase an infant's risk
- the limitations of relying on visual assessment alone to detect jaundice
- timing of screening
- barriers to and enablers of screening within the client's community context
- the client's values and preferences and risk tolerance **[2025]**

Weak recommendation: very low certainty of evidence

This recommendation recognizes the lack of high-certainty evidence on the effectiveness of universal screening, the uniqueness of the midwifery context, and structural barriers that impact midwives' ability to offer community-based bilirubin screening.

13   If visible jaundice develops, obtaining a bilirubin measurement is recommended.

For neonates who have previously had a TcB or TSB result that required no repeat testing or treatment and in whom visible jaundice subsequently develops, midwives may use their clinical judgment in determining the need for re-screening. Consider presence or absence of other clinical factors associated with significant or pathologic hyperbilirubinemia (e.g., suboptimal feeding, lethargy, dark urine, pale chalky stools). **[2025]**

Weak recommendation: very low certainty of evidence
This recommendation recognizes that the timely, frequent and close follow-up of neonates as a standard of midwifery care limits the benefits associated with universal screening, while acknowledging the importance of a clinical manifestation of hyperbilirubinemia.

14   Where available, midwives may offer fibreoptic phototherapy using their clinical experience and the clinical context of the client to guide decision-making. **[2019]**

Weak recommendation: low certainty of evidence
This recommendation recognizes that fibreoptic phototherapy may increase the duration of treatment and therefore may not be appropriate in all cases, but that it has benefits such as an increase in skin-to-skin contact.

15   Midwives may offer fibreoptic phototherapy in the home as an option for treatment where community-based health infrastructure exists. **[2019]**

Weak recommendation: low certainty of evidence
This recommendation recognizes midwives' scope of practice to manage phototherapy, provided midwives have the knowledge, skills, experience and community-based health infrastructure to do so.

16   Midwives should not routinely recommend formula supplementation for otherwise healthy infants undergoing phototherapy, discussing the risks and benefits with clients. **[2019]**

Strong recommendation: very low certainty of evidence
This recommendation recognizes midwifery support of human milk as the optimal physiological nutrition for infants.

17   Midwifery clients would benefit from discussions with their midwife about:
   - results of bilirubin testing and their clinical significance, if any
   - treatment options and alternatives, including what to expect regarding the impact of treatment on skin-to-skin and feeding
   - how to access psychosocial and emotional support during and after their experience of treatment. **[2019]**

Good practice statement
This good practice statement recognizes continuity of care and the skill of midwives in providing health information to clients.

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Original Recommendation [2019]	Updated or New Statement [2025]	Explanation of Change(s)
What factors are associated with jaundice beyond 14 days of life?		
In the otherwise well, human milk-fed infant with prolonged jaundice (jaundice lasting > 14 days), midwives may consider drawing TSB including the conjugated bilirubin to screen for the need for further investigation. If conjugated bilirubin level is > 18 µmol/L or greater than 20% of the TSB concentration, consult with a physician for further investigation of potential underlying causes of prolonged jaundice. *This good practice statement recognizes continuity of care and the ability of the midwife to assess the need for interprofessional collaboration as the neonate's clinical picture requires.*	In the otherwise well, human milk–fed infant with persistent visual jaundice, midwives may consider drawing a TSB, including the conjugated fraction, to determine whether further investigation is needed. A conjugated bilirubin level above 17 µmol/L warrants consultation with a physician for further investigation of potential underlying causes. **[new 2025]** *This good practice statement recognizes continuity of care and midwives' ability to assess the need for interprofessional collaboration as the neonate's clinical picture requires.*	The CPS 2025 Position Statements defines prolonged jaundice as clinically significant jaundice, where TSB levels are within 35 µmol/L of the phototherapy threshold and persist beyond 14 days of age in term or late preterm infants. This section was retitled 'Factors associated with jaundice beyond 14 days of life' to reflect inclusion of breast milk jaundice, a common cause of persistent visible jaundice that does not necessarily meet the new CPS definition of prolonged jaundice. It also outlines potential pathologic causes of prolonged jaundice due to elevated unconjugated bilirubin (e.g., HDN, infection, CH) and elevated conjugated bilirubin related to cholestatic liver diseases (e.g., biliary atresia). The revised good practice statement adopts the CPS threshold, defining direct bilirubin as abnormal when greater than 17 µmol/L (a level > 20% of the total bilirubin is no longer required to diagnose cholestasis).
What factors are associated with the development of severe hyperbilirubinemia and/or acute bilirubin encephalopathy?		
None.	If midwives suspect a pathologic cause of hyperbilirubinemia, further investigation, which may include physician consultation, is required to determine the underlying condition. **[new 2025]** **Good practice statement** *This good practice statement recognizes midwives' ability to identify emerging risk factors and assess the need for interprofessional collaboration as the neonate's clinical picture requires.*	A new good practice statement was written to center the importance of identifying neurotoxicity risk factors, defined in the 2025 CPS Position Statement, as factors that increase the toxic effects of bilirubin on the newborn brain. Assessing this risk requires clinical judgment, as some risk factors are based on the hypothesis that serious illness in a newborn (e.g., sepsis) compromises the blood–brain barrier, thereby supporting the use of lower TSB thresholds to initiate phototherapy.
Timing of universal bilirubin screening		
None.	Universal bilirubin screening may be offered between 12 and 120 hours of age, but it is often done between 24 and 72 hours of age to align with routine newborn screening. **[new 2025]** **Summary statement**	This new summary statement was written to provide information on the new CPS guideline, which expands the screening window from 18 to 72 hours of age to 12 to 120 hours of age and recommends measuring a pre-discharge TSB or TcB no earlier than 12 hours post-birth in all healthy newborns. For home births or discharges before 12 hours of age, the CPS advises that "arrangements should be made for a bilirubin screen to be performed within the recommended period." Although there is no evidence supporting an 'optimal' time for bilirubin screening, it is often performed between 24 to 48 hours of age to align with the optimal timing for DBS screening.