Reproductive Care Program
Halifax Professional Centre
5991 Spring Garden Road, Suite 700
Halifax, NS B3H 1Y6
phone: 902-470-6798
fax: 902–470-6791
http://rcp.nshealth.ca

Routine Bilirubin Screening and Management

Revised: December, 2021

This is a clinical practice guideline only, intended for use by perinatal health professionals. Practices may differ across facilities, depending on available resources and prescriber preference. All policies and procedures must be approved by the appropriate processes within each facility / Nova Scotia Health Authority (e.g..; Maternal/Child or Perinatal Committee, Medical Advisory Committee, etc.).

The information in this resource is up to date as of the time of publication. RCP aims to review posted resources at a minimum every five years, unless new evidence to support practice changes in opposition of this information would require immediate removal and revision. Please feel free to contact us with any questions or concerns about information found in an RCP resource. (902)470-6798.

"This practice resource is intended to assist care providers in making decisions regarding the care of babies ≥ 35 weeks gestation who are well with no clinical signs of jaundice. If an infant is jaundiced, a bilirubin measurement should be obtained, the results plotted on the treatment graph, and phototherapy initiated if indicated. The resource is not a substitute for individual judgment brought to each clinical situation by the primary care provider in collaboration with the newborn's family. As with all clinical reference resources, they reflect the best understanding of the available evidence at the time of publication and should be used with the clear understanding that continued research may result in new knowledge and recommendations".

INTRODUCTION

Neonatal jaundice is a common phenomenon. Most infants will have modest increases in serum bilirubin which will clear spontaneously in the first weeks of life. Severe hyperbilirubinemia while is uncommon, has the potential for causing long-term neurological impairment[1]. Therefore, it is important to systematically evaluate all infants for hyperbilirubinemia.

The purpose of this practice resource is to guide care providers in the screening and identification of at-risk neonates, to prevent morbidities and mortality due to severe hyperbilirubinemia.

SCREENING AND REPORTING RESULTS

1. Obtain a bilirubin level on every infant at 24-72 hours of age, prior to hospital discharge. Bilirubin measurements can be performed via total serum bilirubin (TSB) and / or transcutaneous bilirubin (TcB) via a bilirubinometer. Both are acceptable methods of *screening* bilirubin levels[1]. See Appendix A for important considerations for health care facilities who choose to utilize a transcutaneous bilirubinometer to screen bilirubin levels.

2. To minimize the number of painful procedures, a TSB will most commonly be obtained along with the newborn metabolic screen, which is recommended to be performed at 24-48 hours after birth.

3. Planning for discharge of healthy infants born at > 35 weeks gestation should begin soon after birth and should include an estimated time for discharge. A TSB should be drawn early enough so results are available before the parent and infant are discharged.

[1] KJ. Barrington, K Sankaran; Canadian Paediatric Society, Fetus and Newborn Committee. Guidelines for detection, management and prevention of hyperbilirubinemia in term and late preterm newborn infants (35 or more weeks' gestation): Paediatric Child Health 2007;12(Suppl B):1B-12B. https://www.cps.ca/en/documents/position/hyperbilirubinemia-newborn

4. Plot the bilirubin results on the **'predictive nomogram'**[2] (Appendix B) against the age of the baby at the time the specimen was obtained. Most commonly, the TSB will be plotted by the nurse assigned to care for the baby at the time the results are forwarded from the Laboratory.

5. All bilirubin results must be reported to the ordering physician / midwife.

DETERMINING NEED FOR DAT (DIRECT ANTIGLOBULIN TEST) AS PART OF THE SCREENING PROCESS

1. A DAT should be performed on the infant's cord blood in the following clinical situations:

   a) the TSB plots in the high or high-intermediate zone, regardless of gestation;
   b) the TSB plots in the high, high-intermediate or low-intermediate zone and the infant's gestation is ≤ $37^{6}/_{7}$ weeks gestation;
   c) in infants who are clinically jaundiced, or the TSB plots in the high or high intermediate zone of mothers who are blood type group O;
   d) if the maternal blood type is unknown;
   e) if there is positive maternal red blood cell (RBC) antibodies.

DETERMINING NEED FOR DAT (DIRECT ANTIGLOBULIN TEST) FOR CLINICAL REASONS AND FOR INFANTS FOR WHOM THE SCREENING PROCESS DOES NOT APPLY E.G. BABIES WITH JAUNDICE

1. A DAT should be performed on the infant's cord blood in the following situations:

   a) the infant develops early jaundice e.g. in the first 24 hours;
   b) the infant develops jaundice after 24 hours and the mother's blood type is 'O' or unknown;
   c) there is positive (or unknown) maternal red blood cell (RBC) antibodies.

DETERMINING NEED FOR FOLLOW UP OR TREATMENT

1. If the infant is ≤ $37^{6}/_{7}$ weeks gestation and DAT positive, and the TSB plots in the **'high'** zone, phototherapy is indicated[3].

2. If the infant is ≤ $37^{6}/_{7}$ weeks gestation and DAT positive, and the TSB plots in the **'high-**

[2] American Academy of Pediatrics; Subcommittee on Hyperbilirubinemia. Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation; Pediatrics 2004, 114 (1) 297-316; DOI: https://doi.org/10.1542/peds.114.1.297

[3] A positive DAT (titre of ≤ 1:8) in a Rh-negative mother may be related to the administration of WinRho.

intermediate' or **'low-intermediate'** zone, phototherapy should be carefully considered.

3. Plotting results on the treatment graphs for either **intensive** (Appendix C) or **conventional** (Appendix D) phototherapy is recommended for all decisions around phototherapy. Conventional phototherapy may be considered for TSB levels 35 to 50 µmol/l below those values indicated on the **'intensive graph'**[2], and may prevent development of moderate to severe hyperbilirubinemia.

4. Further testing **within 24 hours** is indicated:

   a) if the TSB plots in the '**high' zone** and phototherapy is not immediately required, regardless of gestation or DAT
   b) if the TSB plots in the **'high intermediate'** or '**low intermediate'** zone and the infant is 35 to $37^{6}/_{7}$ weeks gestation and DAT positive.

   Further testing includes a repeat TSB as well as assessment for visible jaundice, adequacy of feeding and weight.

5. Follow-up **within 24-48 hours** is indicated if the TSB plots in the **'high intermediate'** zone:

   And
   - the infant is ≥ 38 weeks and DAT positive

   Or
   - the infant is 35-$37^{6}/_{7}$ weeks gestation and DAT negative

   Follow-up includes a repeat TSB test and assessment for jaundice, feeding, and weight.

INTERPRETATION OF RESULTS

	≥ 38 weeks and DAT neg (If DAT indicated)	**≥ 38 weeks and DAT pos (If DAT indicated)**	**35-$37^{6}/_{7}$ weeks and DAT neg (If DAT indicated)**	**35-$37^{6}/_{7}$ weeks and DAT pos (If DAT indicated)**
High	Further testing or treatment	Further testing or treatment	Further testing or treatment	Phototherapy
High-Intermediate	Routine Care	Follow-up within 24-48 hours	Follow-up within 24-48 hours	Further testing or treatment
Low-Intermediate	Routine Care	Routine Care	Routine Care	Further testing or treatment
Low	Routine Care	Routine Care	Routine Care	Routine Care

COMMUNICATION WITH PARENTS AND CARE PROVIDERS

1. A discussion including information about the rationale for hyperbilirubinemia screening should occur with the parent(s). If the parent(s) decline screening, documentation in the infant's health record should include the parent's decision and a summary of the discussion that took place.
2. If follow-up following discharge is indicated, a copy of the predictive nomogram should be provided to the parent(s) at the time of discharge from hospital.

3. If repeat testing is indicated following discharge, provide a Laboratory requisition and ensure the parent(s) is informed of the reason for, and the importance of completing the test.

4. Ensure the infant's primary care provider, and/ or other designated provider, is informed of all initial and follow-up TSB results, and the ongoing plan of care as per the Canadian Pediatric Society recommendations[1].

APPENDIX A – TRANSCUTANEOUS BILIRUBINOMETERS AND CONSIDERATIONS FOR USE

A transcutaneous bilirubinometer is a non-invasive device used for measurement of transcutaneous bilirubin (TcB) levels and can provide a valid reflection of serum bilirubin levels up to a certain point[1]. If healthcare facilities choose to purchase transcutaneous bilirubinometers for routine bilirubin screening the following information should be considered.

A transcutaneous bilirubinometer:

1. Requires additional financial resources to purchase.
2. Requires educational requirements to ensure appropriate care provider use.
3. Requires adherence to local and provincial Laboratory Point of Care Testing approval processes and quality assurance practices for initial and ongoing use by care providers within inpatient clinical settings across Nova Scotia.
4. Accuracy of TcB measurements can be impacted by the specific device in use and user variability.

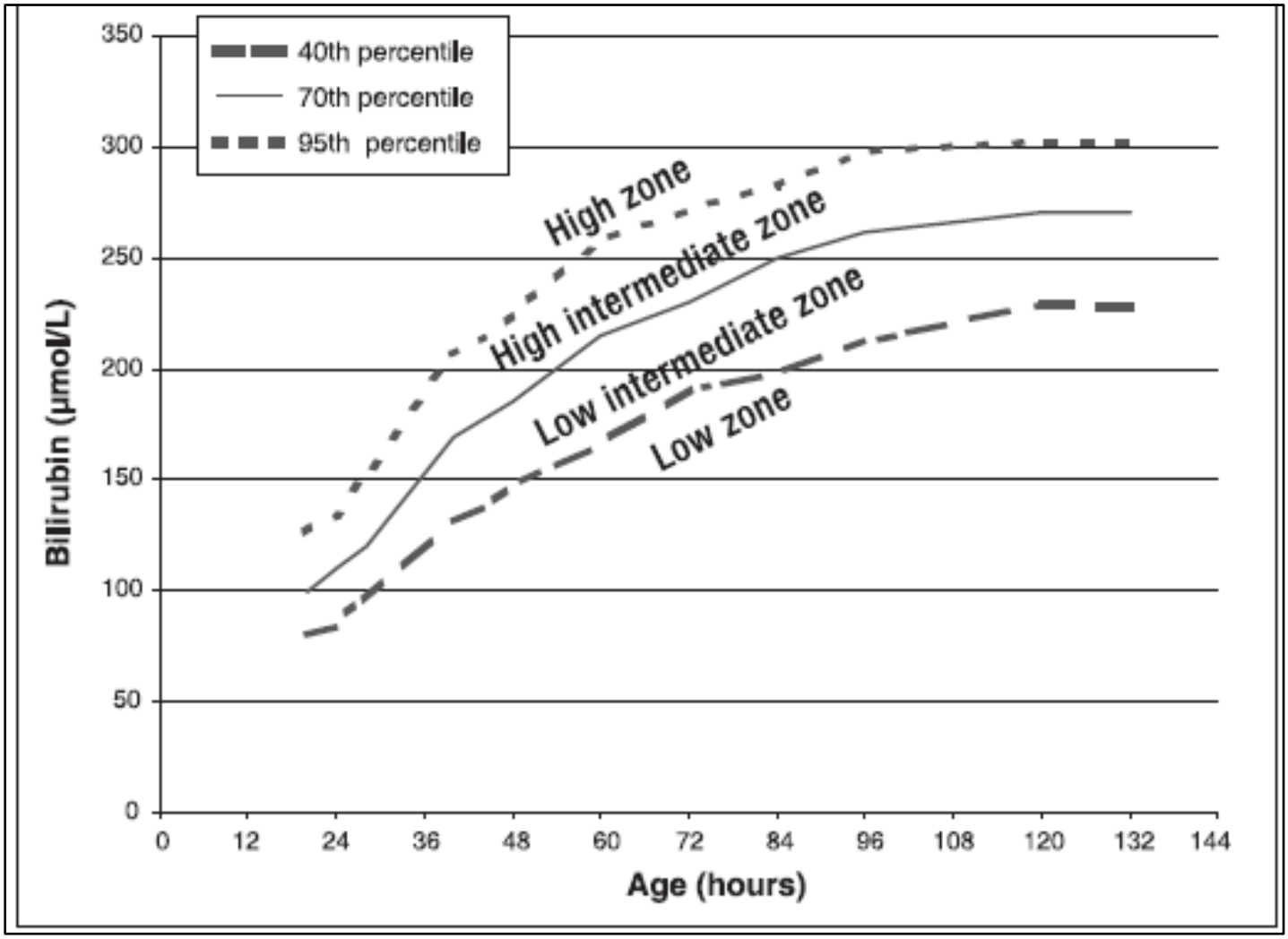
Transcutaneous bilirubin (TcB) screening measurements:

- are more accurate at lower levels of bilirubin;
- are helpful when used for trending, when there is clinical suspicion of hyperbilirubinemia;
- become unreliable if performed:
    - in the presence of changes in skin colour / pigmentation / bruising and thickness;
    - after the initiation of phototherapy.

Transcutaneous bilirubinometer practice points:

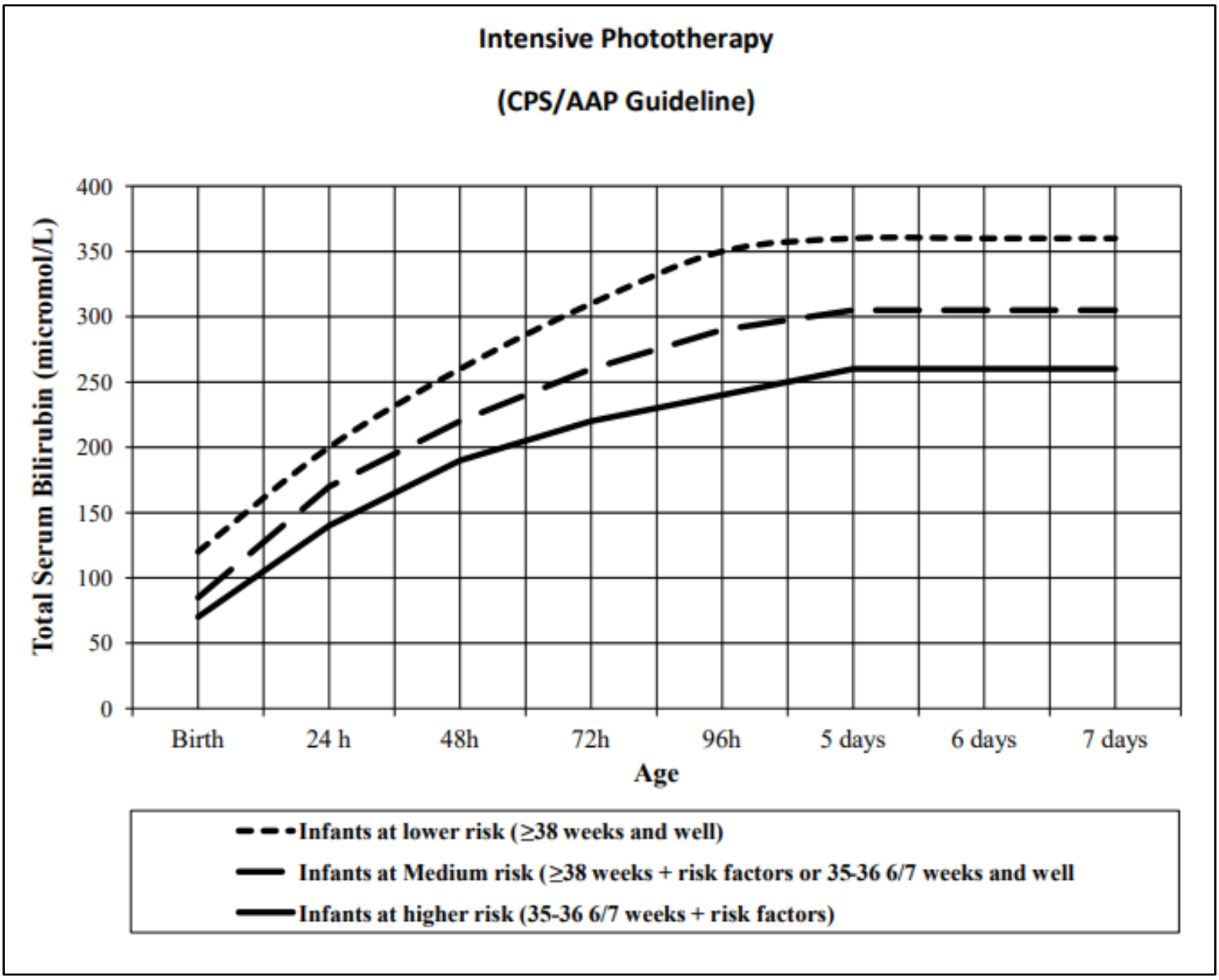
- Perform testing ideally on the infant's sternum. The forehead can also be used if unable to get a reading from the sternum;
- Avoid performing testing on bruises, birthmarks or excessively hairy skin;
- Do not use if infant is undergoing Phototherapy;
- Ensure the TcB measurements are displayed in μmol/L and follow product instructions to safely interpret results. The Canadian Pediatric Society recommends plotting the TcB with the value of the 95% CI for the device added to the results obtained by the meter[1].
- Elevated TcB levels must be verified by a TSB. TSB levels **must** be used in decision-making related to initiation of therapeutic intervention for newborns experiencing hyperbilirubinemia and for ongoing management of response to therapy.

APPENDIX B – PREDICTIVE NOMOGRAM FOR BILIRUBIN SCREENING



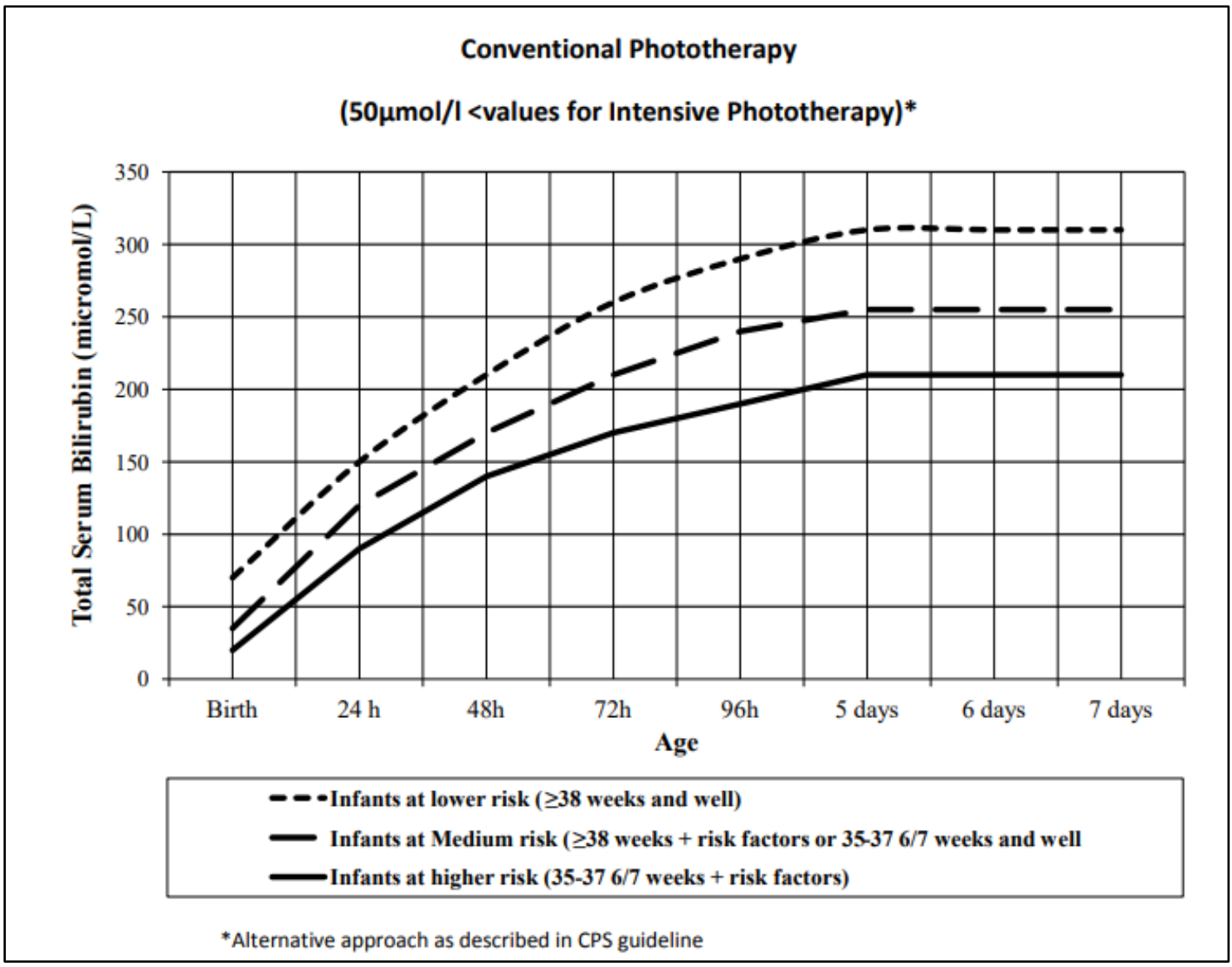
American Academy of Pediatrics; Subcommittee on Hyperbilirubinemia. Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation; Pediatrics 2004, 114 (1) 297-316; DOI: https://doi.org/10.1542/peds.114.1.297

APPENDIX C – INTENSIVE PHOTOTHERAPY



American Academy of Pediatrics; Subcommittee on Hyperbilirubinemia. Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation; Pediatrics 2004, 114 (1) 297-316; DOI: https://doi.org/10.1542/peds.114.1.297

APPENDIX D – CONVENTIONAL PHOTOTHERAPY



KJ. Barrington, K Sankaran; Canadian Paediatric Society, Fetus and Newborn Committee. Guidelines for detection, management and prevention of hyperbilirubinemia in term and late preterm newborn infants (35 or more weeks' gestation): Paediatric Child Health 2007;12(Suppl B):1B-12B. https://www.cps.ca/en/documents/position/hyperbilirubinemia-newborn