

VENTURA COUNTY MEDICAL CENTER
SANTA PAULA HOSPITAL
CLINICAL PRACTICE GUIDELINES / PROTOCOLS

NEONATAL HYPERBILIRUBENEMIA

The contents of this clinical practice guideline are to be used as a guide. Healthcare professionals should use sound clinical judgment and individualize patient care. This CPG is not meant to be a replacement for training, experience, CME or studying the latest literature and drug information.

- A. Identification of the newborn at risk for developing jaundice.** Consider obtaining a total serum (TSB) bilirubin at 24-48 hours on infants with the following risk factors:
1. Any infant that appears icteric*.
 2. Birth trauma: Cephalohematoma, significant cutaneous bruising, instrumental delivery.
 3. Neonatal factors: Polycythemia, GA < 38 weeks, macrosomia, East Asian race
 4. Maternal factors: ABO, Rh, or minor group blood type incompatibility (obtain a cord bili and a 4-6 hour TSB to check the rate of rise), exclusive breastfeeding, diabetes.
 5. Sibling who received phototherapy.
- B. Initiation of conservative management:** All babies with above risk factors**.
1. Encourage mothers to breastfeed 8-12 times per day in the first few days.
 2. Monitor number of wet diapers and stools:
 - a) Less than 2 stools or 3 wet diapers in a 24 hour period after 1st 24 hours merits further investigation. Consider formula supplementation.
 - b) Monitor weight loss (more than 10% in 72 hours should be investigated.)
- C. Consider Initiation of “Bili Bed”:** Patient may remain in couplet care.
1. TSB plots 2-3 mg/dL below the line for intensive phototherapy (see fig. 1).
 2. Look for cause: consider sepsis, hemolysis, cholestasis, etc.
 3. Monitor for adequate hydration via infant’s intake, weight change, output and vital signs.
- D. Initiation of intensive phototherapy:** Patient must be transferred to NICU or Pediatrics.
1. TSB exceeds the phototherapy line for the infant’s given risk category (see fig.1).
 2. Rate of TSB rise is 0.5 mg/dL/hour or more.
 3. Look for cause: Consider Pediatrics/NICU consult if patient appears septic or ill.
 4. Start intensive phototherapy: Irradiance in the blue-green spectrum (430-490 nm) of at least 30 W/cm² per nm measured at the infant’s skin, directly below center of light unit.
 5. Monitor for adequate hydration via infant’s intake, output, and vital signs.
 6. Recheck TSB in 4-6 hours. Consider CBCd and CRP.
 7. If TSB does not decrease, or increases despite intensive phototherapy, strongly consider presence of hemolysis.
 8. Order direct bilirubin at least once to screen for direct hyperbilirubinemia which has different etiology and management.
- E. Discontinuation of Phototherapy:**
1. Continue phototherapy until TSB falls 3-4 mg/dl below the phototherapy line for the infant’s given risk category (fig.1).
 2. If no hemolysis or hematoma, may discontinue lights and not recheck TSB, as rebound is minimal/rare.
 3. If hemolytic disease (or cephalohematoma), recheck TSB 12-24 hours after stopping phototherapy.
- F. Follow up:** See Table 1. Fax appropriate labs to the primary care provider’s office after making the follow-up appointment.
- G.** Consider Public Health Nurse Referral, especially if mom is breastfeeding.
- H.** Provide written and verbal information about jaundice for parents at the time of discharge.
- I.** Hearing screen prior to discharge for NICU or couplet care infants, or if TSB approaches exchange transfusion levels.

*: TSB may be ordered by RN in the first 48 hours of life if the infant is icteric.

** : Interpret all bilirubin values according to the infant’s age in hours.

Fig. 1 - GUIDELINES FOR PHOTOTHERAPY IN HOSPITALIZED INFANTS OF 35 OR MORE WEEKS' GESTATION

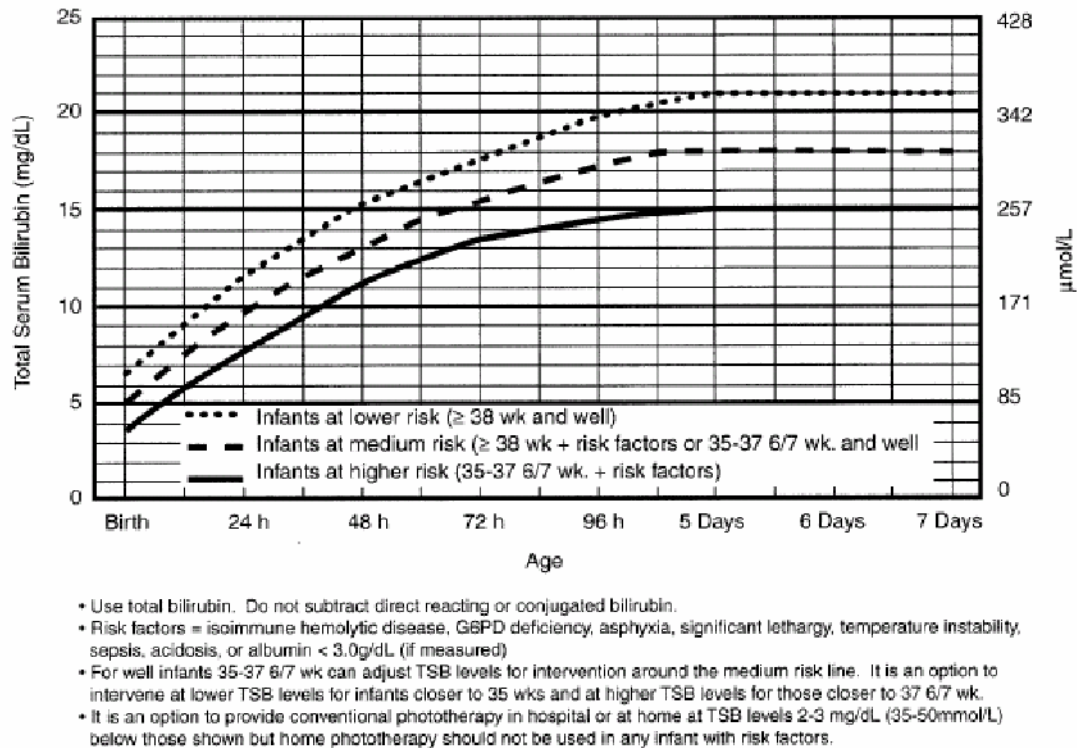


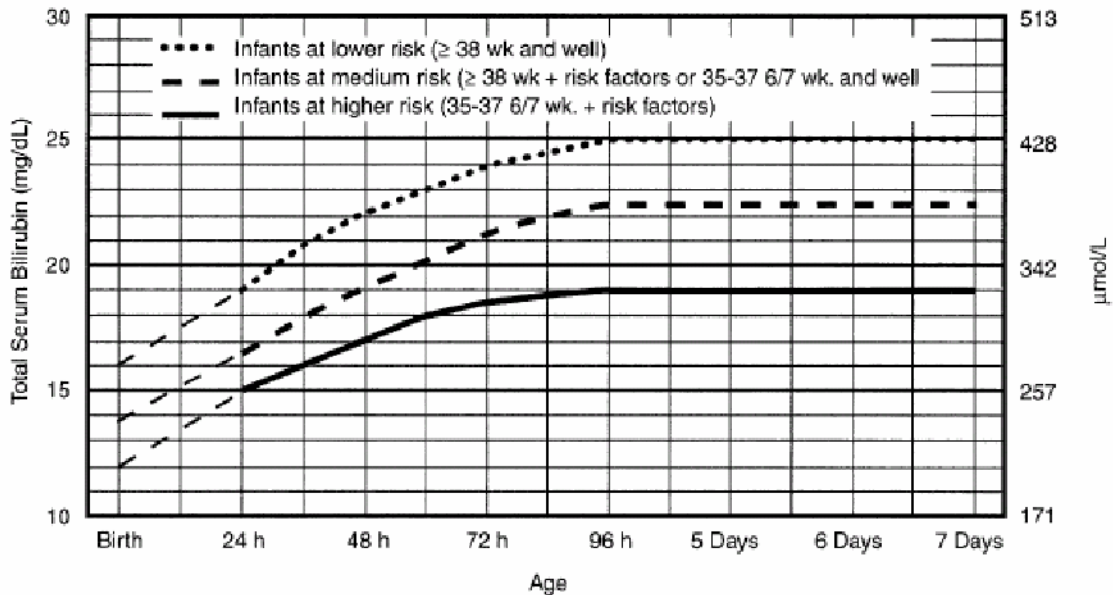
Fig 1. Guidelines for phototherapy in hospitalized infants of 35 or more weeks' gestation.

Note: These guidelines are based on limited evidence and the levels shown are approximations. The guidelines refer to the use of intensive phototherapy which should be used when the TSB exceeds the line indicated for each category. Infants are designated as "higher risk" because of the potential negative effects of the conditions listed on albumin binding of bilirubin, the blood-brain barrier, and the susceptibility of the brain cells to damage by bilirubin. "Intensive phototherapy" implies irradiance in the blue-green spectrum (wavelengths of approximately 430–490 nm) of at least 30 W/cm² per nm (measured at the infant's skin directly below the center of the phototherapy unit) and delivered to as much of the infant's surface area as possible. Note that irradiance measured below the center of the light source is much greater than that measured at the periphery. Measurements should be made with a radiometer specified by the manufacturer of the phototherapy system.

See Appendix 2 (AAP management of hyperbilirubinemia, July 2004) for additional information on measuring the dose of phototherapy, a description of intensive phototherapy, and of light sources used. If total serum bilirubin levels approach or exceed the exchange transfusion line (Fig 2), the sides of the bassinet, incubator, or warmer should be lined with aluminum foil or white material. This will increase the surface area of the infant exposed and increase the efficacy of phototherapy. If the total serum bilirubin does not decrease or continues to rise in an infant who is receiving intensive phototherapy, this strongly suggests the presence of hemolysis. Infants who receive phototherapy and have an elevated direct-reacting or conjugated bilirubin level (cholestatic jaundice) may develop the bronze-baby syndrome. See Appendix 2 for the use of phototherapy in these infants.

AAP, Pediatrics; July 2004, Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation

Fig. 2 – GUIDELINES FOR EXCHANGE TRANSFUSION IN INFANTS 35 OR MORE WEEKS' GESTATION



- The dashed lines for the first 24 hours indicate uncertainty due to a wide range of clinical circumstances and a range of responses to phototherapy.
- Immediate exchange transfusion is recommended if infant shows signs of acute bilirubin encephalopathy (hypertonia, arching, retrocollis, opisthotonos, fever, high pitched cry) or if TSB is ≥ 25 mg/dL (85 µmol/L) above these lines.
- Risk factors - Isoimmune hemolytic disease, G6PD deficiency, asphyxia, significant lethargy, temperature instability, sepsis, acidosis.
- Measure serum albumin and calculate B/A ratio (See legend)
- Use total bilirubin. Do not subtract direct reacting or conjugated bilirubin
- If infant is well and 35-37 6/7 wk (median risk) can individualize TSB levels for exchange based on actual gestational age.

Fig 2. Guidelines for exchange transfusion in infants 35 or more weeks' gestation.

Note that these suggested levels represent a consensus of most of the committee but are based on limited evidence, and the levels shown are approximations. During birth hospitalization, exchange transfusion is recommended if the TSB rises to these levels despite intensive phototherapy. For readmitted infants, if the TSB level is above the exchange level, repeat TSB measurement every 2 to 3 hours and consider exchange if the TSB remains above the levels indicated after intensive phototherapy for 6 hours.

AAP, Pediatrics; July 2004, Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation

Table 1: Timing of Follow-up: Follow-up should be provided as follows:

Infant Discharged:	Should Be Seen by Age:
Before age 24 h	72 h
Between 24 and 47.9 h	96 h
Between 48 and 72 h	120 h

For some newborns discharged before 48 hours, 2 follow-up visits may be required, the first visit between 24 and 72 hours and the second between 72 and 120 hours. Clinical judgment should be used in determining follow-up. Earlier or more frequent follow-up should be provided for those who have risk factors for hyperbilirubinemia (Table 1), whereas those discharged with few or no risk factors can be seen after longer intervals.