Risk Factors

Risk Factors for Development of Severe Hyperbilirubinemia in Infants of 35 or More Weeks’ Gestation
(in Approximate Order of Importance) [AAP Guidelines, 2004]

**Major risk factors**
- Predischarge TSB or TcB level in the high-risk zone
- Jaundice observed in the first 24 hours of life
- Blood group incompatibility with positive direct antiglobulin test (Coombs), other known hemolytic disease (eg, G6PD deficiency), elevated end-tidal carbon monoxide (ETCOc)
- Gestational age 35–36 weeks
- Previous sibling received phototherapy
- Cephalohematoma or significant bruising
- Exclusive breastfeeding, particularly if nursing is not going well and weight loss is excessive
- East Asian race*

**Minor risk factors**
- Predischarge TSB or TcB level in the high-intermediate risk zone
- Gestational age 37–38 weeks
- Jaundice observed before discharge
- Previous sibling with jaundice
- Macrosomic infant of a diabetic mother
- Maternal age ≥ 25 years
- Male gender

**Decreased risk**

These factors are associated with decreased risk of significant jaundice, listed in order of decreasing importance:
- TSB or TcB level in the low-risk zone
- Gestational age ≥ 41 weeks
- Exclusive bottle feeding
- Black race*
- Discharge from hospital after 72 hours of life

* Race as defined by mother’s description

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**Nomogram: Risk of Developing Severe Hyperbilirubinemia Based on Bilirubin Level Prior to Discharge**

Use for babies ≥ 35 weeks and ≥ 2500g, or ≥ 36 weeks and ≥ 2000g.

Nomogram for designation of risk in 2840 well newborns at 36 or more weeks’ gestational age with birth weight of 2000 g or more or 35 or more weeks’ gestational age and birth weight of 2500 g or more based on the hour-specific serum bilirubin values. The serum bilirubin level was obtained before discharge, and the zone in which the value fell predicted the likelihood of a subsequent bilirubin level exceeding the 95th percentile (high-risk zone) as shown in Appendix 1, Table 4. Used with permission from Bhutani et al. See Appendix 1 for additional information about this nomogram, which should not be used to represent the natural history of neonatal hyperbilirubinemia.

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Randall Children’s Newborn Services

For consultation, admission or transfer, call Legacy One Call Consult & Transfer: 1-800-500-9111 to speak with a pediatric hospitalist or neonatologist.
Initiation of Phototherapy Algorithm

Guidelines for phototherapy in hospitalized infants of 35 or more weeks’ gestation.

- Use total bilirubin. Do not subtract direct reacting or conjugated bilirubin.
- Risk factors = isoimmune hemolytic disease, G6PD deficiency, asphyxia, significant lethargy, temperature instability, sepsis, acidosis or albumin < 3.0g/dL (if measured)
- For well infants 35–37 6/7 weeks can adjust TSB levels for intervention around the medium-risk line. It is an option to intervene at lower TSB levels for infants closer to 35 weeks and at higher TSB levels for those closer to 37 6/7 weeks.
- It is an option to provide conventional phototherapy in hospital or at home at TSB levels 2–3 mg/dl (35–50 mmol/L) below those shown, but home phototherapy should not be used in any infant with risk factors.

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 μW/cm² per nm (measured at the infant’s surface) 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 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, send blood for immediate type and crossmatch. Blood for exchange transfusion is modified whole blood (red cells and plasma) crossmatched against the mother and compatible with the infant.

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Exchange Transfusion Algorithm

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 5 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 ration (See legend)
- Use total bilirubin. Do not subtract direct reacting or conjugated bilirubin
- If infant is well and 35–37 6/7 weeks (median risk), can individualize TSB levels for exchange based on actual gestational age.

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. See ref. 3 for risks and complications of exchange transfusion. 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.

The following B/A ratios can be used together with but in not in lieu of the TSB level as an additional factor in determining the need for exchange transfusion.

If the TSB is at or approaching the exchange level, send blood for immediate type and crossmatch. Blood for exchange transfusion is modified whole blood (red cells and plasma) crossmatched against the mother and compatible with the infant.

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