

Isoimmunization Baby Pack

Welcome! Your baby is almost here - Congratulations! Isoimmunization doesn't end once you give birth, so let's cover some of the basics after birth. If your baby is affected, the technical term for the disease is now "Hemolytic Disease of the Newborn". Your baby will need a lot of lab work to keep check on his or her blood until around 12 weeks. You'll find everything you need here to record your baby's lab values, see what the "normal range" is, and you'll find an extra copy of Newborn & Infant Blood testing (with References) to give out if needed.

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Newborn & Infant Blood Testing - What Needs Drawn When

Please note that these are minimums. Some babies will need labs more frequently, but all babies need a weekly hemoglobin/hematocrit check until 12 weeks old to check for delayed onset anemia.¹ Do not give iron supplements without first testing the ferritin level. Infants with HDN do not suffer from iron-deficiency anemia, but hemolytic anemia instead. Iron supplements can be deadly.^{2, 6}

Birth

From Cord Blood - this is not testing done at 4/6/12/24 hours old. This is done at birth. If the cord blood clots, it needs redrawn as soon as possible.^{3, 5}

- DAT or Direct Coombs Test^{4,7}
 - IAT or Indirect Coombs Test⁷: This is needed as well if the DAT comes back negative and mom has: anti-C, anti-c, anti-Fya, anti-Good, anti-H, anti-Jra, anti-M, or anti-Mta antibodies.
- Bilirubin^{4,7}
- CBC (Complete Blood Count)⁷: including Hemoglobin/Hematocrit, Neutrophils, Platelets/Thrombocytes, and a Retic/Reticulocyte count.

1 Week Old (Days 1-7)

- Bilirubin - checked every 4, 6 or 12 hours in the hospital.^{3, 4}
- Bilirubin - checked daily when out of the hospital. This is especially important during days 4-6 when bilirubin due to isoimmunization tends to peak.
- Hemoglobin¹ - checked usually at least 1 other time this week besides birth.
- Retic¹

2 Weeks Old

- Hemoglobin/Hematocrit¹ - checked weekly (some docs do 2x a week if <4 weeks old).
- Retic¹
- Bilirubin - checked every other day.
- Neutrophil count and Thrombocyte/Platelet.¹

3 Weeks Old

- Hemoglobin/Hematocrit¹ - checked weekly
- Retic¹
- Bilirubin 1-2x a week to be sure it is still going down.
- Neutrophil count and Thrombocyte/Platelet count may be repeated depending on the values from earlier.

4 Weeks Old - 12 Weeks Old

- Hemoglobin/Hematocrit³ - checked weekly. This is especially important for weeks 4-6 when newborns have a normal drop in hemoglobin. Infants suffering from HDN can have a larger drop than normal and need their first transfusions during this window. This is not limited to infants whose mothers have had IUTs, but applies to all infants affected by isoimmunization. All infants need the weekly check until 12 weeks old or the hemoglobin is going up 2-3 weeks in a row.
- Retic - checked weekly to see if the infant is making new blood.
- Other Tests - the Thrombocyte/Platelet count, and the Neutrophil count may be repeated every 2 weeks. Thrombocytopenia and Neutropenia are both common side effects of isoimmunization/Hemolytic Disease of the Newborn.¹ See Additional Reading - Neutropenia and Thrombocytopenia.

References

- 1 - Hemolytic disease of the fetus and newborn: managing the mother, fetus, and newborn. Delaney M, Matthews DC. Hematology Am Soc Hematol Educ Program. 2015;2015:146-51. doi: 10.1182/asheducation-2015.1.146.
- 2 - Rath ME, Smits-Wintjens VE, Oepkes D, Walther FJ, Lopriore E. Iron status in infants with alloimmune haemolytic disease in the first three months of life. Vox Sang. 2013 Nov;105(4):328-33. doi: 10.1111/vox.12061.
- 3 - Moise, K Jr. Post-Natal Management of Red Cell Alloimmunization Following IUT. https://lookaside.fbsbx.com/file/Dr.%20Moise%20Post-Natal%20Management%20of%20Red%20Cell%20Alloimmunization%20Following%20IUT08182014.pdf?token=AWzYI8dIfOoH4YGvacIKMiRFFU9ozNcJUpwW-cA3zcK Gd2k3OfhMScfhSNGW-FIqWmMsGRFQcqr6JauviAcc2d8t2fz1QD47_51FwvbHJnPtNawaV2Kzfn-gYUz9UvSSk_eaThXb6Ukivxz03Yr6UBK6 Accessed September 20, 2017
- 4 - Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation Pediatrics Jul 2004, 114 (1) 297-316; DOI: 10.1542/peds.114.1.297
- 5 - Murray N, Roberts IAG. Haemolytic Disease of the Newborn. Arch Dis Child Fetal Neonatal Ed. 2007 Mar; 92(2): F83–F88. doi: 10.1136/adc.2005.076794
- 6 - Medscape. Schick, Paul. Hemolytic Anemia Treatment & Management. <http://emedicine.medscape.com/article/201066-treatment#showall>. Accessed August 8, 2018.
- 7 - Calhoun, D. Postnatal diagnosis and management of hemolytic disease of the fetus and newborn. <https://www.uptodate.com/contents/postnatal-diagnosis-and-management-of-hemolytic-disease-of-the-fetus-and-newborn> Accessed July 11, 2018.

Additional Reading By Topic

Direct Coomb's Test (DAT) Exceptions

Anti-C, anti-c, anti-Fya, anti-Good, anti-H, anti-Jra, anti-M, and anti-Mta are the Direct Coomb's Test Exceptions. The test may show negative, but the infant still be severely affected.

Medscape. Wagle S. Hemolytic Disease of the Newborn Workup. <https://emedicine.medscape.com/article/974349-workup?>. Accessed August 6, 2018

Heddle NM, Wentworth P, Anderson DR, Emmerson D, Kelton JG, Blajchman MA. Three examples of Rh haemolytic disease of the newborn with a negative direct antiglobulin test. *Journal of Transfusion Medicine*. 1995 Jun;5(2):113-6. Doi: 10.1111/j.1365-3148.1995.tb00197

Babinszki A, Berkowitz R. Haemolytic disease of the newborn caused by anti-c, anti-E and anti-Fya antibodies: report of five cases. *Prenatal Diagnosis*. 1999; 19(6):533-536. doi: 10.1002/(SICI)1097-0223(199906)19:6%3C533

Frumin A, Porter M, Eichman M. The Good Factor as a Possible Cause of Hemolytic Disease of the Newborn. *The Blood Journal*. <http://www.bloodjournal.org/content/bloodjournal/15/5/681.full.pdf> Accessed August 6, 2018.

Shastry S, Lewis L, Bhat S. A rare case of haemolytic disease of the newborn with Bombay phenotype mother. *The Asian Journal of Transfusion Science*. 2013; 7(2): 153-155. doi: 10.4103/0973-6247.115583

Endo Y, Ito S, Ogiyama Y. Suspected anemia caused by maternal anti-Jra antibodies: a case report. *Biomark Research*. 2015; 3:23. Doi: 10.1186/s40364-015-0048-x

Thompson DJ, Stults DZ, Daniel SJ. Anti-M Antibody in Pregnancy. *Obstet Gynecol Surv*. 1989; 44(9):637-641

Duro EA, Desalvo L, Kuret S. Severe Hemolytic Disease of the Newborn Caused by Anti-M Antibodies. *The Iranian Journal of Pediatrics*. 2013. 23(5): 607-608.

Satyam A, Veena D, Arti M, Uvershi K, Saurabh G. Maternal anti-M induced hemolytic disease of the newborn followed by prolonged anemia in newborn twins. *The Asian Journal of Transfusion Science*. 2015 9(1):98-101

Cheung CC, Challis D, Fisher G, Russell SJ, Davis A, Bruce H, Watt J, Chong BH. Anti-Mta associated with three cases of hemolytic disease of the newborn. *Immunohematology*. 2002;18(2):37-9.

Hemolytic Anemia and Iron Status

"The vast majority of neonates with alloimmune HDFN have iron overload at birth. Incidence of iron overload gradually decreases within the first 3 months without iron supplementation...In recent literature, a ferritin level <12 lg/l is used for the definition of iron deficiency during the first year of life. Based on that definition, no cases of iron deficiency were present until 3 months of age in our study group... On the contrary, iron overload occurs in 70% of neonates with alloimmune HDFN at birth, 50% at the age of 1 month and 18% at the age of 3 months. Therefore, we advise to measure iron status, and we discourage the use of iron supplementation in the first 3 months of life in neonates with alloimmune HDFN."

Rath ME, Smits-Wintjens VE, Oepkes D, Walther FJ, Lopriore E. Iron status in infants with alloimmune haemolytic disease in the first three months of life. *Vox Sang*. 2013 Nov;105(4):328-33. doi: 10.1111/vox.12061.

Smits-Wintjens VE, Walther FJ, Lopriore E. Rhesus haemolytic disease of the newborn: Postnatal management, associated morbidity and long-term outcome. *Semin Fetal Neonatal Med*. 2008 Aug;13(4):265-71. doi: 10.1016/j.siny.2008.02.005.

Yılmaz S, Duman N, Özer E. A Case of Rhesus Hemolytic Disease With Hemophagocytosis and Severe Iron Overload Due to Multiple Transfusions. *The Journal of Pediatric Hematology and Oncology*. 2006 May;28(5):290-2. DOI: 10.1097/01.mph.0000212906.07018.93

Hemolytic Anemia and Iron Status Continued

Medscape. Schick, Paul. Hemolytic Anemia Treatment & Management.

<http://emedicine.medscape.com/article/201066-treatment#showall>. Accessed August 8, 2018.

Late Onset Anemia

Kennedy MS, Moise KJ Jr. Management of non-Rhesus (D) red blood cell alloantibodies during pregnancy.

<https://www.uptodate.com/contents/management-of-non-rhesus-d-red-blood-cell-alloantibodies-during-pregnancy>. Accessed August 6, 2018.

Delaney M, Matthews DC. Hemolytic Disease of the Fetus and Newborn: Managing the Mother, Fetus, and Newborn. *Hematology Am Soc Hematol Educ Program*. 2015;2015:146-51. doi: 10.1182/asheducation-2015.1.146.

Jadala HV, Pooja V, Raghavendra K, Prithvish CM, Srinivas B. Late Onset Severe Anemia Due to Rhesus Isoimmunization. *International Journal of Contemporary Pediatrics*. 2016; 3(4), 1472-1473. DOI: <http://dx.doi.org/10.18203/2349-3291.ijcp20163704>

Neutropenia

Delaney M, Matthews DC. Hemolytic Disease of the Fetus and Newborn: Managing the Mother, Fetus, and Newborn. *Hematology Am Soc Hematol Educ Program*. 2015;2015:146-51. doi: 10.1182/asheducation-2015.1.146.

Boxer L. Isoimmune Neonatal Neutropenia. *The Journal of Pediatrics*. *J Pediatr*. 1972; 5:775-782. doi:10.1016/S0022-3476(72)80131-8

LALEZARI, P., NUSSBAUM, M., GELMAN, S., & SPAET, T. H. Neonatal Neutropenia Due to Maternal Isoimmunization. *Blood* 1960; 15(2), 236-243. <http://www.bloodjournal.org/content/15/2/236>. Accessed August 06, 2018.

Bux, J., Jung, K.D., Kauth, T. & Mueller-Eckhardt, C. Serological and clinical aspects of granulocyte antibodies leading to alloimmune neonatal neutropenia. *Transfusion Med* 1992; 2:143-149. doi:10.1111/j.1365-3148.1992.tb00148.x
Koenig JM, Christensen RD. Neutropenia and thrombocytopenia in infants with Rh hemolytic disease. *Journal of Pediatrics*. *J Pediatr*. 1989 Apr;114(4 Pt 1):625-31. doi:10.1016/S0022-3476(89)80709-7.

Thrombocytopenia

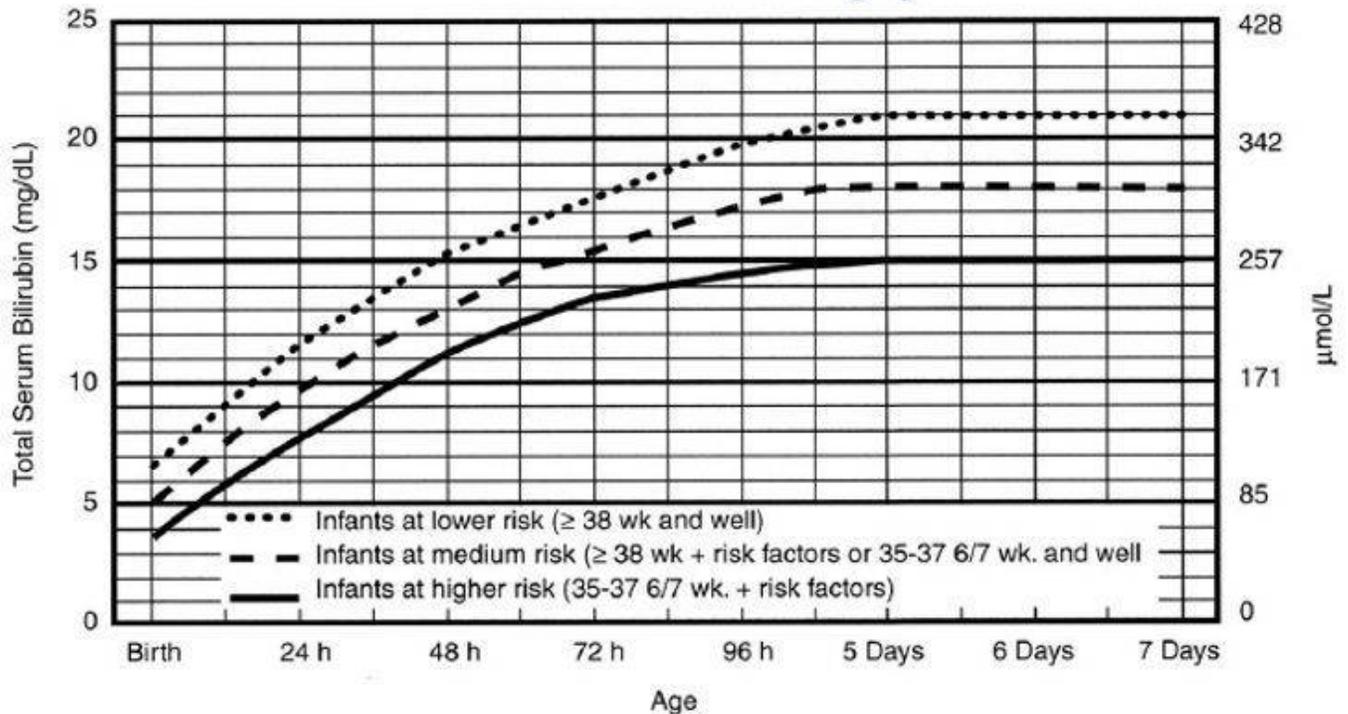
van den Akker ES, de Haan TR, Lopriore E, Brand A, Kanhai HH, Oepkes D. Severe fetal thrombocytopenia in Rhesus D alloimmunized pregnancies. *Am J Obstet Gynecol*. 2008 Oct;199(4):387.e1-4. doi: 10.1016/j.ajog.2008.07.001.

Koenig JM, Christensen RD. Neutropenia and thrombocytopenia in infants with Rh hemolytic disease. *Journal of Pediatrics*. *J Pediatr*. 1989 Apr;114(4 Pt 1):625-31. doi:10.1016/S0022-3476(89)80709-7.

Normal Laboratory Values

These printables are references for normal lab values. You will see a listed link below each table or graph with the original source. Always consult with your doctor about laboratory results.

Phototherapy



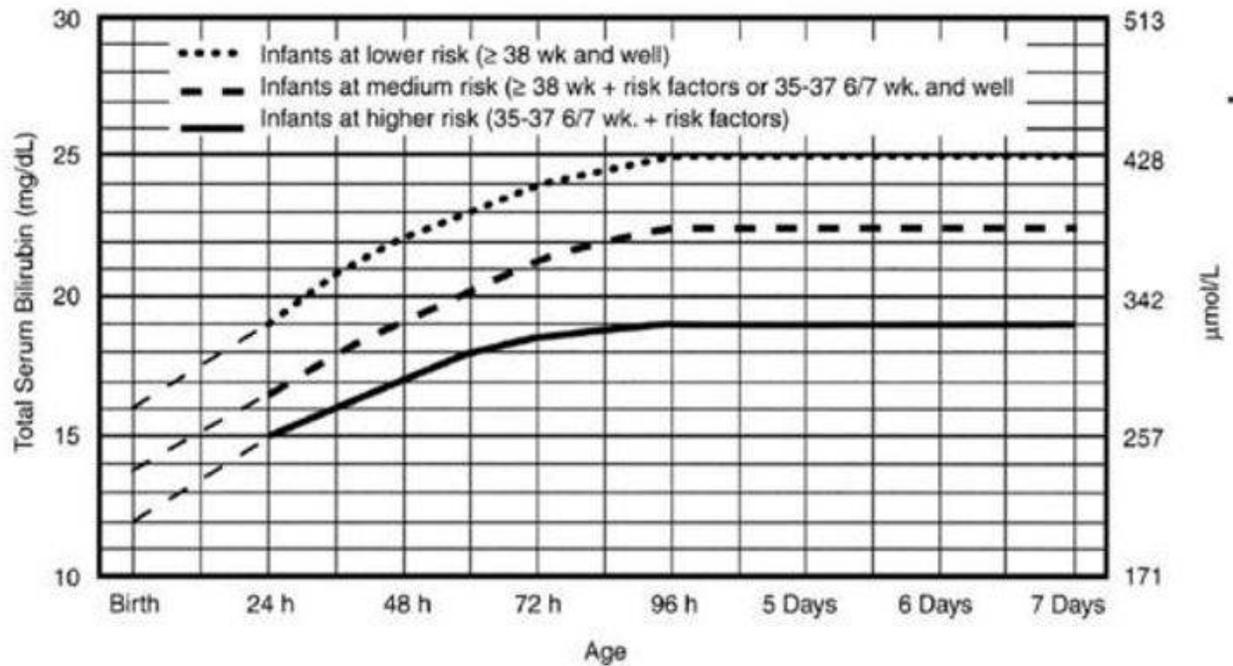
- Use total bilirubin. Do not subtract direct reacting or conjugated bilirubin.
- Risk factors = isoimmune hemolytic disease, G6PD deficiency, asphyxia, significant lethargy, temperature instability, sepsis, acidosis, or albumin < 3.0g/dL (if measured)
- For well infants 35-37 6/7 wk can adjust TSB levels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

Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation

Pediatrics Jul 2004, 114 (1) 297-316; DOI: 10.1542/peds.114.1.297 Retrieved from

<http://pediatrics.aappublications.org/content/114/1/297>

Exchange Transfusion



- 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 ($85 \mu\text{mol/L}$) 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.

Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation

Pediatrics Jul 2004, 114 (1) 297-316; DOI: 10.1542/peds.114.1.297 Retrieved from

<http://pediatrics.aappublications.org/content/114/1/297>

Phototherapy

Canada and UK

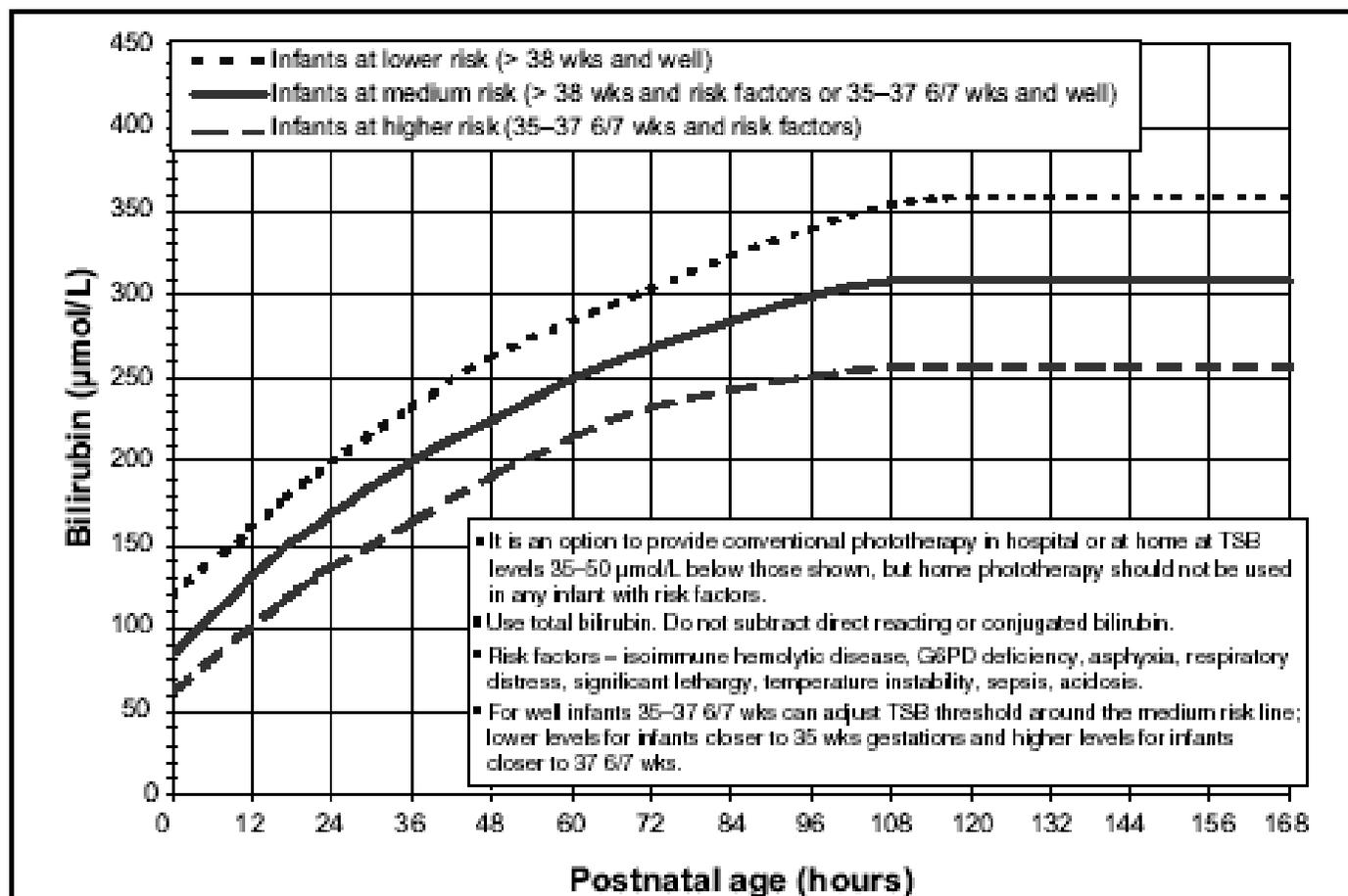


Figure 2) Guidelines for intensive phototherapy in infants of 35 or more weeks' (wk) gestation. These guidelines are based on limited evidence and the levels shown are approximations. Intensive phototherapy should be used when the total serum bilirubin (TSB) concentration exceeds the line indicated for each category. G6PD Glucose-6-phosphate dehydrogenase

Guidelines for detection, management and prevention of hyperbilirubinemia in term and late preterm newborn infants

Paediatr Child Health 2007;12(Suppl B):1B-12B

Retrieved from <http://www.cps.ca/documents/position/hyperbilirubinemia-newborn>

Exchange Transfusion

Canada and UK

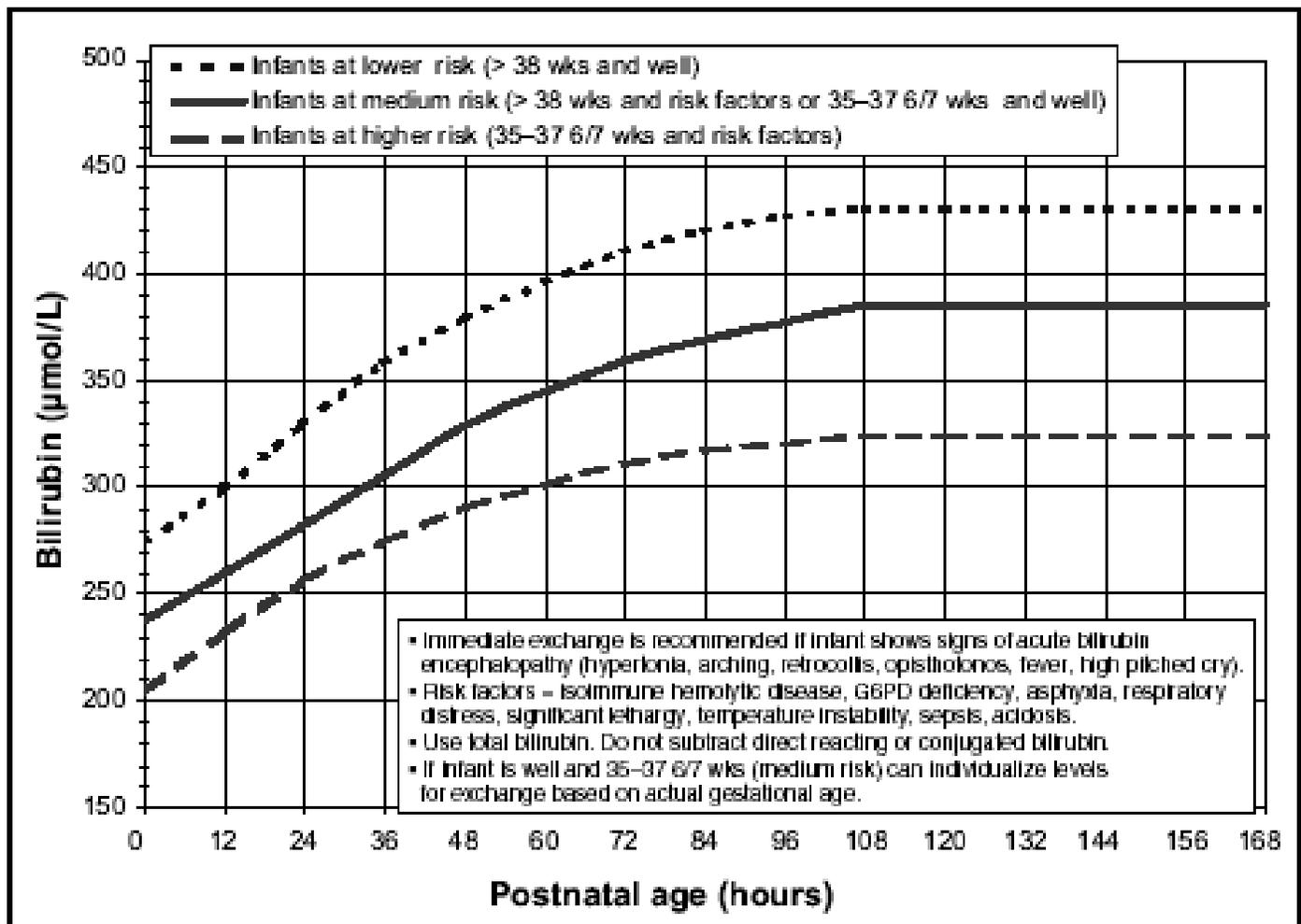


Figure 3) Guidelines for exchange transfusion in infants of 35 or more weeks' (wk) gestation. These guidelines are based on limited evidence and the levels shown are approximations. Exchange transfusions should be used when the total serum bilirubin (TSB) concentration exceeds the line indicated for each category. G6PD Glucose-6-phosphate dehydrogenase

Guidelines for detection, management and prevention of hyperbilirubinemia in term and late preterm newborn infants

Paediatr Child Health 2007;12(Suppl B):1B-12B

Retrieved from <http://www.cps.ca/documents/position/hyperbilirubinemia-newborn>

Blood Count Values

Selected Normal Pediatric Laboratory Values - Hemoglobin

Age	Females (g/dL)	Males (g/dL)
Newborn	12.7 - 18.3	14.7 - 18.6
6 months - 2 years	10.4 - 12.4	10.3 - 12.4

Selected Normal Pediatric Lab Values. Retrieved from
<http://wps.prenhall.com/wps/media/objects/354/362846/London%20App.%20B.pdf>

Selected Normal Pediatric Laboratory Values - Hematocrit

Age	Females (g/dL)	Males (g/dL)
Age	Females (%)	Males (%)
Newborn	37.4 - 55.9	43.4 - 56.1
6 months - 2 years	31.2 - 37.2	30.9 - 37.0

Selected Normal Pediatric Lab Values. Retrieved from
<http://wps.prenhall.com/wps/media/objects/354/362846/London%20App.%20B.pdf>

Selected Normal Pediatric Laboratory Values - Ferritin

Age	Females (g/dL)	Males (g/dL)
Age	ng/mL	mcg/mL
Newborn	25 - 200	25 - 200
1 to 5 months	50 - 200	50 - 200

Ferritin. (2015, August 21). Retrieved from <http://www.webmd.com/a-to-z-guides/ferritin?page=2>

Neutrophil Count

Normal Laboratory Values for Neonates - Term

Values	Cord	1 - 12 hours	12 - 24 hours	3-10 days
Neutro x 10 ⁹ /L	6 - 26	6 - 28	5 - 21	1.5 - 10

Normal Laboratory Values for Neonates - Preterm

Value	Birth	12 hours	24 hours	1 week	2 weeks	1 month
Neutro x 10 ⁹ /L	6 - 26	6 - 28	5 - 21	1.5 - 10	1 - 9.5	1 - 9

Normal Laboratory Values for Neonates. Retrieved from
<https://www2.health.vic.gov.au/hospitals-and-health-services/patient-care/perinatal-reproductive/neonatal-e-handbook/pathology/normal-laboratory-values>

Reticulocyte Count (Retic)

Newborns have a normal reticulocyte count of 2.5% to 6.5%. In normal babies, this value drops within 2 weeks to 0.5% to 2.0%. In ISO babies, it is normal for the retic to remain higher for longer as the baby combats anemia.

Reticulocyte Count. (2015, February 20). Retrieved from <http://www.webmd.com/a-to-z-guides/reticulocyte-count>

Thrombocyte Count (Platelet Count)

Thrombocytopenia is defined as a platelet count of less than 150 x 10⁹/L. This value is the same regardless of age.

Gersten, T. (2016, February 12). Thrombocytopenia. Retrieved from
<https://www.nlm.nih.gov/medlineplus/ency/article/000586.htm>

Your Baby's Numbers

Birth Date: _____ Time: _____ Gestational Age: _____

Weight: _____ Blood Type: _____ Direct Coomb's: _____

Date									
Hemoglobin									
Hematocrit									
Retic									
Bilirubin (total)									
Neutrophils									
Platelets									

Date									
Hemoglobin									
Hematocrit									
Retic									
Bilirubin (total)									
Neutrophils									
Platelets									

Date									
Bilirubin									

Notes:

NICU Survival Guide

This section is all about time in the NICU. I'll be adding sections about questions to ask, touring the NICU, what to expect, what to bring with you, and other things to help make things a little easier on iso moms. Time in the NICU is stressful. There's a lot of information being thrown at you, fear and worry about what will happen to your baby, and you're just trying to make it through. Things can seem like a blur. Thankfully we have a few things that can make life easier for you.

Things to bring:

Breast pads - even if you're not nursing/pumping, your milk may come in and you'll want to avoid the spots.
High protein snacks - you've got to keep your nutrition up so your body can keep running (not to mention recover from birth). Choose mostly healthy snack options. Fruit or fruit cups, granola bars, nuts, jerky, and veggies in a bag are all great options that don't require refrigeration.

A refillable water bottle - You'll be drinking lots of water, so you might as well make it taste like something other than styrofoam and plastic straws.

Insulated cup with lid - some NICUs don't like open drinks, and want lids. An insulated cup will hold water, coffee, or even protein shakes at a great temperature.

Disposable camera - Put this inside the drawer or next to baby. This way the nurses can capture moments they think you'd like to see.

Phone charger - Just spend the extra \$5 and get one to leave there.

Activities - You'll want to bring something to pass the time with. Books, word finds, sudoku, all these can be found at the Dollar Store if you're on a budget.

Notebook - don't forget the pens and mechanical pencils (there's no pencil sharpeners) too.

A baby wrap (Moby style)

Children's Books - bonding can be hard, especially if you can't hold baby yet. Read to them to help bond.

Music - your little one can hear. Go ahead and play soft music for them, or even heartbeat noises.

Non-toxic ink pad - handprints and footprints, what more can I say? You can take them every month or more if you'd like.

Baby blanket and clothes - you can bring your own blanket and baby clothes if you'd like. Sometimes it's even preferred if baby has sensitive skin (we had to bring our own clothes to make the rashes go away).

Pillow and blanket - you just gave birth; remember to focus on your recovery too. Bring a pillow and blanket so you can rest and nap when you can.

Boppy pillow and spare cover - helps with nursing or holding baby.

Robe - robes are bigger for kangaroo care and can keep you modestly covered, keep baby warm, and are super soft for baby's skin (unlike button up shirts which can be scratchy or too small). Add in some slippers too if you like them and they're more comfortable than your shoes.

Nursing cover

Lanolin or breast cream

Baby lotion - you can massage babies after baths or anytime. This really helps with their sensitive, dry skin.

Change of clothes - you'll need them.

Stain remover - you'll spill, leak, get spit up on, etc. It's necessary and Tide pens are small.

Laundry bag

Toiletries - keep a small bag with a toothbrush/paste, soap, and a hairbrush in case baby has a rough night and you need to stay overnight.

Nail clippers - nails are sometimes considered cosmetic so the nurses might not tend to them. Bring a little pair of clippers to take care of the fast growing, super sharp baby nails.

Bottles - if baby will take a bottle at home, it's a good idea to bring your kind of bottle to the NICU to try ahead of time. If baby doesn't like them or doesn't do well, you still have time to get a different kind before discharge. Bottle brush and travel soap - you'll have to clean those bottles after all.

Things to do:

Take photos. Your baby is beautiful. Even though you may have no desire at the moment to remember this time, take the photos. It may seem hard to take photos, but your baby's time in the NICU is still where memories happen. Later you'll cherish all of the keepsakes from baby's first few weeks. Just because baby's first bath, or the first smile happens in the NICU doesn't make it any less valuable than if it had happened at home. Your baby could be there for weeks. You don't want to look back on the first month or two of his/her life and have no photos. It's also common for children to want to know about their time in the hospital when they are older. One day baby will grow up and might want to know the details. Sometimes you can even tape pictures to the incubator.

Journal. So much can happen from day to day. Did baby finally get off the ventilator? Did baby suck his thumb for the first time? Did baby get to nurse for the first time? All these are things you'll want to remember later. You can also use the notebook for practical things like: how much did baby eat, what were the lab results, what are the requirements to go home, and more. It's also helpful to jot down notes about what happened and what the doctors said so you can share with your spouse later. You can also write down if you've had a wonderful nurse or doctor that you'd like to send a thank you card to later. If you're one of the women who saves the umbilical cord, or the hospital bracelet, you can tuck it safely away in the pages. You can also take baby's handprints or footprints on the pages too.

Wear your baby. Babies benefit from kangaroo care, plus it helps bonding. If the NICU allows it, you can use a Moby wrap (or similar style) to wrap your baby to you. You can have your hands free, the little one gets the snuggles, all while still being hooked up to the monitors.

Read to your baby or play music. Baby loves to hear your voice, after all he's heard it for the past several months. Reading can help you to bond.

Take part in her care. Don't be afraid to do things for your baby. You can ask the nurses to teach you how to do things so that you can be an active part of her care. You can do things for your baby like diapers and feeding, but you can also do baths, and some physical therapy if needed.

Bond with your nurses. They're there all the time when you're not. They know lots of little things about your baby and cheer him on daily. It's vital that you feel connected with them and know that your baby is safe and well cared for when you're not there.

Take time for your spouse. Chances are your spouse is just as confused, worried, and scared as you are. Don't forget that you are a team first. Take care to spend time together. Play a game (cards and small board games are super portable), plan a date, talk about non baby/NICU things. Make sure you reconnect as a couple.

Take time for your other children. I once heard the saying, "your baby in the NICU can't tell time, but your older children can." Older ones have had their world turned upside down. Mommy left for the hospital (which can be a scary place), and is now home less than before. They can be worried about their new sibling, and many other things. Take care to spend time daily with them. Your little one is in capable hands at the NICU and your older babies need you now too.

Things to Bring to the NICU

For Mom

Food/Drink

- High protein snacks, fruit or fruit cups, granola bars, nuts, jerky, and veggies in a bag.
- A refillable water bottle
- Insulated cup with lid

Entertainment/Records

- Disposable camera
- Phone charger
- Activities, books, word finds, sudoku
- Notebook pens and mechanical pencils
- Non-toxic ink pad

Clothing/Home Comforts

- Change of clothes.
- Stain remover/Tide pen
- Nursing cover
- Robe
- Slippers
- Laundry bag
- Pillow and blanket

Toiletries

- Toothbrush/toothpaste
- Soap
- Hairbrush
- Breast pads
- Lanolin

For Baby

Food/Drink

- Bottles
- Bottle brush

Entertainment/Records

- Children's Books
- Music

Home Comforts

- Baby blanket and clothes
- Boppy pillow and spare cover
- Baby wrap (Moby style)

Toiletries

- Baby lotion
- Nail clippers

Newborn & Infant Blood Testing

What Needs Drawn When

Please note that these are minimums. Some babies will need labs more frequently, but all babies need a weekly hemoglobin/hematocrit check until 12 weeks old to check for delayed onset anemia.¹ Do not give iron supplements without first testing the ferritin level. Infants with HDN do not suffer from iron-deficiency anemia, but hemolytic anemia instead. Iron supplements can be deadly.^{2, 6}

Birth

From Cord Blood - this is not testing done at 4/6/12/24 hours old. This is done at birth. If the cord blood clots, it needs redrawn as soon as possible.^{3, 5}

- DAT or Direct Coombs Test^{4,7}
 - IAT or Indirect Coombs Test⁷: This is needed as well if the DAT comes back negative and mom has: anti-C, anti-c, anti-Fya, anti-Goood, anti-H, anti-Jra, anti-M, or anti-Mta antibodies.
- Bilirubin^{4, 7}
- CBC (Complete Blood Count)⁷: including Hemoglobin/Hematocrit, Neutrophils, Platelets/Thrombocytes, and a Retic/Reticulocyte count.

1 Week Old (Days 1-7)

- Bilirubin - checked every 4, 6 or 12 hours in the hospital.^{3, 4}
- Bilirubin - checked daily when out of the hospital. This is especially important during days 4-6 when bilirubin due to isoimmunization tends to peak.
- Hemoglobin¹ - checked usually at least 1 other time this week besides birth.
- Retic¹

2 Weeks Old

- Hemoglobin/Hematocrit¹ - checked weekly (some docs do 2x a week if <4 weeks old).
- Retic¹
- Bilirubin - checked every other day.
- Neutrophil count and Thrombocyte/Platelet.¹

3 Weeks Old

- Hemoglobin/Hematocrit¹ - checked weekly
- Retic¹
- Bilirubin 1-2x a week to be sure it is still going down.
- Neutrophil count and Thrombocyte/Platelet count may be repeated depending on the values from earlier.

4 Weeks Old - 12 Weeks Old

- Hemoglobin/Hematocrit³ - checked weekly. This is especially important for weeks 4-6 when newborns have a normal drop in hemoglobin. Infants suffering from HDN can have a larger drop than normal and need their first transfusions during this window. This is not limited to infants whose mothers have had IUTs, but applies to all infants affected by isoimmunization. All infants need the weekly check until 12 weeks old or the hemoglobin is going up 2-3 weeks in a row.
- Retic - checked weekly to see if the infant is making new blood.
- Other Tests - the Thrombocyte/Platelet count, and the Neutrophil count may be repeated every 2 weeks. Thrombocytopenia and Neutropenia are both common side effects of isoimmunization/Hemolytic Disease of the Newborn.¹ See Additional Reading - Neutropenia and Thrombocytopenia.

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Additional Reading By Topic

Direct Coomb's Test (DAT) Exceptions

Anti-C, anti-c, anti-Fya, anti-Good, anti-H, anti-Jra, anti-M, and anti-Mta are the Direct Coomb's Test Exceptions. The test may show negative, but the infant still be severely affected.

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Hemolytic Anemia and Iron Status

"The vast majority of neonates with alloimmune HDFN have iron overload at birth. Incidence of iron overload gradually decreases within the first 3 months without iron supplementation...In recent literature, a ferritin level <12 lg/l is used for the definition of iron deficiency during the first year of life. Based on that definition, no cases of iron deficiency were present until 3 months of age in our study group... On the contrary, iron overload occurs in 70% of neonates with alloimmune HDFN at birth, 50% at the age of 1 month and 18% at the age of 3 months. Therefore, we advise to measure iron status, and we discourage the use of iron supplementation in the first 3 months of life in neonates with alloimmune HDFN."

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