

Jaundice - Newborn

Pediatric After-Hours Version 2021

DEFINITION

- Yellow color of the skin
- Whites of the eye (sclera) may turn yellow at a higher bilirubin level
- Covers jaundice in newborn to age 3 months (90 days)

INITIAL ASSESSMENT QUESTIONS

1. SKIN COLOR: "What color is the jaundice?" "How deep is the color?" "Is your baby a lot more yellow than when last seen?"
2. EYE COLOR: "Are the whites of the eyes (sclera) yellow?"
3. SEVERITY and LOCATION: "What part of the body is jaundiced?" "Does it involve the legs?"
 - MILD jaundice: Face only
 - MODERATE jaundice: Trunk involved (chest and/or abdomen)
 - SEVERE jaundice: Legs involved or entire body surface
4. ONSET: "On what day of life did you first notice your newborn was jaundiced?" (Days)
5. BILIRUBIN LEVEL: "Did the hospital or office tell you your baby's discharge bilirubin level?" If so, "What was it?" (Note: includes either serum or transcutaneous measurements)
6. SYMPTOMS: "Does your baby have any other symptoms?" If so, ask: "What are they?"
7. OUTPUT: "How many poops has your baby passed in the last 24 hours?" (Normal: 3 or more per day) "How many wet diapers have there been in the last 24 hours?"
8. FEEDING: "How is feeding going?" "How strong a feeder is your baby?"
9. BABY'S APPEARANCE: "How is your baby acting?"

- Author's note: IAQ's are intended for training purposes and not meant to be required on every call.

TRIAGE ASSESSMENT QUESTIONS

Call EMS 911 Now

Unresponsive and can't be awakened

CA: 50, 7

Shock suspected (very weak, limp, not moving, too weak to stand, pale cool skin)

FIRST AID: have child lie down with feet elevated

CA: 50, 7

Sounds like a life-threatening emergency to the triager

CA: 50, 7

See More Appropriate Guideline

Age more than 3 months (90 days)

Go to Guideline: Jaundice - Child or Teenager (Pediatric)

Go to ED Now

[1] Age < 12 weeks AND [2] fever 100.4 F (38.0 C) or higher rectally

R/O: sepsis, UTI

CA: 51, 8, 7

Go to ED Now (or PCP triage)

Difficult to awaken or to keep awake
(Exception: child needs normal sleep)

CA: 52, 7

[1] Newborn (< 1 month old) AND [2] starts to look or act abnormal in any way (e.g., decrease in activity or feeding)

R/O: sepsis

CA: 52, 7

Feeding poorly (e.g., little interest, poor suck, doesn't finish)

CA: 52, 7

Dehydration suspected (no urine > 8 hours, sunken soft spot, very dry mouth, etc.)

CA: 52, 7

[1] Purple (or blood-colored) spots or dots on skin AND [2] unexplained

R/O: congenital infection

CA: 52, 7

[1] Low temperature < 96.8 F (36.0 C) rectally AND [2] doesn't respond to rewarming

R/O: sepsis

CA: 52, 7

See HCP within 4 Hours (or PCP Triage)

Began during the first 24 hours of life

R/O: hemolytic jaundice

CA: 53, 11, 7

SEVERE jaundice (skin looks deep yellow or orange; legs are jaundiced) (Exception: sclera are white)

R/O: high bilirubin level

CA: 53, 11, 7

HIGH-RISK baby for severe jaundice (preterm < 37 weeks OR ABO or Rh problem OR cephalohematoma OR sib needed bili-lights OR Asian race, etc)

CA: 53, 11, 7

Call PCP Now

Triager uncertain if baby needs urgent bilirubin test (e.g, more yellow than when last seen)
(Exception: sclera are white)

CA: 59, 11, 7

[1] Newborn (< 1 month old) AND [2] change in behavior or feeding AND [3] triager unsure if baby needs to be seen urgently

CA: 59, 11, 7

[1] Home phototherapy AND [2] caller has URGENT question triager unable to answer

CA: 59, 12, 13, 14, 15, 16, 11, 7

See PCP within 24 Hours

Whites of the eye (sclera) have turned yellow

Reason: bilirubin level may be higher

CA: 54, 2, 3, 4, 10, 17, 7

Jaundice spreads to abdomen (belly)

CA: 54, 2, 3, 4, 10, 17, 7

Good-sized yellow, seedy BMs per day are < 3

(Exception: If breastfed, not expected while milk is coming in during 1-4 days of life)

R/O: poor milk intake

CA: 54, 2, 3, 4, 10, 9, 7

[1] Breastfed AND [2] day 2 to 4 of life AND [3] no BM in over 24 hours

R/O: poor milk intake

CA: 54, 3, 4, 10, 9, 7

[1] Breastfed AND [2] mother concerned the baby is not getting enough milk

R/O: elevated bilirubin due to poor milk intake

CA: 54, 3, 4, 10, 9, 7

Wet diapers per day are < 6

(Exception: If breastfed, 3 wet diapers/day can be normal while milk is coming in during 1-4 days of life)

R/O: poor milk intake

CA: 54, 2, 3, 4, 10, 9, 7

[1] Discharged before 48 hours of life AND [2] 4 or more days old AND [3] hasn't been examined since discharge

Reason: AAP recommends re-check

CA: 54, 2, 3, 4, 10, 9, 7

Call PCP within 24 Hours

Caller is concerned about the degree of jaundice, but sounds MILD

CA: 60, 2, 3, 4, 10, 9, 7

[1] Had previous bilirubin level AND [2] jaundice worse, but sounds MILD

Reason: PCP may decide to recheck bilirubin level

CA: 60, 2, 3, 4, 10, 9, 7

[1] Home phototherapy AND [2] caller has NON-URGENT question triager unable to answer

CA: 60, 12, 13, 14, 15, 16, 2, 3, 4, 17, 7

See PCP within 3 Days

[1] > 7 days of age AND [2] the color becomes deeper

Reason: not physiological jaundice

CA: 55, 2, 3, 4, 10, 9, 7

[1] > 14 days of age AND [2] the jaundice is not gone

R/O: breastmilk jaundice, liver disease, UTI

CA: 55, 2, 3, 10, 9, 7

Jaundice began or reappears after 7 days of age

R/O: liver disease

CA: 55, 2, 3, 10, 9, 7

Stools (BMs) are white, pale yellow or light gray

R/O: neonatal hepatitis, biliary atresia

CA: 55, 2, 3, 10, 9, 7

Home Care

[1] Receiving home phototherapy AND [2] caller has question triager able to answer

CA: 58, 13, 14, 15, 16, 2, 3, 4, 17, 7

Mild jaundice of newborn

CA: 58, 1, 2, 3, 4, 10, 5, 6, 7

CARE ADVICE (CA) -

1. Reassurance and Education:

- Jaundice means the skin has turned yellow
- Bilirubin is the pigment that turns the skin yellow.
- Bilirubin comes from the normal breakdown of old red blood cells.
- The liver normally gets rid of bilirubin. But at birth, the liver may be immature.
- Half of babies have some jaundice. Usually, it is mild and doesn't need any treatment.
- The first place for jaundice to appear is on the face.
- Jaundice that only involves the face is harmless.
- Jaundice that involves the whites of the eyes (sclera) needs to be checked.
- The level of bilirubin that is harmful is around 20. Reaching a level this high is rare.
- High levels need to be treated with bili-lights. That's why your doctor checks your baby's bilirubin levels until it becomes low.

2. Bottlefeed More Often:

- If bottlefed, increase the frequency of feedings.
- Try for an interval of every 2 to 3 hours during the day.

3. **Breastfeed More Often:**
 - If breastfed, increase the frequency of feedings.
 - Nurse your baby every 1-1/2 to 2 hours during the day.
 - Don't let your baby sleep more than 4 hours at night without a feeding.
 - Reason: increased stools carry more bilirubin out of the body.
 - Goal: at least 10 feedings every 24 hours.
4. **Infrequent Stools Means Your Baby Needs More Milk:**
 - Breastmilk and formula help carry bilirubin out of the body. Therefore, good feedings are important for bringing down the bilirubin level.
 - In the first month, keep track of how many stools are passed daily. The number of stools reflects how much milk your baby is getting.
 - If your baby is 5 days or older, he should have at least 3 stools daily. If stooling less than that, it usually means your baby needs more to eat.
 - Try to increase the number and amount of feedings per day.
 - If you are having any trouble with breastfeeding, consult a lactation expert. Also schedule a weight check.
 - Caution: Stimulating the anus to increase the release of stools is not helpful for reducing the bilirubin level.
5. **Expected Course:**
 - Physiological jaundice peaks on day 4 or 5 and then gradually disappears over 1-2 weeks.
6. **Call Back If:**
 - Jaundice becomes worse
 - Legs or eyes becomes yellow
 - Feeding poorly or weak suck
 - Baby starts to act sick or abnormal
 - Jaundice not gone by day 14
7. **Care Advice** given per Jaundice - Newborn (Pediatric) guideline.
8. **Fever Under 3 Months Old - Don't Give Fever Medicine:**
 - Don't give any acetaminophen before being seen.
 - Need accurate documentation of temperature in medical setting to decide if fever is really present. (Reason: may require septic work-up.)
9. **Call Back If**
 - Jaundice becomes worse
 - Sclera (whites of the eyes) become yellow
 - Legs or belly become yellow
 - Feeding poorly or weak suck
 - Your baby starts to act sick or abnormal

10. **Judging Jaundice:**
 - Jaundice starts on the face and moves downward. Try to determine where it stops.
 - View your baby unclothed in natural light near a window.
 - Press on the yellow skin with a finger to remove the normal skin tone.
 - Then try to assess if the skin is yellow before the pink color returns.
 - Move down the body, doing the same. Try to assess where the yellow color stops.
 - Jaundice that only involves the face is harmless.
 - As it involves the chest, the level is going up.
 - If it involves the abdomen (belly) or legs, the bilirubin level needs to be checked.
 - Jaundice that involves the whites of the eyes (sclera) also needs to be checked.
11. **Call Back If:**
 - Your baby starts to act sick or abnormal
12. **Alternate Disposition - Call the Home Health Agency:**
 - If your child is being followed by a home health nurse, a home visit may be an option instead of calling the PCP or going in to the office. Follow the same time frames as for contacting the PCP.
 - Note: In some instances, these babies are followed by the hospital nursery that discharged them. In this case, you can contact the hospital nursery instead.
 - The home health nurse can assess your baby and provide education.
 - If you have questions about medical equipment being used in your home, the home health agency may be able to answer your questions over the phone as well.
13. **Bili-blanket - How it works:**
 - A bili-blanket is a type of phototherapy that can be used at home. It must be prescribed by your baby's doctor. The light emitted from the blanket helps to breakdown the bilirubin in the skin. The blanket is connected to a machine by a cable. The machine is then plugged into a wall outlet.
 - Safety: The bili-blanket system uses pure light energy so no electricity or heat is generated near your baby. The newborn can't see the light, so no eye patches are necessary.
14. **Bili-blanket - How to put it on:**
 - The fiberoptic blanket is inserted into a soft cover so it doesn't irritate the baby's skin.
 - It emits light from one side only.
 - The bright side is placed directly on the baby's skin and wraps the torso area.
 - You can put the baby's clothes over the bili-blanket and swaddle with a regular blanket to keep the newborn warm.
15. **Bili-blanket - When to wear it:**
 - The blanket should be left on when holding, feeding, or sleeping.
 - The only time it's necessary to remove it and turn it off is during bathing.
 - In fact, the blanket should be worn as much as possible to be effective.
16. **Bili-blanket - Follow-up needed:**
 - These babies are usually followed by a home health agency.
 - Usually, daily bilirubin tests and weights are done.
 - Follow your doctor's or nurse's instructions regarding follow-up. If unsure, speak to your doctor.

17. **Call Back If:**
- Jaundice becomes worse
 - Feeding poorly or weak suck
 - Your baby starts to act sick or abnormal
50. **Call EMS 911 Now:**
- Your child needs immediate medical attention. You need to hang up and call 911 (or an ambulance).
 - Triager Discretion: I'll call you back in a few minutes to be sure you were able to reach them.
51. **Go To ED Now:**
- Your child needs to be seen in the Emergency Department immediately.
 - Go to the ED at _____ Hospital.
 - Leave now. Drive carefully.
52. **Go To ED Now (or PCP Triage):**
- **If No PCP (Primary Care Provider) Second-Level Triage:** Your child needs to be seen within the next hour. Go to the ED/UCC at _____ Hospital. Leave as soon as you can.
 - **If PCP Second-Level Triage Required:** Your child may need to be seen. Your doctor (or NP/PA) will want to talk with you to decide what's best. I'll page the on-call provider now. If you haven't heard from the provider (or me) within 30 minutes, go directly to the ED/UCC at _____ Hospital.
53. **See HCP Within 4 Hours (or PCP triage):**
- **If Office Will Be Open:** Your child needs to be seen within the next 3 or 4 hours. Call your doctor's (or NP/PA) office as soon as it opens.
 - **If Office Will Be Closed and No PCP (Primary Care Provider) Second-Level Triage:** Your child needs to be seen within the next 3 or 4 hours. A nearby Urgent Care Center (UCC) is often a good source of care. Another choice is to go to the ED. Go sooner if your child becomes worse.
 - **If Office Will Be Closed and PCP Second-Level Triage Required:** Your child may need to be seen. Your doctor (or NP/PA) will want to talk with you to decide what's best. I'll page the on-call provider now. If you haven't heard from the provider (or me) within 30 minutes, call again. **Note:** If on-call provider can't be reached, send to UCC or ED.
- Note to Triager:**
- Use nurse judgment to select the most appropriate source of care.
 - Consider both the urgency of the patient's symptoms AND what resources may be needed to evaluate and manage the patient.
- Sources of Care:**
- **ED:** Patients who may need surgery or hospital admission need to be sent to an ED. So do most patients with serious symptoms or complex medical problems.
 - **UCC:** Some UCCs can manage patients who are stable and have less serious symptoms (e.g., minor illnesses and injuries). The triager must know the UCC capabilities before sending a patient there. If unsure, call ahead.
 - **OFFICE:** If patient sounds stable and not seriously ill, consult PCP (or follow your office policy) to see if patient can be seen NOW in office.

54. **See PCP Within 24 Hours:**
- **If Office Will Be Open:** Your child needs to be examined within the next 24 hours. Call your child's doctor (or NP/PA) when the office opens and make an appointment.
 - **If Office Will Be Closed:** Your child needs to be examined within the next 24 hours. A clinic or an urgent care center is often a good source of care if your doctor's office is closed or you can't get an appointment.
 - **If Patient Has No PCP:** Refer patient to a clinic or urgent care center. Also try to help caller find a PCP (medical home) for future care.
- Note to Triager:**
- Use nurse judgment to select the most appropriate source of care.
 - Consider both the urgency of the patient's symptoms AND what resources may be needed to evaluate and manage the patient.
55. **See PCP Within 3 Days:**
- Your child needs to be examined within 2 or 3 days.
 - **PCP Visit:** Call your doctor (or NP/PA) during regular office hours and make an appointment. A clinic or urgent care center are good places to go for care if your doctor's office is closed or you can't get an appointment. **Note:** If office will be open tomorrow, tell caller to call then, not in 3 days.
 - **If Patient Has No PCP (Primary Care Provider):** Try to help caller find a PCP for future care (e.g., use a physician referral line). Having a PCP or "medical home" means better long-term care.
56. **See PCP Within 2 Weeks:**
- Your child needs an evaluation for this ongoing problem within the next 2 weeks.
 - **PCP Visit:** Call your child's doctor (or NP/PA) during regular office hours and make an appointment.
 - **If Patient Has No PCP (Primary Care Provider):** A primary care clinic is where you need to be seen for chronic health problems. **Note:** Try to help caller find a PCP (e.g., use a physician referral line). Having a PCP or 'medical home' means better long-term care.
58. **Home Care:**
- You should be able to treat this at home.
59. **Call PCP Now:**
- You need to discuss this with your child's doctor (or NP/PA).
 - I'll page the on-call provider now. If you haven't heard from the provider (or me) within 30 minutes, call again.
60. **Call PCP Within 24 Hours:**
- You need to discuss this with your child's doctor (or NP/PA) within the next 24 hours.
 - **If Office Will Be Open:** Call the office when it opens tomorrow morning.
 - **If Office Will Be Closed:** I'll page the on-call provider now. Exception: From 9 pm to 9 am. Since this isn't urgent, we'll hold the page until morning.
61. **Call PCP When Office Is Open:**
- You need to discuss this with your child's doctor (or NP/PA) within the next few days.
 - Call the office when it is open.



N/A

BACKGROUND INFORMATION

Recognizing the Presence of Jaundice by Parent

Sometimes callers aren't certain if the newborn's skin is jaundiced. Have them look at the sclera. The color of the sclera is essential in assessing whether significant jaundice is present in babies with darkly pigmented skin or those who normally have a yellowish skin tone (some Hispanics). If the sclera are white, the bilirubin level is not worrisome. If the sclera are yellow, the level may be above 15 ml/dL, and it needs to be checked. Parents of darkly pigmented newborns can also be taught to observe the hands and feet for yellowing.

Estimation of Bilirubin Level by Parent

- If the parent can be taught to report what part of the body is jaundiced, this information can be helpful. (See Care Advice 10: Judging Jaundice)
- Parents are not qualified however, to judge the depth of jaundice. Even physicians and nurses are not consistently reliable.
- Therefore, if the caller thinks the jaundice is deep yellow or orange, the patient is seen now.
- If the caller thinks the jaundice is light yellow, but they are concerned, the baby is seen within 24 hours.
- Trying to get the parent to be more specific about the degree of jaundice is unfair and potentially dangerous.

Bilirubin Level Severity By Parent's Report of Location

- The following rating scale is used for phone assessment in this guideline:
- MILD jaundice: Face only
- MODERATE jaundice: Trunk involved (chest and abdomen). The bilirubin level is higher if the abdomen is involved.
- SEVERE jaundice: Legs involved or entire body surface
- Newborns with SEVERE jaundice all need to be referred in for a bilirubin level NOW.
- Jaundice that involves the whites of the eyes (sclera) also needs to be checked.
- Source: Dr. Elizabeth Thilo, Neonatologist

Estimates of Bilirubin Levels Using Zones of Dermal Icterus (Original Study)

Jaundice begins on the face of newborns and proceeds to the trunk, the extremities, and finally the palms and soles. The most distal zone of dermal icterus in this cephalopedal progression correlates with the level of serum bilirubin (Kramer, 1969). Once, the bilirubin stops rising, the progression of dermal icterus also stops. When the serum bilirubin falls, gradual fading of jaundice occurs on all skin surfaces simultaneously. The following correlations between the most distal body part that is jaundiced and the predicted level of bilirubin can be helpful, but they do not substitute for an actual serum bilirubin. These observations were made by nurses, not parents.

- Head and neck 4-8
- Upper trunk (chest) 5-12
- Lower trunk (abdomen) and thighs 8-16

- Arms and lower legs 11-18
- Palms and soles > 15
- Entire body 15-30
- These zones of jaundice probably relate to differences in capillary perfusion and skin temperature.

Location of Jaundice: Survey of 10 Denver PCPs

- The following results came from a survey of 10 Pediatric Groups in Denver (May 2008)
- Premise: Assume you have a phone call about a jaundiced newborn
- Survey question: Do you use the parent's report of the level of jaundice on the baby's body surface to help you decide if a bilirubin is needed? If yes, what location prompts you to order a bilirubin?
- Abdomen: 20%
- Legs: 20%
- More jaundiced than when last seen: 40%
- Don't use because parent's observation not reliable: 20%

Scleral Icterus: a Possible Marker for Significant Bilirubin

- A 2013 study from the NICU at University of Pittsburgh Department of Pediatrics (Azzuqa, et.al.) found that scleral icterus was a marker for bilirubin levels above 15 mg/dL.
- None of the newborns with bilirubin levels of 10-15 mg/dL had scleral icterus.
- This finding is different than the observation in older children and adults that scleral icterus appears early, with bilirubin levels of 3-5 mg/dL.
- The research needs repeating. In the meantime, this guideline now suggests that newborns with scleral icterus have the bilirubin level checked within 24 hours.
- The AAP website for parents recommends seeing newborns if the whites of the eyes become yellow. They also recommend seeing those with jaundice of the abdomen, arms or legs. (www.healthychildren.org).

Bilirubin Measurement

- **Total serum bilirubin (TSB):** This is a blood test. It is still considered the "gold standard" and true measurement of the bilirubin. It is done to determine whether babies need phototherapy or not.
- **Transcutaneous bilirubin (TcB):** This is a non-invasive way to estimate the bilirubin level. A bilirubinometer is placed on the skin and measures the amount of bilirubin present in the extravascular tissue. It is not a substitute for TSB, but it can be used for screening to provide an estimate of the TSB value. If a baby is felt to be at risk for developing clinically significant hyperbilirubinemia, a TSB should be done. The TcB level is not reliable in babies who have received phototherapy.

Types of Jaundice

Physiological jaundice (50% of newborns)

- Onset 2 to 3 days of age
- Peaks day 4 to 5 (Reason for recheck visits on these days)
- Disappears 1 to 2 weeks of age

Breastfeeding or suboptimal intake jaundice (5 to 10% of newborns)

- Due to inadequate intake of breastmilk
- Pattern similar to physiological type

- Also causes poor weight gain

Breast-milk jaundice (10% of breastfed newborns)

- Due to conjugation inhibitor in breastmilk that blocks the removal of bilirubin
- Also called prolonged unconjugated hyperbilirubinemia jaundice
- Onset 4 to 7 days of age
- Lasts 3 to 12 weeks
- Breastmilk intake and weight gain are normal
- Not harmful

Rh and ABO blood group incompatibility

- Onset during first 24 hours of life
- Can reach harmful levels

Liver Disease (rare)

- White or pale stools suggest biliary atresia or other obstructive liver disease as the cause of the jaundice.

Normal Prolonged Jaundice in Breastfed Babies

- Also called prolonged unconjugated hyperbilirubinemia jaundice
- At 3 weeks of age, 43% of breastfed newborns have a bilirubin level above 5 mg/dL, and 34% were clinically jaundiced.
- At 4 weeks of age, 34% of breastfed newborns have a bilirubin level above 5 mg/dL, and 21% were clinically jaundiced.
- This new data should help with reassuring mothers and HCPs that this is normal and usually doesn't require any lab tests.
- Reference: Maisels, et.al., Pediatrics 2015

Risk Factors for Severe Jaundice

- Onset within first 24 hours of life
- Blood type incompatibility (Mother is Type O or Rh negative)
- Gestational age less than 37 weeks (Preterms are 5 times more likely to have bilirubin levels over 12 than 40 week newborns)
- Sibling required phototherapy
- Bruising from birth trauma (e.g., cephalohematoma)
- Breastfeeding, especially if firstborn and feeding not going well. Newborns discharged on Thursday or Friday are at highest risk, because they need to be seen on the weekend for a recheck of their jaundice. (and sometimes that is overlooked)
- Asian race (Bilirubin levels over 12 occur in 23% of Asian babies, 12% of whites and 4% of African-Americans.)
- Recent phototherapy
- Caller mentions last bilirubin level was in "high-risk" zone

Kernicterus Prevention

- Kernicterus (bilirubin encephalopathy) is the most serious complication of high bilirubin levels
- Early symptoms are lethargy, hypotonia, poor suck and high-pitched cry

- The US kernicterus registry reported 61 cases in term and near-term healthy newborns in 8 years (Johnson 2002). Currently over 120 cases (2007).
- Bilirubin levels 22-48; 31% idiopathic, 31% G6PD, 10% hematomas
- Breastfed: 59 of 61 (increased risk for dehydration and malnutrition) (97%)
- Sequelae > 90% at 18 mo (cerebral palsy, developmental delays, hearing loss)
- Lapses in follow-up care: Only 28% were given an early follow-up appointment within 2-3 days of discharge. (AAP Practice Parameter 1994 and 2004 recommends any newborn discharged before 48 hours needs a check-up within 2-3 days of discharge for jaundice, feeding behavior, weight, hydration, etc.)
- Errors in telephone care: Mothers who phoned their doctor's office for jaundice, drowsiness, poor feeding, etc. received repeated reassurance rather than being seen

Bili-Blankets and Home Phototherapy

A bili-blanket is a type of phototherapy that can be used at home. It must be prescribed by your baby's doctor. The light emitted from the blanket helps to breakdown the bilirubin in the skin. The blanket is connected to a machine by a cable. The machine is then plugged into a wall outlet.

Safety: The bili-blanket system uses pure light energy so no electricity or heat is generated near your baby. The newborn can't see the light, so no eye patches are necessary.

The fiberoptic blanket is inserted into a soft cover so it doesn't irritate the baby's skin. It emits light from one side only. The bright side is placed directly on the baby's skin and wraps the torso area. The parents can put the baby's clothes over the bili-blanket and swaddle with a regular blanket to keep the newborn warm.

The blanket should be left on when holding, feeding, or sleeping. The only time it's necessary to remove it and turn it off is during bathing. In fact, the blanket should be worn as much as possible to be effective.

These babies are usually followed by a home health agency and usually require daily bilirubin tests and weights.

Sunlight Therapy for Jaundice

- Sunlight that comes through a window can lower bilirubin levels, but the actual benefits have not been researched.
- This guideline does not recommend sunlight therapy because of the lack of proven benefits and the following potential harmful effects: [1] exposing the baby's uncovered back to sunlight gives a risk of rolling prone and suffocation AND [2] exposure to outdoor direct light could cause sunburn.
- Maisels (NEJM 2008) warns us: "Sunlight will lower the serum bilirubin level, but the practical difficulties involved in safely exposing a naked newborn to the sun either inside or outside (and avoiding sunburn) preclude the use of sunlight as a reliable therapeutic tool".

The Sick Newborn: Subtle Symptoms

- **Newborn vulnerability:** Newborns are a very high-risk age group, especially during the first 7 days of life. Over 90% of underreferrals that result in a serious adverse outcome involve newborns. Newborns with serious chronic diseases may look good at birth, but abruptly change during the first week of life. Examples are congenital heart disease and metabolic disease. Newborns are at special risk for sepsis and can deteriorate very rapidly.
- The symptoms of serious illness in newborns can be very subtle. That is why the statement "[1]

Newborn (< 1 month old) AND [2] starts to look or act abnormal in any way" is found in the "See Immediately" category of at least 20 guidelines.

- Keep in mind that when a parent denies that their newborn is acting "sick", they may simply mean that the newborn doesn't have a cough, runny nose, or diarrhea. Always ask them, "What's normal for your baby?, What's different (or abnormal)? and What is your baby doing right now?"
- Feeding behavior is the one universal and reliable measure of a newborn's well being. Newborns should be vigorous eating-machines. (EXCEPTION: never a vigorous feeder, but takes adequate amounts and nothing has changed).

Symptoms of illness in a newborn includes the following:

- Poor feeding behavior or a sudden change in feeding behavior (has to be repeatedly awakened to feed or can't stay awake for feedings)
- Poor suck or inability to sustain sucking
- Sweating during feedings
- Sleeping excessively (EXCEPTION: normally parent has to awaken for feeds, but is easy to arouse, alert for feedings and nothing has changed)
- Change in muscle tone (decreased or limp)
- Decreased activity or movement
- Change in color (i.e., pallor, cyanosis or gray extremities)
- Fever or low temperature
- Unusual crying, moaning, grunting
- Tachypnea
- Parent who calls back about the same concerns

Birth To 3 Months Old: Indications For Seeing Patients Immediately With Fever

- The triage question, "Age < 12 weeks AND fever 100.4 F (38.0 C) or higher rectally", is found in multiple symptom-based and newborn guidelines.
- Rectal temperatures are preferred before sending babies into the Emergency Room. (Reason: EDs/offices perform rectal readings to guide ED work-ups). If a caller is unable to take a rectal temp, the following definitions of fever can apply to this question as well:
- Rectal or Temporal Artery temperature: 100.4 F (38.0 C) or higher
- Pacifier temperature: 100 F (37.8 C) or higher
- Axillary (armpit) temperature: 99 F (37.2 C) or higher
- Tympanic temperatures are not reliable before 6 months of age.
- Temporal artery and skin infrared temperatures may be reliable in young infants. (De Curtis 2008)
- Note: Rectal temperatures always preferred over axillary readings (Reason: axillary often inaccurate). (EXCEPTION: Axillary temp above 100.4 F (38 C), just see them)

Expert Reviewer

- Elizabeth Thilo, MD; Neonatologist; Children's Hospital Colorado, Aurora, Colorado
- The author is extremely grateful for this critical review.

REFERENCES

1. American Academy of Pediatrics, Subcommittee on Neonatal Hyperbilirubinemia Neonatal jaundice and kernicterus. *Pediatrics*. 2001;108:763-764
2. Azzuqa A, Watchko JF. Scleral (conjunctival) icterus in neonates: A marker of significant hyperbilirubinemia. *E-PAS (Pediatric Academic Societies)* 2013; 3841.708

3. Bhutani V, Johnson L and Keren R. Treating acute bilirubin encephalopathy-before it's too late. *Contemp Pediatr*. 2005;22(5):57-74.
4. Brumbaugh D, Mack C. Conjugated hyperbilirubinemia in children. *Pediatr Rev*. 2012;33(7):291-302.
5. Burke BL, Robbins JM, Bird TM, et al. Trends in hospitalizations for neonatal jaundice and kernicterus in the United States, 1988-2005. *Pediatrics*. 2009;123:524-532.
6. Chang PW, Kuzniewicz MW, McCulloch CE, et al. A clinical prediction rule for rebound hyperbilirubinemia following inpatient phototherapy. *Pediatrics*. 2017 Mar;139(3). pii: e20162896.
7. Chen YJ, Yeh TF, Chen CM. Effect of breast-feeding frequency on hyperbilirubinemia in breast-fed term neonate. *Pediatr Int*. 2015;57(6):1121-1125.
8. Chiu A. Unconjugated hyperbilirubinemia. In: Moyer V, Davis RL, Elliott E, et al, eds. *Evidence Based Pediatrics and Child Health*. London, England: BMJ Publishing Group; 2000. p. 306-312
9. Dixit R and Gartner LM. The jaundiced newborn: Minimizing the risks. *Contemp Pediatr*. 1999;16(4):166-183.
10. Flaherman VJ, Maisels MJ; Academy of Breastfeeding Medicine. ABM Clinical Protocol #22: Guidelines for Management of Jaundice in the Breastfeeding Infant 35 Weeks or More of Gestation-Revised 2017. *Breastfeed Med*. 2017 Jun;12(5):250-257.
11. Gartner LM, Herrarias CT, Sebring RH. Practice patterns in neonatal hyperbilirubinemia. *Pediatrics*. 1998;101:25-31.
12. Gartner LM. Neonatal jaundice. *Pediatr Rev*. 1994;15:422-432.
13. Keren R, et al. Visual assessment of jaundice in newborns often inaccurate. *Arch Dis Child Fetal Neonatal Ed*. 2009;94:F317-F322.
14. Kramer LI. Advancement of dermal icterus in the jaundiced newborn. *Am J Dis Child*. 1969;118:454.
15. Kuzniewicz MW, Wickremasinghe AC, Wu YW, et al. Incidence, etiology, and outcomes of hazardous hyperbilirubinemia in newborns. *Pediatrics*. 2014 Sep;134(3):504-509.
16. Maisels MJ, Clune S, Coleman K, et al. The natural history of jaundice in predominantly breastfed infants. *Pediatrics*. 2014 Aug;134(2):e340-345.
17. Maisels MJ, McDonagh AF. Phototherapy for neonatal jaundice. *N Engl J Med*. 2008;358:920-928.
18. Maisels MJ. Neonatal jaundice. *Pediatr Rev*. 2006;27(12):443-454.
19. Maisels MJ. Jaundice in a newborn. *Contemp Pediatr*. 2005;22(5):34-54.
20. Maisels, MJ. Transcutaneous bilirubin measurement: does it work in the real world? *Pediatrics* 2015;135(2):364-366.
21. Moyer VA, Ahn C, Sneed S. Accuracy of clinical judgment in neonatal jaundice. *Arch Pediatr Adolesc Med*. 2000;154:391-394.

22. Palmer HR, Clanton M, Ezhuthachan S, et al. Applying the 10 simple rules of the institute of medicine to management of hyperbilirubinemia in newborns. *Pediatrics*. 2003;112(6):1388-1393.
23. Pan DH, Rivase Y. Jaundice: newborn to age 2 months. *Pediatr Rev* 2017;38(11):499-510.
24. Riskin A, Tamir A, Kugelman A, et al. Is visual assessment of jaundice reliable as a screening tool to detect significant neonatal hyperbilirubinemia? *J Pediatr*. 2008;152:782-786.
25. Romero HM, Ringer C, Leu MG, et al. Neonatal jaundice: Improved quality and cost savings after implementation of a standard pathway. *Pediatrics*. 2018 Mar;141(3). pii: e20161472.
26. Taylor JA, Stout JW, de Greef L, et al. Use of a smartphone app to assess neonatal jaundice. *Pediatrics*. 2017 Sep;140(3). pii: e20170312.
27. US Preventive Services Task Force. Screening of infants for hyperbilirubinemia to prevent chronic bilirubin encephalopathy. *Pediatrics*. 2009;124:1172-1177.

SEARCH WORDS

BILIRUBIN
BREASTFEEDING JAUNDICE
BREAST-MILK JAUNDICE
JAUNDICE
JAUNDICED NEWBORN
LIVER DISEASE
NEWBORN JAUNDICE
ORANGE SKIN
PHYSIOLOGICAL JAUNDICE
YELLOW
YELLOW EYE
YELLOW EYES
YELLOW OR ORANGE COLORED SKIN
YELLOW SCLERA
YELLOW SKIN
YELLOWING OF EYES

AUTHOR AND COPYRIGHT

Author: Barton D. Schmitt, MD, FAAP
Copyright: Copyright 1994-2021, Schmitt Pediatric Guidelines LLC All rights reserved.
Content Set: Telephone Triage Protocols - Pediatric After-Hours Version
Schmitt-Thompson Clinical Content
Version Year: 2021
Last Revised: 4/30/2021
Last Reviewed: 4/30/2021