Jaundice - Newborn
Pediatric After-Hours Version - Standard - 2015

DEFINITION

- Yellow color of the skin
- Whites of the eye (sclera) may turn yellow at a higher bilirubin level

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

\[CA: \, 50, \, 7\]

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
(Except: 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 Physician 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


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

See Physician within 24 Hours

Whites of the eye (sclera) have turned yellow

Reason: bilirubin level may be higher
CA: 54, 2, 3, 4, 10, 9, 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


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


Reason: PCP may decide to recheck bilirubin level  
CA: 60, 2, 3, 4, 10, 9, 7


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

See PCP When Office is Open (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 (BM) 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 (all triage questions negative)

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

Mild jaundice of newborn (all triage questions negative)

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

CARE ADVICE (CA) -

1. Reassurance:
   - Some jaundice is present in 50% of newborns.
   - It is usually temporary and harmless.
   - The first place for jaundice to appear is on the face.
   - Jaundice that only involves the face only is harmless.
   - Jaundice that involves the whites of the eyes (sclera) needs to be checked.

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

3. Breastfed:
   - 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. Increase Stools:
   - If your baby is 5 days or older And has less than 3 stools/day, carefully insert a lubricated thermometer 1/2 inch (12 mm) into the anus and gently move it from side to side a few times to stimulate the release of a stool.
   - Reason: Stools carry bilirubin out of the body.
   - Do this once or twice per day until jaundice improves or stool frequency becomes normal.

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 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 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 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 only is harmless.
    - As it involves the chest, the level is going up.
    - If it involves the abdomen, arms 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 ER at __________ Hospital. Leave now. Drive carefully.

52. **Go To ED Now (or PCP Triage):**
   - **If No PCP Triage:** Your child needs to be seen within the next hour. Go to the ER/UCC at __________ Hospital. Leave as soon as you can.
   - **If PCP Triage Required:** Your child may need to be seen. Your doctor will want to talk with you to decide what's best. I'll page him now. If you haven't heard from the on-call doctor within 30 minutes, or your child becomes worse, go directly to the ER/UCC at __________ Hospital.

53. **See Physician Within 4 Hours** (or PCP triage):
   - **If No PCP Triage:** Your child needs to be seen. Go to ______ (ED/UCC or office if it will be open) within the next 3 or 4 hours. Go sooner if your child becomes worse.
   - **If PCP Triage Required:** Your child may need to be seen. Your doctor will want to talk with you to decide what's best. I'll page him now. If you haven't heard from the on-call doctor within 30 minutes, call again. (Note: If PCP can't be reached, send to ED/UCC or office.)

54. **See Physician Within 24 Hours:**
   - **If Office Will Be Open:** Your child needs to be examined within the next 24 hours. Call your child's doctor when the office opens, and make an appointment.
   - **If Office Will Be Closed And No PCP Triage:** Your child needs to be examined within the next 24 hours. Go to ______ at your convenience.
   - **If Office Will Be Closed And PCP Triage Required:** Your child may need to be seen within the next 24 hours. Your doctor will want to talk with you to decide what's best. I'll page him now. (Exception: from 10 pm to 7 am. Since this isn't serious, we'll hold the page until morning.)

55. **See PCP Within 3 Days:** Your child needs to be examined within 2 or 3 days. Call your child's doctor during regular office hours and make an appointment. (Note: if office will be open tomorrow, tell caller to call then, not in 3 days.)
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/or abdomen)
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](http://www.healthychildren.org)).

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 malnutrition 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 newborns)

• Due to conjugation inhibitor in breastmilk that blocks destruction of bilirubin
• Onset 4 to 7 days of age
• Lasts 3 to 12 weeks
• 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

• 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.)
• 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
  - Tymppanic 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, CO

**REFERENCES**


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

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