

CHAPTER 21

Postpartum Complications



FIGURE 21.1 Postpartum Complications Postpartum complications can occur at any time from birth to 6 weeks and even up to 1 year after birth. These complications can have a tremendous impact on the birthing person, the newborn, and the family. (credit: “First term Airman, first time father Pt. 3: Welcome to our family!” by Airman 1st Class Travis Beihl/Keesler Air Force Base, Public Domain)

CHAPTER OUTLINE

- 21.1 Postpartum Infections
- 21.2 Postpartum Hemorrhage
- 21.3 Breasts and Breast-Feeding
- 21.4 Cesarean Birth Discomforts
- 21.5 Postpartum Mood Disorders and Psychiatric Disorders

INTRODUCTION Ideally, the postpartum period is a time for parents to bond with newborns. It is also a time for the laboring person to rest and reflect on the labor and birth. In some cases, however, complications occur and interrupt the routine postpartum course. Some postpartum complications, such as breast-feeding complications, perineal discomforts, and recovery from cesarean birth, are common. Other complications, such as infections, hemorrhage, and depression, can be more serious. The nurse plays a vital role in identifying and assisting persons with postpartum complications and collaborates with other health-care providers to promote the best possible outcomes for both the birthing person and the newborn.

21.1 Postpartum Infections

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Explain the risk factors and signs and symptoms of wound infections related to birth
- Explain the risk factors and signs and symptoms of postpartum endometritis
- Explain the risk factors and signs and symptoms of postpartum urinary tract infections
- Explain the risk factors and signs and symptoms of postpartum mastitis
- Explain the risk factors and signs and symptoms of postpartum thrush
- Develop a plan of care based on the specific postpartum infection the person is experiencing

Postpartum infections can be caused by multiple factors. Endometritis and wound infections are more likely to occur in persons with prolonged rupture of membranes and chorioamnionitis. Urinary tract infections can be caused by indwelling catheters. Mastitis can occur with a break in skin integrity from a poor latch. Some of these infections are preventable, while others are not. The nurse assesses for signs of postpartum infections and provides education to help prevent and decrease the risk for infections.

Care of the Postpartum Person with a Wound Infection

Infections occur more often in persons with STIs, chorioamnionitis, prolonged rupture of membranes, and third- or fourth-degree lacerations. Infections can be related to trauma or lacerations that occur during birth, allowing the introduction of bacteria. Chorioamnionitis can cause wound infections, endometritis, and sepsis (Daifotis et al., 2020). Postpartum wound infections can occur from bacteria ascending from the vagina, colonized on the skin, or introduced during a cesarean birth. Persons with a body mass index (BMI) ≥ 30 have higher risks of developing postpartum infections, especially wound infections. Persons with a BMI ≥ 40 are at higher risk for morbidity related to postpartum infection (Mitchell et al., 2020).

Signs of postpartum wound infections are the same as those of other laceration or perioperative wound infections. Signs include redness and purulent drainage from the laceration, episiotomy, or abdominal incision; fever (temperature greater than 100.4° F/38° C); pain; and fatigue. Nursing care of the postpartum person includes assessment of the laceration, episiotomy, or incision for signs of infection and pharmacologic treatment of the infection per provider's orders. The nurse educates the postpartum person to keep the wound clean and dry, to wash hands before and after touching the wound, and to call the health-care provider for worsening signs of infection after discharge from the birthing facility, such as increase in purulent drainage, increase in wound pain, and increase in fever.



PHARMACOLOGY CONNECTIONS

Antibiotics for Postpartum Wound Infections

Ampicillin and gentamicin are often administered to postpartum persons to treat wound infections in the perineum and after a cesarean birth. Both of these antibiotics are safe to use if the postpartum person is breast-feeding. The postpartum person is provided with instructions to call their health care provider if the signs and symptoms of the infection do not improve after 3 to 5 days of antibiotics.

Ampicillin (Omnipen)

- **Classification:** penicillin antibiotic
- **Route/Dosage:** PO: 250 or 500 mg; IM: 1–2 g; IV: 1–2 g
- **Indications:** treatment of infections caused by gram positive and negative infections
- **Mechanism of Action:** kills the bacteria by interfering with cell wall synthesis during replication
- **Contraindications:** hypersensitivity to any penicillin; renal disease
- **Adverse Reactions/Side Effects:** nausea, vomiting, rash, hives, urticaria, pancytopenia,
- **Nursing Implications:** The nurse ensures the postpartum person understands it is important to take all of the antibiotic. The nurse monitors the patient's vital signs, CBC, and culture reports.
- **Parent/Family Education:** Call health care provider for difficulty breathing, dark urine, severe diarrhea,

wheezing, chest tightness, fever, itching, swelling of face, lips, tongue, or throat

Gentamicin (Garamycin)

- **Classification:** aminoglycoside antibiotic
- **Route/Dosage:** IM or IV: 1 mg/kg/day
- **High Alert/Black Box Warning:** gentamicin toxicity is associated nephrotoxicity and ototoxicity
- **Indications:** treatment of infections caused by gram positive and negative infections
- **Mechanism of Action:** kills the bacteria by inhibiting protein synthesis in susceptible bacteria
- **Contraindications:** hypersensitivity to gentamicin; renal disease
- **Adverse Reactions/Side Effects:** rash, hives, urticaria, tinnitus, dizziness, vertigo, seizures
- **Nursing Implications:** The nurse ensures the postpartum person understands it is important to take all of the antibiotic. The nurse monitors the patient's vital signs, CBC, and culture reports.

(Vallerand & Sansoski, 2023)

Care of the Postpartum Person with Endometritis

Infection of the uterus that occurs in the postpartum period is **postpartum endometritis**. It occurs more often with chorioamnionitis, prolonged rupture of membranes, and cesarean birth (Elsevier, 2024). Symptoms of postpartum endometritis include uterine tenderness or pain with fundal massage, foul-smelling lochia, increased bleeding, and fever. The nurse will administer antibiotics and antipyretics according to the health-care provider's orders. The nurse monitors the patient for signs of worsening infection (severe uterine pain, increase in odor of lochia, rising fever). Endometritis can lead to sepsis (Shields et al., 2023). The nurse closely monitors the postpartum person for early signs of sepsis (increased or decreased white blood cell [WBC] count, fever, chills, low body temperature, tachycardia, dizziness, decreased urine output, and discolored skin). Onset of altered mental state and hypotension are signs of worsening sepsis (Centers for Disease Control and Prevention [CDC], 2023b). When providing discharge instructions to the postpartum person diagnosed with endometritis, the nurse educates the person on finishing their medications once discharged, continuing peri-care, handwashing, the importance of getting rest, and contacting their health-care provider if signs of worsening infection appear.

CLINICAL JUDGMENT MEASUREMENT MODEL

Recognize Cues: Postpartum Endometritis

The nurse will recognize the cues of postpartum endometritis by:

1. assessing the fundus
 - recognizing pain or tenderness
 - recognizing increased bleeding
2. assessing vital signs
 - recognizing fever (temperature $\geq 100.4^{\circ}\text{F}$ / 38°C)
3. assessing lochia
 - recognizing foul-smelling lochia
4. assessing level of coping
 - recognizing the postpartum person is extremely tired
 - recognizing the person is complaining of malaise
 - recognizing the person is not wanting to get out of bed

Care of the Postpartum Person with a Urinary Tract Infection

Urinary tract infections (UTIs) occur in 2 percent to 4 percent of births and are the most common postpartum infection (Gundersen et al., 2018). UTIs occur more often in those with a urinary catheter during labor. However, some postpartum persons experience urinary retention after birth, and this can contribute to UTIs. The nurse assesses for signs of overdistention of the bladder or urinary retention during the postpartum period, such as palpable bladder, uterine atony and displacement, and frequently voiding in small amounts.

Signs of a UTI include frequency, urgency, dysuria, hematuria, fever, and pain. The nurse assesses the postpartum person for signs the UTI has ascended to the kidneys by noting costovertebral angle tenderness (CVAT), high fever, nausea, and chills. The health-care provider is notified of these signs, and many times a urine culture and sensitivity are ordered (Milton, 2024). The nurse administers antibiotics and antipyretics per the health-care provider's orders and monitors the culture and sensitivity reports. Education provided to the postpartum person includes encouraging increased water intake and frequent urination, finishing all antibiotics after discharge from the birthing facility, importance of perineal care and handwashing, and instructions to call the health-care provider for worsening symptoms (increase in fever, increase in suprapubic or flank pain, and flu-like symptoms).

Care of the Postpartum Person with Mastitis

Inflammation and/or infection of the breast, or **mastitis**, occurs most often while breast-feeding. Causes of mastitis include clogged ducts, engorgement, hyperlactation, nipple trauma, decreased immune system, or poor handwashing routine. Clogged ducts occur with constricting clothes or compression of the breast and cause milk to collect and create a painful, firm area. If the inflammation and milk stasis continue, mastitis can occur. Another cause of mastitis is an incorrect nursing latch that causes cracks or fissures in the nipple (Şahin et al., 2023). Such breaks in skin integrity allow bacteria to enter the nipple.

Symptoms of mastitis include fever, chills, flu-like symptoms, and a painful, hot, reddened area of the breast ([Figure 21.2](#)). The nurse assesses the patient while breast-feeding for a good latch and examines nipples for cracking or redness. The nurse or lactation consultant can assist the patient to establish a good latch (See [21.3 Breasts and Breast-Feeding](#) and [Chapter 24 Care of the Typical Newborn](#) for more information on LATCH). The nurse provides education regarding nipple integrity, explaining the importance of establishing a good latch and, if the latch hurts, to remove the baby and relatch. The nursing person should examine the nipples for cracking or bleeding. The person can use nipple ointment for faster healing in hopes of preventing mastitis. For the patient with mastitis, the nurse should encourage nursing every 2 to 3 hours to empty breasts for comfort and to avoid engorgement. If the breasts are too painful for nursing, the patient can pump to empty the breasts and maintain milk supply. The nurse can teach the patient to apply a cool (or warm) compress to the reddened area and to use nonsteroidal anti-inflammatory drugs (NSAIDs) or acetaminophen (Tylenol) to decrease pain (Louis-Jacques et al., 2023). Increasing water intake is important to maintain milk supply. Prompt evaluation by the health-care provider is important, as antibiotics are routinely ordered and should be started soon after the diagnosis to prevent progression to breast abscess.

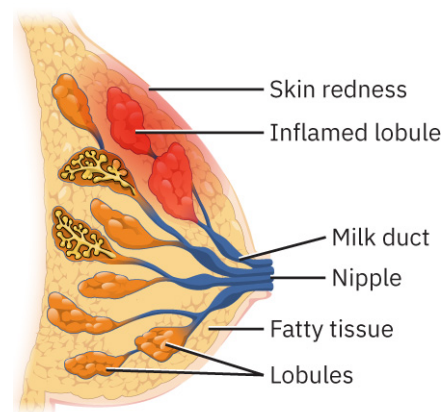


FIGURE 21.2 Mastitis This breast shows classic signs of the redness and inflammation of mastitis. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Care of the Postpartum Person with Thrush

Thrush is a yeast (fungal) infection of the breast that causes a red rash around the nipple. Thrush causes the nipple to itch and burn and can cause shooting breast pain upon latching. Thrush present in the newborn's mouth can be passed between the newborn and the breast-feeding person; therefore, both must be treated with an antifungal medication. The nurse assesses the breast and nipple after a nursing session to observe for signs of nipple trauma (cracking, redness, pain), a risk factor for developing thrush (Louis-Jacques et al., 2023). When the nurse observes nipple thrush, education is provided to the breast-feeding person to allow nipples to dry before putting on a bra or

nursing pads, to change nursing pads as soon as they are damp, and to wash hands well prior to every nursing. Wet, dark areas are perfect media for yeast, especially with milk present to feed the yeast. Once thrush is resolved, the breast-feeding person should continue to monitor the newborn's mouth for any signs of thrush in the future and contact the pediatrician and their health-care provider to initiate treatment for them both as soon as possible if thrush is detected.

Nursing Interventions for the Person Experiencing a Postpartum Infection

As discussed previously, nursing interventions begin with prevention of postpartum infections. Postpartum infections account for 5 percent to 10 percent of the morbidity and mortality of postpartum persons (Boushra & Rahman, 2023). The importance of handwashing and perineal care is reinforced. The nurse also encourages the postpartum person to get as much sleep as possible, eat a healthy diet with plenty of protein, and boost the immune system with fruits, vegetables, vitamin C, and vitamin D. Pelvic rest (avoiding sex, tampons, or douching) to prevent infections is reviewed at discharge. Sitz baths are encouraged, as they promote cleansing and healing of the perineum (Milton, 2024).

Recognizing the signs of infection and treating it promptly decreases the risk of morbidity and mortality from postpartum infections. During nursing assessments, a temperature of 38° C/100.4° F is considered a fever and should be addressed. Tachycardia can be another sign of infection. Infections of the perineum or incision are assessed using the REEDA scale (redness, edema, ecchymosis, discharge, and approximation; see [Table 20.4](#)) (Ernawati et al., 2020). Uterine infections are often recognized during a fundal massage that causes pain or a fundus that is not involuted properly. Nausea and vomiting and other flu-like symptoms are additional signs of infection.

Caring for the person with a postpartum infection includes administering antibiotics per the health-care provider's orders. Breast-feeding persons should continue to breast-feed because the majority of antibiotics used to treat postpartum infections are not contraindicated. Monitoring the person's pain and administering pain medication are important interventions. The nurse is aware that increasing pain could signal worsening of the infection. Reviewing lab results for WBCs can help determine improvement or worsening of an infection. Prompt notification of the health-care provider is essential if the nurse notices signs of sepsis.



CLINICAL SAFETY AND PROCEDURES (QSEN)

QSEN: Evidence-Based Practice of Sepsis

The California Maternal Quality Care Collaborative (CMQCC) has developed a screening system for maternal sepsis that was adopted by the Society for Maternal-Fetal Medicine (Shields et al., 2023). The evidence shows that early recognition of maternal sepsis decreases maternal mortality. The CMQCC recommends the following initial sepsis screen:

The screen is positive if 2 of 4 criteria are met:

- oral temperature <36° C (98.8° F) or ≥ 38° C (100.4° F)
- heart rate >110 beats per minute
- respiratory rate >24 breaths per minute
- WBCs >15,000/mm³ or <4,000mm³ or >10 percent bands

Nurses can help decrease maternal morbidity and mortality by using evidence-based screening such as this sepsis screen.

Discharge teaching for the person with a postpartum infection includes teaching the person when to take any prescribed medications, whether to take the medications with or without food, which food(s) to avoid during antibiotic therapy, and the importance of completing the antibiotic regimen. Teaching also includes watching for signs of worsening infection and indications to contact their health-care provider, such as pain, fever, increased lochia, foul-smelling discharge, breakdown of perineal wound, purulent discharge from the incision, painful urination, and abdominal pain. Persons should be instructed to ask for help with housework and childcare, as rest is important for healing.

21.2 Postpartum Hemorrhage

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Differentiate between immediate (early) postpartum hemorrhage and secondary (late) postpartum hemorrhage
- Analyze the risk factors and causes of postpartum hemorrhage
- Explain the management of a postpartum hemorrhage
- Develop a nursing diagnosis that would be appropriate for a person experiencing a postpartum hemorrhage

Postpartum hemorrhage (PPH) is one of the most common complications of birth, occurring after 1 percent to 5 percent of births. PPH is defined by the American College of Obstetricians and Gynecologists (ACOG; 2017) as 1,000 mL of blood loss within 24 hours of birth for both vaginal and cesarean births. However, if 500 mL of blood is lost after a vaginal birth, this indicates a need for intervention.

Detection of Postpartum Hemorrhage

Labor and postpartum nurses must be aware of risk factors, prevention, and treatment of PPH. Risk factors include large for gestational age (LGA) infant, multiple gestation, grand multiparity, prolonged labor, chorioamnionitis, prolonged or precipitous labor, and placenta previa or placental abruption. Facilities have instituted a PPH risk-assessment tool to be used in recognizing those at risk for PPH (Faysal et al., 2023). This tool allows the nurse to prepare and monitor for a potential PPH. Some providers practice active management of the third stage of labor, meaning the health-care provider may apply umbilical cord traction to deliver the placenta quickly, order oxytocin (Pitocin) to be administered after the birth of the placenta, and begin uterine massage after delivery of the placenta (ACOG, 2017). Estimating blood loss is difficult because blood is mixed with amniotic fluid. The nurse plays a role in early detection of PPH by performing **quantitative blood loss (QBL)**, the process of weighing and measuring the amount of blood lost during the birth and immediately postpartum. Many birthing facilities have a rapid response or hemorrhage team the nurse can activate during PPH cases. A multidisciplinary team is vital in treating PPH and preventing maternal mortality.



LINK TO LEARNING

The Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) provides guidelines for quantifying blood loss during childbirth. Accurate measurement of blood loss is crucial for identifying postpartum hemorrhage and ensuring timely interventions. This video [describes how to accurately quantify blood loss \(https://openstax.org/r/77bloodloss\)](https://openstax.org/r/77bloodloss) during childbirth.

Morbidity and Mortality Specific to Postpartum Hemorrhage in the United States

Approximately 11 percent of maternal deaths in the United States are caused by PPH; unfortunately, 54 percent to 93 percent of those deaths may have been preventable (ACOG, 2019). ACOG notes that some preventable cases are due to health-care providers underestimating the amount of blood loss and delaying treatment of PPH. This led to ACOG (2019) recommending that quantitative blood loss be assessed at all births.



CULTURAL CONTEXT

Global Results of Postpartum Hemorrhage

Postpartum hemorrhage causes 25 percent of all maternal deaths globally and is the leading cause of maternal mortality in low-income countries (Yeshitila et al., 2021). In low-income countries such as Ethiopia, delay in receiving care for obstetric complications is a major risk factor for maternal mortality. Non-pneumatic anti-shock garments (NASGs) are used in low-resource areas to prevent shock and death from postpartum hemorrhage. NASGs are neoprene and Velcro devices applied to the legs, similar to a sequential compression device (Figure 21.3). The NASG is then applied to the pelvis and abdomen to compress those areas and increase blood flow to the heart,

lungs, and brain. This device can prevent hypovolemic shock while transporting the postpartum person to a higher level of care. In Ethiopia, the NASG was introduced in 2011 and has reduced maternal deaths from postpartum hemorrhage by 79 percent (Yeshitila et al., 2021). In low-income areas, this device has made an overwhelming difference for birthing women.



FIGURE 21.3 Non-pneumatic Anti-shock Garments The non-pneumatic anti-shock garment is placed to increase blood to the heart, lungs, and brain after a postpartum hemorrhage. (credit: “Non-pneumatic Anti-Shock Garment” by Alison El Ayadi, Elizabeth Butrick, Jillian Geissler, and Suellen Miller/ResearchGate.net, CC BY 2.0).

Early (Primary) Postpartum Hemorrhage

Postpartum hemorrhage that occurs after the birth of the placenta up to 24 hours postpartum is considered **early PPH** or **primary PPH**. It is more common than secondary, or late, PPH. Common causes of PPH are the four T’s—tone, trauma, tissue, and thrombin—with uterine atony being the most common cause of early PPH (Salati et al., 2019). Because of the increased blood volume of the pregnant person, classic signs of hypovolemia may not occur until a significant hemorrhage has occurred. See [Chapter 19 Complications of Labor and Birth](#) for further discussion of early (primary) postpartum hemorrhage.

Late (Secondary) Postpartum Hemorrhage

Postpartum hemorrhage that occurs after the first 24 hours up to 12 weeks postpartum is considered **late PPH** or **secondary PPH**. The most common cause of late PPH is **subinvolution**, which is the inability of the uterus to return to its original size. At the 6-week follow-up, subinvolution is diagnosed when the patient’s uterus is larger than expected and the lochia has not progressed to lochia alba. Retained placenta or membranes can be another cause of late PPH and can also lead to infection and bleeding. Just as coagulation disorders can cause early PPH, these disorders can also cause late PPH. The nurse will give the patient anticipatory guidance and signs of when to call their health-care provider if late PPH were to occur.

Recognizing Postpartum Hemorrhage

Nurses caring for postpartum patients need to monitor for and recognize the signs and symptoms of postpartum hemorrhage before the patient is compromised. Two important nursing actions are monitoring blood loss and recognizing the signs and symptoms of hypovolemia. Both of these actions provide nurses with cues to diagnose fluid volume deficit.

Quantitative Blood Loss

Measuring quantitative blood loss (QBL) has been recommended for all births by ACOG (2019) because estimated blood loss is inaccurate. Research has shown that blood loss is underestimated with larger blood loss and

overestimated with smaller blood loss (ACOG, 2019). To perform QBL, birthing facilities must provide scales for weighing sponges and drapes that allow quantification of blood loss. Research has also found that facilities using QBL have reduced rates of maternal morbidity, decreased time until escalation of care, and increased team awareness of the need for emergency intervention (AWHONN, 2021).



CLINICAL SAFETY AND PROCEDURES (QSEN)

Determining Quantitative Blood Loss

The Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) recommends the following education and supplies be utilized for determining QBL:

1. using standardized items to calculate QBL
2. ensuring all labor and postpartum rooms and operative suites have access to scales and PPH carts
3. attaching a laminated list of the dry weight of sponges and pads to all scales for accurate measurement
4. ensuring electronic charting automatically deducts dry weights from wet weights
5. providing laminated staging algorithms in each room or on the PPH cart
6. practicing simulation drills for PPH with all members of the interprofessional team
7. debriefing after each PPH to identify areas of needed education

(AWHONN, 2021)

Signs and Symptoms of Hypovolemia

The blood loss from postpartum hemorrhage results in hypovolemia. Early symptoms and signs of hypovolemia include feeling weak, dizzy, and anxious; decreased blood pressure; and increased pulse and respiratory rates. Severe hypovolemia causes tachycardia, hypotension, decreased oxygen saturation, thirst, restlessness, low body temperature, and decreased urinary output ([Figure 21.4](#)). The postpartum person becomes pale and diaphoretic, confused, and loses consciousness as the hypovolemia becomes critical. The pregnant person has 50 percent more blood volume than the nonpregnant person (Agrawal et al., 2018). As a result, the postpartum person may not exhibit signs of hypovolemia until they have lost a significant amount of blood. Therefore, the nurse monitors blood loss closely for all postpartum patients, especially for those persons at higher risk for PPH.

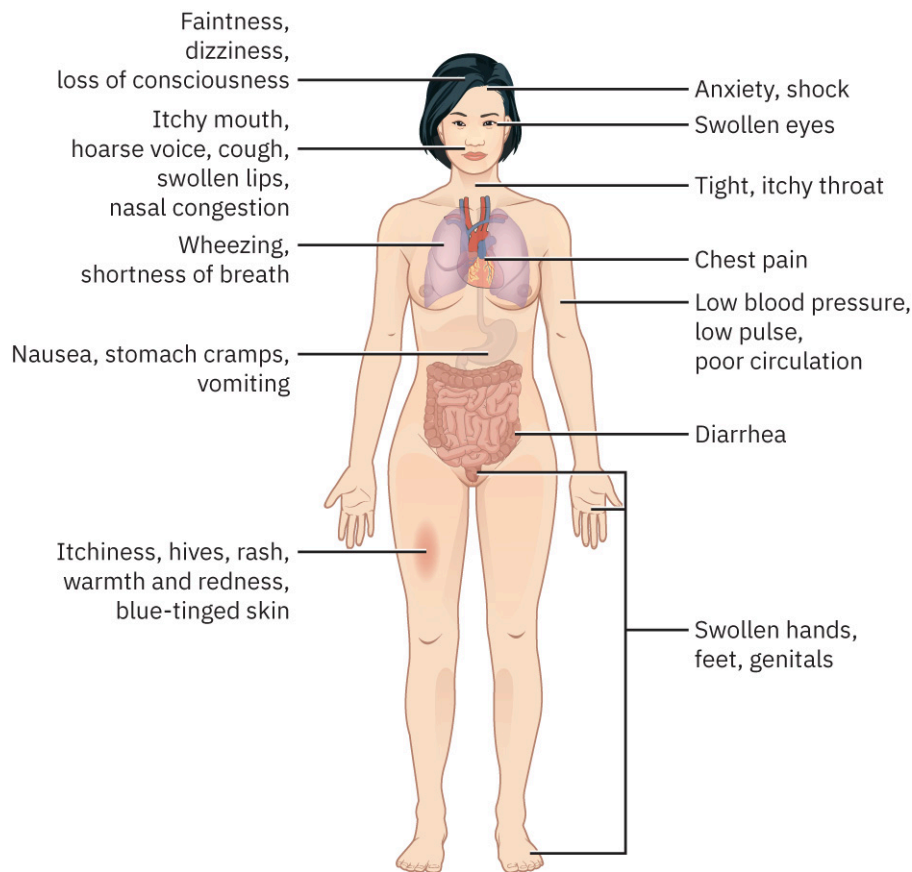


FIGURE 21.4 Hypovolemic Shock These are symptoms and signs of hypovolemic shock. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Causes of Postpartum Hemorrhage

As mentioned earlier, the causes of postpartum hemorrhage can be summarized using the four T's of tone, trauma, tissue, and thrombin. See [Chapter 19 Complications of Labor and Birth](#) for further discussion of the four Ts.

Tone

Tone refers to the tone of the uterus. To stop bleeding from the placental site, the uterine muscles contract to strangulate the spiral arteries that are feeding blood to the placenta. If the uterine muscles are not contracted, the fundus is soft and boggy, and the spiral arteries are free to pump blood and cause rapid blood loss. Risk factors associated with PPH secondary to uterine atony include a large number of previous births, chorioamnionitis, prolonged labor with oxytocin (Pitocin) use, general anesthesia, macrosomic babies, multiple gestations, and polyhydramnios. A full bladder can also impede the uterus from contracting (Milton, 2024).

Trauma

Trauma refers to lacerations in the reproductive tract, uterine rupture, hematomas, and uterine inversion. All these circumstances can cause rapid blood loss. Hematomas might not be identified immediately, but the postpartum person will report increased pain, and vital signs will show a decrease in blood pressure and an increase in heart rate. Risk factors for PPH secondary to trauma include precipitous birth, delivery of an LGA infant, poor nutritional status, use of oxytocin during labor, uterine tachysystole, and the use of vacuum extractor or obstetric forceps. Risk factors leading to uterine inversion are excessive traction on the umbilical cord and fundal placenta implantation (Milton, 2024).

Tissue

Tissue refers to retained placental tissue. The retained tissue can be a large cotyledon or a small piece of membrane. This tissue interrupts the uterus from contracting and leads to PPH. Risk factors for retained placenta are early preterm birth (less than 32 weeks' gestation), extra placental lobes, placenta accreta, and a history of uterine surgery. Retained tissue can also lead to postpartum infection (Shields et al., 2023).

Thrombin

Thrombin refers to coagulation disorders. Disorders in the activation or amount of thrombin include von Willebrand disease and thrombocytopenia. Other bleeding disorders include lack of required features of the clotting cascade (ACOG, 2017). Disseminated intravascular coagulation (DIC) can also lead to PPH because of the inability of the blood to clot. See [Chapter 19 Complications of Labor and Birth](#) for further discussion of DIC. Risk factors for coagulation issues are intrauterine fetal demise, placental abruption, sepsis, DIC, and genetic coagulation disease (ACOG, 2017).

Management of Postpartum Hemorrhage

Management of PPH differs for early and late PPH. Late PPH is managed in the office or perhaps in the emergency department and many times is treated with antibiotics or methylergonovine (Methergine). If retained placental products are suspected, dilation and curettage may be performed. Management of early PPH occurs in the birthing room and will depend on the cause of the hemorrhage. Because uterine atony is the most common cause of early PPH, interventions to induce uterine contractions are quickly performed.

Fundal Massage

Fundal massage is the technique of massaging the uterus to stimulate contractions to decrease postpartum bleeding. The nurse places one hand on the fundus and the other hand guards the uterus. The hand on the fundus massages until the uterus becomes firm. When the uterus contracts, it stops the blood from being pumped by the spiral arteries (Bilgin & Komurcu, 2020). This is almost always the first intervention for postpartum bleeding. [Figure 21.5](#) demonstrates fundal massage.



FIGURE 21.5 Fundal Massage The nurse massages the fundus to induce uterine contractions to control postpartum bleeding. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Oxytocin

Oxytocin (Pitocin) is the first-line medication to treat PPH. The usual dose is 10 to 40 units in 500 to 1,000 mL of intravenous (IV) fluid (ACOG, 2017). During PPH, oxytocin is infused as a bolus. It can also be administered intramuscularly (IM) with the usual dose of 10 units when IV access is not available. The goal is to stimulate contractions to treat uterine atony. The nurse explains to the postpartum person that strong uterine contractions will occur due to oxytocin administration but that the medication will treat or prevent PPH. See [Chapter 19 Complications of Labor and Birth](#) for further information regarding oxytocin.

Misoprostol

Misoprostol (Cytotec) is a prostaglandin used for cervical ripening or labor induction. It is also used to treat PPH because it induces uterine contractions. The usual dose for PPH is 600 to 1,000 mcg orally, rectally, or sublingually (ACOG, 2017). Even though it is a prostaglandin, misoprostol does not cause reactive airway constriction or an asthma flare. It can be given to persons with hypertension. Therefore, it is a safe prostaglandin to be administered to most postpartum persons. Misoprostol can, however, cause nausea, vomiting, diarrhea, chills, some rise in blood pressure, and fever. These symptoms are not severe and resolve over several hours.

Methylergonovine

Methylergonovine (Methergine) is also a uterotonic. It produces sustained uterine contractions to help treat PPH. It is the only uterotonic that causes sustained versus rhythmic contractions. The usual dose is 0.2 mg IM for early PPH (ACOG, 2017). It should not be given IV. It should also not be given to persons with hypertension or preeclampsia. Methylergonovine can be used for late PPH and subinvolution, but it is administered orally for several days. The side effects of methylergonovine include nausea, vomiting, and hypertension.

Carboprost

Carboprost (Hemabate) is a strong prostaglandin that induces uterine contractions. The usual dose is 250 mcg IM (ACOG, 2017). It can also be administered into the muscle of the uterus by the health-care provider in a severe case of PPH. Carboprost has serious side effects, and the nurse should inform the postpartum person that the following side effects may occur: nausea, vomiting, fever, diarrhea, chills, and bronchospasm. The nurse may medicate the person with an antipyretic and antidiarrheal, as prescribed, to possibly prevent these side effects. Carboprost should not be given to a person with asthma due to its bronchospasm side effect.

Tranexamic Acid

Tranexamic acid, or TXA (Cyklokapron), is an antifibrinolytic that can reduce mortality from PPH by reducing complications from the clotting cascade (ACOG, 2017). TXA blocks the breakdown of clots; prevents bleeding complications, such as DIC; and has very few side effects. The usual dose is 1 g in 100 mL of IV fluid administered over 10 minutes. It should be given within 3 hours of birth and is prescribed in conjunction with a uterotonic.

Intrauterine Tamponade

When PPH continues despite uterotonic administration and bimanual massage, compression of the uterus through bimanual compression or intrauterine tamponade may be the next intervention; the uterine tamponade system is inserted by the health-care provider (ACOG, 2017). Two systems of intrauterine tamponade are available in the United States, the Bakri Balloon and the Jada System. If neither is available, some health-care providers will pack the uterus with gauze. The Bakri Balloon is designed to be used as a tamponade during a PPH ([Figure 21.6](#)). The balloon is placed in the uterus and inflated by the health-care provider. Acting as a tamponade, the balloon compresses the inside of the uterus to stop the bleeding.

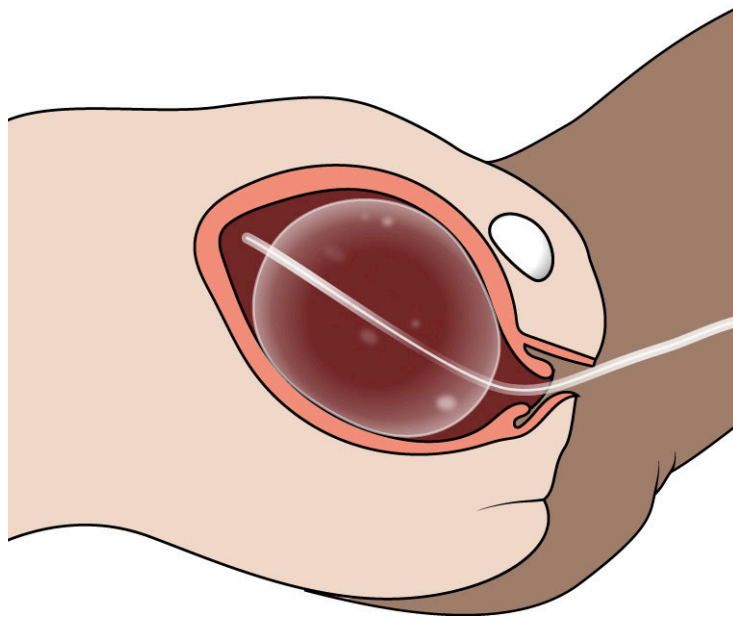


FIGURE 21.6 Bakri Balloon The Bakri Balloon is used as a tamponade in the uterus during a PPH. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

LINK TO LEARNING

This video from Cook Medical, the manufacturer of the [Bakri \(https://openstax.org/r/77bakriballoon\)](https://openstax.org/r/77bakriballoon) balloon, explains how it is inserted.

The Jada System is a device that uses an intrauterine vacuum to contract the uterus around the device to stop the bleeding. It is also placed by a health-care provider. The system is then connected to a vacuum device or wall suction ([Figure 21.7](#)).

LINK TO LEARNING

This video from [Jada \(https://openstax.org/r/77JadaSystem\)](https://openstax.org/r/77JadaSystem) explains how the system is inserted and how it works.

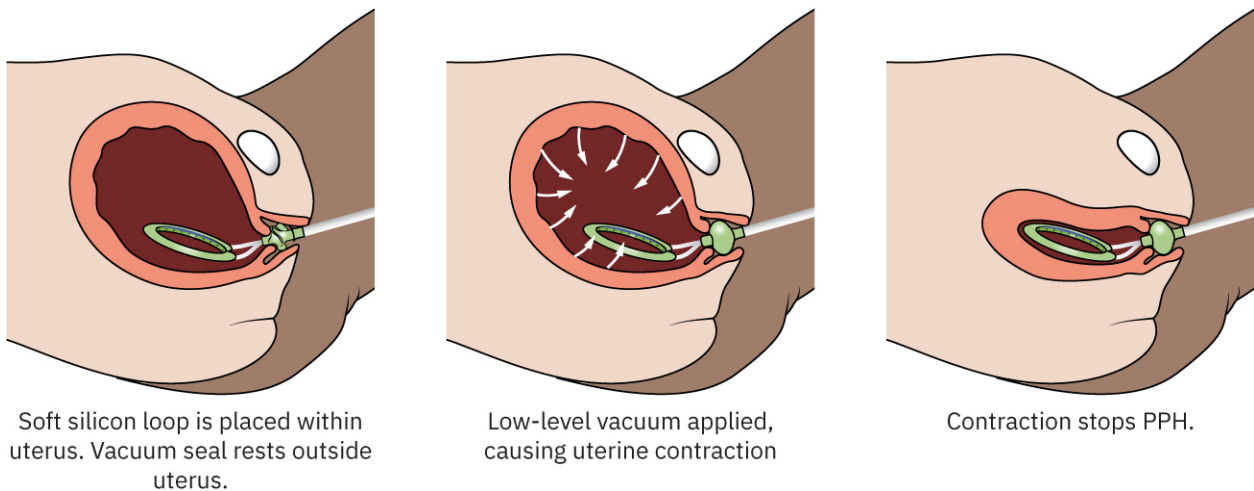


FIGURE 21.7 Jada System for Intrauterine Tamponade The Jada System is inserted by the health-care provider to treat PPH by causing the uterus to contract around the device to stop the uterus from bleeding. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Hysterectomy

Hysterectomy is the last procedure if all other interventions to control a PPH have failed. The uterus is removed, and the blood vessels feeding the uterus are tied off and cauterized. Because the uterus is removed, a hysterectomy results in permanent sterilization (Kallianidis et al., 2021). The risk of surgical complications is increased, including infection, further blood loss, bladder and ureteral injuries, and damage to the bowel. The postpartum person will need a great amount of emotional support from the nurse after an unexpected hysterectomy. The nurse will provide postsurgical care and education, including encouragement of ambulation, teaching about signs of infection of the incision, pain control, and help with breast-feeding to avoid pain from the surgical site.

Nursing Assessment and Diagnosis

Nursing assessment for PPH begins by determining risk factors prior to birth. Several tools have been developed to measure a postpartum person's risk for PPH (Lagrew et al., 2022). Assessment for PPH continues until discharge. The nurse will watch for bladder distention that could cause uterine atony and assist the patient in emptying the bladder in those cases. The nurse encourages the patient to void frequently (every 2 hours), performs QBL throughout the postpartum hospitalization, monitors vital signs for symptoms of hypovolemia, performs fundal assessment of the tone of the uterus and massages the fundus when needed, and assesses the perineum for signs of hematoma (Elsevier, 2024). When caring for a patient who had a cesarean birth, the nurse assesses the abdomen and incision for bleeding. Nursing diagnoses made according to these assessments include fluid volume deficit, impaired tissue perfusion, and risk for excessive bleeding.

Fluid Volume Deficit

Postpartum hemorrhage causes the postpartum person to have a deficiency in fluid volume. The nurse will assess for signs of dehydration (increased thirst, weakness, tachycardia, decreased urine output). The nurse will administer a rapid bolus of IV fluids or a blood transfusion to replace the lost fluid volume as prescribed by the health-care provider. When a blood transfusion is ordered, the nurse will also monitor for signs of a transfusion reaction and fluid overload. Urine output is monitored and should be at least 30 mL/hr. If the person does not have an indwelling urinary catheter, the nurse may insert one to monitor output more closely, when ordered.

Impaired Tissue Perfusion

The nurse will monitor capillary refill and oxygen saturation to assess for decreased tissue perfusion. During a PPH, the vessels of the extremities contract to shunt blood to the lungs, heart, and brain. Therefore, peripheral perfusion is decreased. A warm blanket is wrapped around the person to keep the body and extremities warm. The nurse positions the person with elevated legs and keeps the person on bed rest. Supplemental oxygen can be administered and titrated based on the oxygen saturation, as prescribed.

Risk for Excessive Bleeding

The nurse assesses for signs of excessive bleeding from the uterus, incision, and potential sites of hematomas. The nurse also assesses for cues that bleeding continues to be excessive. These cues include worsening vital signs, change in neurologic status, shortness of breath, pallor, and soaking a peripad in less than 1 hour. Lab results (CBC and clotting studies) are monitored often. Fundal assessment and massage are performed frequently to ensure the uterus continues to stay contracted (firm).

UNFOLDING CASE STUDY

Labor and Delivery: Part 3

See [Labor and Delivery: Part 2](#) for a review of the patient data.

After 20 hours of labor, Brianne had a vaginal delivery of a male infant with mild shoulder dystocia (shoulders delivered within 30 seconds). Infant birth weight is 3,995 g. Placenta delivered spontaneously and intact by inspection. A second-degree vaginal laceration was repaired. Quantitative blood loss is 450 mL. The postpartum admitting nurse received the past medical history during the SBAR (situation, background, assessment, and recommendation tool) from the labor and birth unit.

Past medical history	36 years old, G1 P1 Allergy to penicillin A negative, antibody screen negative Rubella nonimmune Negative tests for STIs at initial prenatal visit and 36 weeks' gestation GBS positive and treated during labor Gestational diabetes diagnosed at 26 weeks Husband, Trey, present for labor and birth, very supportive	
Nursing notes	Postpartum Admission Assessment	
	Postpartum Data	Data Obtained at Admission to the Floor
	Maternal BP	128/84
	Maternal TPR	99.6°F, 88, 18
	Pain/location	2/perineal
	Breasts	Soft/nipples intact
	Location of fundus	Midline/2 finger breadths below umbilicus
	Consistency of fundus	Firm
	Color of lochia	Rubra
	Amount of lochia	Moderate
	Abnormal odor to lochia	Absent
	Labial edema	Present
	Laceration	Intact
	Perineum	Soft, no bruising

Flowchart	Vital Signs Admission to L&B Unit BP 128/74; Temp 98.2 (F), Pulse 84, Resp 18 10 hours after admission 120/64; 98.4°F, 76, 20 14 hours after admission 124/68; 99.8°F, 80, 20 1 hour after birth 118/68; 99.4°F, 84, 18
Provider's orders	Transfer to mother/baby unit IV 1,000 mL LR with 20 units oxytocin (Pitocin) at 125 mL/hr May discontinue IV fluids when patient is tolerating regular diet and voiding without difficulty Regular diet Continue pad count to monitor cumulative QBL (quantitative blood loss) Ice pack to perineum for 24 hours Ibuprofen 600 mg po every 6 hours prn pain May get out of bed and shower with assistance when stable and has recovered from epidural RhoGAM workup if Rh negative Administer rubella vaccine before discharge if nonimmune

1. The nurse assesses the patient 2 hours after admission to the mother/baby unit.

Postpartum Data	Current Data
Maternal BP	124/64
Maternal TPR	99.4 °F, 92, 20
Pain/location	4/uterine cramping
Breasts	Soft/nipples intact
Location of fundus	Deviated to right/2 finger breadths above umbilicus
Consistency of fundus	Boggy
Color of lochia	Rubra
Amount of lochia	Saturated peripad and passed two walnut-sized clots
Abnormal odor to lochia	absent
Labial edema	present
Laceration	intact
Perineum	soft, no bruising

What are the **priority** nursing actions at this time? Select three that apply.

- a. Administer ibuprofen 600 mg po now.
- b. Discuss the purpose of Rho(D) immune globulin.
- c. Insert a Foley catheter to empty the bladder.
- d. Educate the patient on signs and symptoms of preeclampsia.
- e. Determine the patient's QBL.
- f. Educate the patient on the importance of ice to the perineum for the first 24 hours.
- g. Massage the patient's uterus.
- h. Assist the patient to the bathroom to void.

2. The nurse performs the priority nursing actions and obtains new patient data on Brianne. Identify if the new patient data demonstrate that nursing actions were effective, unchanged, or ineffective.

Patient Data	Data Obtained prior to Nursing Actions	New Patient Data after Nursing Actions	Effective, Ineffective, or Unchanged
Pain/ location	5/uterine cramping	2/uterine cramping	a. effective b. ineffective c. unchanged
Location of fundus	Deviated to right/2 finger breaths above umbilicus	Midline/at the umbilicus	a. effective b. ineffective c. unchanged
Consistency of fundus	Boggy	Firm	a. effective b. ineffective c. unchanged
Color of lochia	Rubra	Rubra	a. effective b. ineffective c. unchanged
Amount of lochia	Saturated peripad and passed two walnut-sized clots	Saturated ¼ of the peripad	a. effective b. ineffective c. unchanged
Laceration	Intact	Intact	a. effective b. ineffective c. unchanged
Perineum	Soft, no bruising	Soft, no bruising	a. effective b. ineffective c. unchanged

21.3 Breasts and Breast-Feeding

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Explain the difficulties a person learning to breast-feed may experience
- Provide education for a person attempting to breast-feed a preterm neonate

Breast-feeding persons are taught to wear supportive bras, feed newborns on demand, ensure a good latch, and air-

dry nipples. Breast-feeding can be complicated because the breast-feeding person and the newborn must work together to ensure a good latch, empty the breast, and stimulate the breasts to make more milk. The nurse provides support and education to help breast-feeding proceed without difficulties. When difficulties do arise, the nurse develops interventions to help overcome them to promote a successful breast-feeding relationship.

Breast-Feeding Difficulties

Breast-feeding difficulties can occur at the initiation of breast-feeding or later in the postpartum period. Ineffective latch can be corrected by the nurse or lactation consultant. Cracked and sore nipples are most often the consequence of an ineffective latch. Breast engorgement usually occurs on postpartum day 3 to 5 (ACOG, 2022). Inadequate supply can occur anytime during the breast-feeding relationship. Once the person and infant are discharged home, community resources are available to assist in breast-feeding, such as lactation consultants, La Leche League, and WIC.

Ineffective Latch

To transfer milk, the infant must have an effective latch. Signs of a good latch include the nipple feeling comfortable and pain free, the infant's chest being against the breast-feeding person's chest, the infant's head being straight and not turned to the side, and the infant's mouth being wide prior to latching. The areola, not just the nipple, should be in the infant's mouth. The nurse encourages the person to try to relax and deep breathe. Signs of an inadequate latch include painful, cracked nipples; nipples shaped irregularly after nursing; and lack of emptying of the breast. If the ineffective latch continues, the person will eventually have inadequate milk supply (Griffin et al., 2022).

The LATCH screen (shown in [Table 21.1](#)) helps the nurse determine if the infant is getting a good latch to avoid nipple trauma and inadequate supply. The higher the score on the LATCH screen, the better the latch.

Score	0	1	2
Latch	Sleepy, no latch	Holds nipple in mouth, sucks only when stimulated	Holds nipple and areola in mouth, tongue below nipple, lips flanged, sucks rhythmically
Audible swallowing	None	Rarely when sucking	Frequently when sucking
Type of nipple	Inverted	Flat	Everted
Comfort	Severe pain with sucking Cracked, bruised, or bleeding nipples Blisters on nipples	Moderate pain with sucking Nipples reddened, bruised or blisters present	No pain with sucking Nipples intact
Hold	Requires assistance to position and maintain hold of baby	Minimal assistance needed to position or hold baby	Patient able to correctly position and hold baby

TABLE 21.1 Determining the LATCH Score When Breast-Feeding



LINK TO LEARNING

This website from [Health for Under 5s \(https://openstax.org/r/77HealthUnder5\)](https://openstax.org/r/77HealthUnder5) provides information, photos, and a video that explain and demonstrate an effective latch for breast-feeding.

Cracked, Sore Nipples

Nipples can become very sore and cracked as the dyad of the breast-feeding person and newborn are learning to breast-feed. The best prevention is ensuring a good latch. Treatment for cracked nipples can be air-drying after nursing, applying nipple ointment, using breast milk on the nipple, and using nipple shells to keep the nipple from brushing against the bra (Coentro et al., 2021).

CLINICAL JUDGMENT MEASUREMENT MODEL

Take Action: Ensuring a Good Latch

The nurse can educate and provide help to the breast-feeding person to ensure a good latch is achieved. The nurse provides the following education to the patient.

1. Squeeze the breast like a hamburger or sandwich to reduce the size of the breast and make the nipple small enough for your baby's mouth.
2. Touch the baby's nose or upper lip with your nipple.
3. Allow the baby to open the mouth wide.
4. Place the nipple inside the mouth, pointing to the roof of the baby's mouth.
5. Make sure the baby's head is free to move back and forth.
6. To unlatch the baby, use your pinky finger to break the seal on the baby's mouth prior to removing the baby from the breast.

Engorgement

When the breast becomes very full of milk, it is called engorgement. It usually occurs when the colostrum transitions into mature milk. However, engorgement can occur at any time during the breast-feeding relationship, especially if feedings are skipped. Symptoms of engorgement include firm, swollen, hard, painful breasts. The breast might feel warm and look shiny from swelling. The nipple can become flat from the engorgement. To relieve pressure and pain, the breast-feeding person can apply a warm compress or get into a warm shower and hand express enough milk to allow the nipple to protrude and the breast to soften. The nurse explains that the newborn will have difficulty latching if the nipple is flat and the breasts are full. The patient can also apply a cool compress for 5 to 10 minutes between feedings to decrease inflammation, and can take NSAIDs for pain relief. The nurse also explains that the person should not pump or express to empty the breast, as that will increase milk production and engorgement (Mitoulas & Riccardo, 2022).

Inadequate Supply

Many breast-feeding persons are concerned with inadequate milk supply. Signs of adequate milk supply include breasts feeling softer as the baby nurses, appropriate numbers of wet and dirty diapers, and appropriate infant weight gain (see [Chapter 24 Care of the Typical Newborn](#)). If the health-care provider is concerned about inadequate milk supply, the nurse can encourage the breast-feeding person to nurse every time the baby is hungry, being sure to nurse every 2 to 3 hours (or 8 to 12 times per day) (CDC, 2023a). The nurse will evaluate the latch to ensure the newborn is deep enough on the areola to drain the breast. Recommend avoiding bottles and pacifiers. The nurse encourages the person to get plenty of rest, eat a good diet, drink plenty of liquids, and keep the newborn skin-to-skin as much as possible. The breast-feeding person can also pump between feedings to stimulate the breast to make more milk.

Breast-Feeding a Preterm Neonate

Breast milk is essential for the health of the premature infant. Breast milk helps prevent infections, is easy to digest, and protects against necrotizing enterocolitis. However, premature infants may not be able to breast-feed after birth. Normal suck and swallow coordination does not mature until 34 to 36 weeks' gestation. To stimulate and maintain the milk supply until the infant can breast-feed, the breast-feeding person should attempt to empty the breasts every 2 to 3 hours. The nurse can help the postpartum person hand express into a cup. The nurse reassures the person that the colostrum, while not large in amount, is the perfect amount for the newborn. If the newborn needs more milk, donor milk might be provided. Donor milk is milk that is provided to milk banks and then pasteurized. Donor milk protects preterm infants by decreasing the risk for necrotizing enterocolitis (inflammation of the intestine leading to necrosis) (Tran et al., 2020). Once the mature milk is present, the breast-feeding person can

pump and provide milk to the newborn. As the premature infant grows, the nurse will assist the breast-feeding person to latch and nurse the baby.



LINK TO LEARNING

The [Human Milk Bank \(https://openstax.org/r/77HumanMilkBank\)](https://openstax.org/r/77HumanMilkBank) offers information and resources about milk banks, which provide donor milk that is used by preterm or low birth weight infants when breast-feeding is not available.

While the infant is in the neonatal intensive care unit (NICU), the pumped milk can be given to the newborn in different ways. Milk can be given through a feeding tube until the newborn is strong enough to suck. Once the newborn is able to suck, the newborn can attempt to nurse. Sometimes, the newborn will start to feed on the breast, and then the nurse will gavage-feed the newborn if they become too tired while sucking. The newborn can remain skin-to-skin with a parent during tube-feeding and bottle-feeding to allow for bonding and to stimulate the breasts to increase milk supply. The NICU nurse works with the family to balance quiet time with feeding time.



REAL RN STORIES

Nurse: Patricia, BSN, RN

Years in Practice: 4

Clinical Setting: Mother/baby unit

Geographic Location: Georgia

In my facility, the lactation consultant was not available to assist with breast-feeding twenty-four hours a day. The night nurses on the mother/baby unit were expected to provide lactation assistance. I remember this one newborn who was latching on one breast but was refusing to latch on the other. The birthing person was becoming frustrated. She would be going back to the mission in remote Guatemala to be with the rest of her family within the next four to six weeks, and it was important for breast-feeding and the milk supply to be established. I noticed when I was doing the shift assessment on the newborn that he had a very prominent tonic neck reflex with his head facing the left. The newborn latched on well to the right breast using the traditional cradle hold. I suggested the birthing person use the clutch hold when switching the baby to the left breast at the next feeding. When I performed my next rounds and walked into the room, she was smiling because the newborn was latched on and nursing well on the left breast using the clutch hold.

21.4 Cesarean Birth Discomforts

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Describe the postpartum recovery after a cesarean birth
- Plan the nursing education provided to a postpartum person who experienced a cesarean birth before being discharged home

Postpartum recovery after a cesarean birth includes many of the same assessments as a vaginal birth and postoperative surgeries. Vital signs, breasts, location and tone of the fundus, lochia, extremities, and level of pain are all assessed. Additional assessments of the postpartum person after a cesarean birth include the dressing over the incision for the first 24 hours and the incision itself after that, nausea and vomiting and abdomen, deep vein thrombosis (DVT), mobility, and the lungs for signs of infiltrates if general anesthesia was used. Pain and discomfort will be increased in persons after a cesarean birth.

Discomforts Related to Cesarean Births

The nurse recognizes certain discomforts related to cesarean birth, such as abdominal pain, incision pain, increased constipation and gas, and difficulty with ambulation. Education provided to the postpartum person includes education on and remedies for these discomforts. The nurse encourages ambulation, pain management prior to the

pain becoming extreme, eating a healthy diet, and asking for help with activities of daily living.



CULTURAL CONTEXT

Culture, Breast-Feeding, and Cesarean Birth

The breast-feeding rates in China show a 6-month exclusive rate of only 27.8 percent. Chinese people with a history of cesarean birth have even lower rates of breast-feeding at 6 months. Hu et al. (2020) found that people in China having a cesarean birth had a decreased willingness to breast-feed and more difficulty in breast-feeding than those having a vaginal birth. Because the cesarean rate in China increased to 35.9 percent, educating people about the importance of breast-feeding is essential. In this study, patients scheduled for cesarean section were provided additional breast-feeding education during their postpartum stay. Results showed the intervention group had higher breast-feeding rates up to 4 months postpartum, fewer cracked nipples, and fewer reports of insufficient milk supply. Education made a significant difference to the persons and infants in this study.

(Hu et al., 2020)

Gas Pain

Gas pain is common after a cesarean birth. Anesthetics used during surgery slow the bowels and decrease peristalsis. This leads to constipation and difficulty in passing gas. Also, opening of the peritoneum during surgery allows air to become trapped in the abdomen. That air must be absorbed and released as flatulence. The nurse encourages early and frequent ambulation and avoidance of extremely cold liquids to help release gas. Simethicone is often prescribed to relieve gas pain by aiding in gas release (Elsevier, 2024).

Incisional Pain

Pain related to cesarean birth is mostly incisional pain. As in any surgery, postpartum persons will feel increased incisional pain with movement, coughing, and ambulation. When coughing, the person is encouraged to splint the incision by placing a pillow over the lower abdomen to decrease pain (Figure 21.8). The nurse also encourages the person to ambulate slowly and to splint the incision when getting in and out of bed. Some health-care providers will order an abdominal binder to act as a splint.



(a)



(b)

FIGURE 21.8 Managing Incision Pain after Cesarean Birth (a) Splinting the incision with a pillow helps to reduce the incisional discomfort when coughing and deep breathing or moving after a cesarean birth. (b) Instructing the postpartum patient in how to get in and out of bed helps to decrease incisional discomfort after a cesarean birth. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Pain medication will be ordered by the health-care provider. The nurse will assess pain frequently and administer medications as needed. A morphine injection (Duramorph) may be used if spinal anesthesia was administered for a cesarean birth. A patient-controlled analgesia pump may be used, which slowly administers pain medication and allows the patient to give themselves a bolus when pain is intense. Some health-care providers will insert a catheter into the incision. The catheter is connected to a pain ball pump that administers a steady flow of pain medication directly to the incision to control pain. [Figure 21.9](#) shows a pain pump used after cesarean birth.

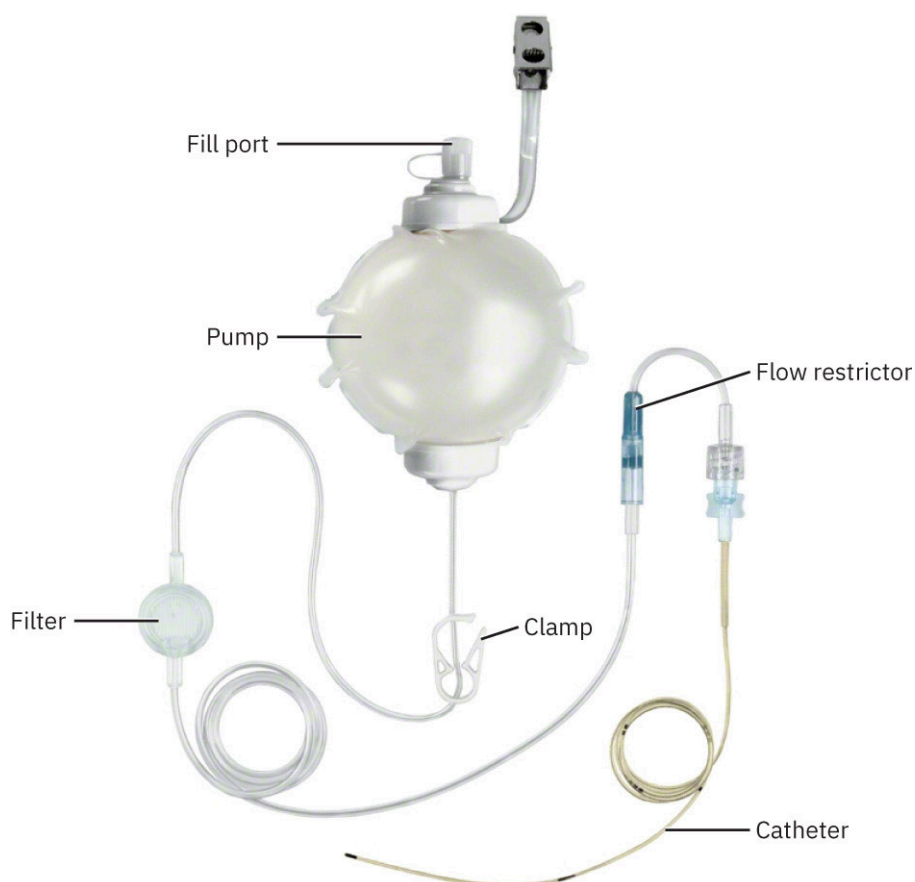


FIGURE 21.9 Pain Pump The pain pump catheter is threaded along the incision to slowly release pain medication to reduce incision pain. (credit: "ON-Q® PainBuster®" by unknown/Braun, Public Domain)

Sleep Difficulties

Sleep can be difficult after a cesarean birth because of incisional and gas pain. The postpartum person experiences pain at the incision while turning or moving. This can disrupt sleep. Breast-feeding or holding the newborn can also cause incisional pain and difficulty in sleeping. The nurse encourages relaxation techniques, deep breathing, and relaxation imagery to help the person release stress prior to sleeping. The nurse assesses pain and provides pain medications prior to pain becoming severe and interfering with sleep (Elsevier, 2024). The nurse can cluster assessments and interventions to decrease the number of sleep interruptions. They can also encourage the patient to take naps and ask the family to limit interruptions.

Incisional Healing

Incisions from cesarean births heal differently, depending on the type of incision. The majority of cesarean births involve low, transverse incisions. These incisions heal faster with less pain than vertical incisions. For incisions closed with staples, the staples will be removed several days after the surgery. Other incisions are closed with suture that is dissolvable and will not need removal of stitches. Still other incisions are closed using surgical glue. Almost all cesarean birth incisions are covered with a dressing immediately after surgery. The dressing most often is removed the next day to allow for airflow to the incision. The nurse assesses the incision and instructs the postpartum patient to keep the incision clean and dry.

Restrictions Related to Surgery

After surgery, ambulation is encouraged. Exercise, however, is restricted until the patient is seen by the health-care provider at the 6-week postpartum checkup. The nurse discourages lots of stair climbing and housework. Sexual intercourse is restricted with a cesarean birth until the patient is seen for follow-up. While persons are taking pain medications, driving a car is restricted (Elsevier, 2024).

When to Follow Up

Postpartum follow-up will be determined by the health-care provider, if complications occur, and if staples need

removing. For staple removal, the person is usually seen within the first few days after discharge. Otherwise, persons are usually seen in the office between 2 and 6 weeks to evaluate the incision, screen for postpartum depression, discuss contraception, and perform a postpartum assessment. In addition, some health-care providers see the person for follow-up again between 10 and 12 weeks for an annual gynecologic exam.

Nursing Education for the Birthing Person Experiencing a Cesarean Birth

For persons experiencing a cesarean birth, the nurse provides routine postpartum education, education on pain medications, along with education on restrictions and recommendations related to the procedure.

Opioid Medication

Opioid medication causes drowsiness and sleepiness. The nurse encourages the postpartum patient to rest and focus on caring for themselves and the newborn. The nurse explains that while taking opioid pain medications, the postpartum person should not drive a car. Driving is safe once the person has transitioned to only acetaminophen or ibuprofen.

Lifting Restrictions

Lifting is restricted to the weight of the newborn for the first 6 weeks postpartum. Persons are discouraged from lifting older children. The nurse encourages the family to assist the older child to sit next to the postpartum person in a chair or on the couch.

Importance of Fluids

Increased water intake helps to increase breast milk and prevent dehydration. Persons experiencing a cesarean birth are at higher risk for blood clots. Dehydration can increase that risk even more.

Pillow on the Lap

The person can use a pillow or an abdominal binder to splint the incision while moving or getting out of bed. The pillow can also be used to assist in holding the newborn. When the person coughs or sneezes, the pillow is also used for splinting to prevent pain (see [Figure 21.8](#)).

Football Hold for Breast-Feeding

Breast-feeding can be painful if the newborn is held against the incision. The nurse will demonstrate different ways to hold the newborn while nursing. Football hold allows the newborn to avoid contact with the incision but still nurse with a good latch. The newborn is held to the person's side supported by pillows. The hand supports the baby's head and turns the baby to face the breast ([Figure 21.10](#)).



FIGURE 21.10 Breast-Feeding Position to Minimize Cesarean Incision Pain This illustration shows a postpartum person using the football, or clutch hold, when nursing. Note how a pillow under the newborn assists in bringing the newborn to the breast for a better latch and also provides a cushion to keep the newborn away from direct contact with the abdominal incision after a cesarean birth. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Importance of Ambulating

Ambulation after cesarean section is important for several reasons. Ambulation keeps the blood moving in the extremities helping to prevent venous stasis and DVTs. Ambulation aids in relieving gas pain and preventing constipation in the postpartum person. Ambulation also aids in recovery by increasing circulation and helping to decrease edema.

21.5 Postpartum Mood Disorders and Psychiatric Disorders

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Compare and contrast postpartum depression and baby blues
- Summarize the signs and symptoms a postpartum person might experience related to postpartum psychiatric disorders
- Develop a nursing care plan that reflects knowledge of current clinical therapy and nursing and preventive management for the person experiencing a postpartum psychiatric disorder

The postpartum period can be an exciting time of change and adaptation. For some patients, however, change can trigger alterations in psychosocial functioning and coping. Lack of sleep, pain, feelings of being overwhelmed, and changing hormone levels in the postpartum patient can cause baby blues. If these symptoms do not resolve, postpartum depression (PPD) can occur. Postpartum nurses assess for baby blues and PPD. Nursing interventions are aimed at prevention and care of these psychologic changes.

Baby Blues versus Depression

The baby blues are described as an adjustment disorder (Alba, 2021); symptoms include anxiety, irritability, crying, and insomnia. Baby blues occur more often in first births, generally beginning on postpartum day 2 or 3. A distinguishing factor between postpartum blues and postpartum depression (PPD) is that PPD lasts for at least 14 days (Gałęziowska et al., 2021). Furthermore, PPD is debilitating and causes extreme sadness, anxiety, hopelessness, and inability to perform simple tasks. PPD also causes issues with bonding and attachment with the newborn.

Risk Factors for Postpartum Depression and Anxiety

The nurse evaluates for risk factors of postpartum psychiatric disorders, such as a history of psychologic disorders before and during pregnancy, history of previous PPD or postpartum psychosis (PPP), a sick infant in the NICU, birth complications, and lack of support. [Table 21.2](#) lists other risk factors for depression during pregnancy and postpartum.

Timing	Risk Factors
During pregnancy	Maternal anxiety History of depression Lack of social support Life stress Unintended pregnancy Medicaid insurance Intimate partner violence Child abuse Lower income Lower education Smoking Single status Poor relationship quality
During postpartum	Depression during pregnancy Anxiety during pregnancy Experiencing stressful life events during pregnancy or the early postpartum period Traumatic birth experience Preterm birth/infant admission to neonatal intensive care Low levels of social support Previous history of depression Breast-feeding problems

TABLE 21.2 Risk Factors for Depression during Pregnancy and Postpartum (ACOG, 2018)

Postpartum Psychosis

The mood disorder that occurs suddenly and can be very dangerous, with symptoms occurring within a few hours to weeks after birth, is **postpartum psychosis (PPP)**. PPP is characterized by delusional thinking, hallucinations, and other psychotic symptoms (Alba, 2021). Other symptoms are manic elation, deep anxiety and depression, fear, and guilt (Alba, 2021). PPP is considered an emergency because paranoid thoughts can lead to homicide, infanticide, or suicide. The incidence of PPP is 0.89 to 2.6 per 1,000 births worldwide (Forde et al., 2020). When patients progress from PPD to PPP, some persons are admitted to inpatient recovery facilities to aid in safe, faster recovery.

Impact of Postpartum Depression and Anxiety on the Family

Postpartum psychiatric disorders cause the person who gave birth to feel immense loss, fear, and guilt. They have difficulty in bonding with the infant, which can have long-term behavioral and developmental effects on the newborn. Infants have breast-feeding difficulties, sleep problems, and potentially failure to thrive (Alba, 2021). Partners are also affected by postpartum psychiatric disorders and are at increased risk of developing depression and anxiety when the postpartum person experiences PPD. Partners can feel teary, stressed, sleep deprived, and experience lack of concentration and ability to support the family. The partner relationship can suffer from these disorders as well.

Maternal Morbidity and Mortality

According to the Centers for Disease Control and Prevention (CDC), the prevalence of postpartum depression in the United States ranges from 9.7 percent to 23.5 percent, with an average of 13.2 percent. (Bauman et al., 2020). Campbell et al. (2021) noted that approximately 20 percent of postpartum deaths are attributed to suicide associated with peripartum depression or psychosis. This study reveals that underlying depression is the major risk factor for increased suicidal ideation and attempts. Campbell et al. (2021) also note that Maternal Mortality Review Committees, local and state committees that review deaths associated with pregnancy and postpartum, have brought awareness to suicide. The study also found that intimate partner violence was an increased risk factor for maternal suicide and depression.

Depression Screening throughout Pregnancy and Postpartum

The American College of Obstetricians and Gynecologists (ACOG, 2018) recommends screening for perinatal depression at least once during the prenatal and postpartum periods using a validated tool. Several validated tools are available for use. The most common PPD screening tool is the Edinburgh Postnatal Depression Scale (EPDS). In pregnant and postpartum persons with current depression or anxiety, it is recommended to monitor closely for suicidal thoughts and psychosis. Health-care providers should initiate therapy and referrals for positive screens.

During the postpartum period, the nurse reviews the person's history for current depression or anxiety, notes any antidepressants the person is taking, as well as any previous history of PPD or PPP. Nurses utilize screening tools to assess for PPD. Positive screens are reported to the health-care provider for further evaluation and treatment (Lui & Yang, 2021). The nurse also informs the postpartum person that their pediatrician will screen for PPD at their well-infant visits.



LINK TO LEARNING

The [Edinburgh Postnatal Depression Scale \(EPDS\)](https://openstax.org/r/77PPDDepresScle) (<https://openstax.org/r/77PPDDepresScle>) is one tool used to detect PPD.

Medications throughout Pregnancy

Medications used to treat depression and some anxiety disorders usually consist of selective serotonin reuptake inhibitors (SSRIs). Yue et al. (2023) noted that SSRIs are prescribed at a lower rate for pregnant persons than for nonpregnant persons. They attributed this discrepancy to the perception of patients or health-care providers that medications for mental illness cause fetal harm. Some health-care providers will decrease the dose or wean the patient off SSRIs during pregnancy because of this perception. Studies have shown that persons who stop antidepressants during pregnancy have a 68 percent chance of major depression returning (Yue et al., 2023). A suggestion made by researchers is that health-care providers should make decisions on the use of SSRIs on an individual basis because not enough evidence is available to determine safety or harm to the fetus from antidepressant use (Besag & Vasey, 2023).

For postpartum persons, the most common medications for PPD are sertraline (Zoloft), fluoxetine (Prozac), paroxetine (Paxil), and citalopram (Celexa) (Kaufman et al., 2022). Newer medications for PPD include two neuroactive steroids: zuranolone (Zurzuave), an oral medication used for 14 days, and brexanolone (Zulresso), an IV medication given over 60 hours. All medications pass through breast milk; however, the benefits of these medications outweigh the risk for breast-feeding. Other treatments for PPD include **cognitive behavioral therapy (CBT)**, an evidence-based therapy that helps people change their thinking patterns; acupuncture; and hormonal supplementation. Again, it is recommended for health-care providers to treat postpartum persons individually due to the lack of research on the efficacy and safety of antidepressants and their effects on breast-feeding and PPD.

Rebalancing of Hormones and Adjusting to the New Family

Rapid changes in estrogen, progesterone, and prolactin levels occur immediately after birth. This rapid change is the cause of some cases of PPD. Medications have been introduced to provide a gentler decrease in estrogen and progesterone. Adjusting to a new family dynamic is another common cause of psychosocial disturbance for postpartum persons. They must adjust to their new role, as must the other members of the family. Cognitive behavioral therapy can help the family talk through their concerns and fears to help make those adjustments easier.

Nursing Care Plan for the Person Experiencing Postpartum Psychiatric Disorders

Treatment for postpartum psychiatric disorders includes psychotherapy, medications, and social support. The nurse is in a unique position to assess the patient for signs of PPD and develop interventions to assist with treatment. Nurses can provide support and education and can help destigmatize PPD.

Nursing Assessment and Diagnosis

Nurses assess all postpartum persons for risk factors associated with PPD and perform a risk assessment, such as the EPDS. The nurse assesses the family's perception of the birth and any labor or birth complications. During routine assessments, the nurse evaluates for signs of PPD or lack of coping. The nurse assesses newborn bonding,

partner participation, social support, and family relationships throughout the postpartum period. When the nurse recognizes signs of PPD, the nurse diagnoses ineffective coping, impaired bonding, risk for impaired parenting, and risk for self-harm. When caring for the postpartum person with a history of psychiatric disorders, it is important for the nurse to discuss suicide and other harmful behaviors. The nurse can also provide information regarding help lines, such as the Substance Abuse and Mental Health Services Administration (SAMHSA) (1-800-662-4357) or the National Maternal Mental Health Hotline, which patients can call or text 1-833-TLC-MAMA (1-833-852-6262) for a free, confidential hotline in English and Spanish for pregnant persons and new parents, 24/7.

Nursing Plan and Implementation

The nurse describes the signs and symptoms of PPD and discusses any concerning symptoms with the patient and family. The nurse explains the difference between baby blues and PPD and lists reasons why the patient and/or family should call their health-care provider (Table 21.3). The nurse encourages the family to have a plan for support when the non-birthing partner returns to work or when family members return to out-of-town locations. Social services can be consulted if the family lacks support, either emotionally or financially. The nurse provides referrals to community resources when necessary.

Disorder	Symptoms	Treatment
Baby blues	• short-term drop in mood (2–3 days); should be over by 2 weeks • symptoms less severe • 80% of birthing persons affected • not associated with depression prior to pregnancy • mood swings from happy to sad • feel irritable, exhausted, overwhelmed, anxious • does not cause despair	• sleeping when the baby is sleeping • eating nutritious food • exercising, going for a walk • accepting help, not worrying about chores
Postpartum depression	• occurs longer than several days and can occur up to 1 year after birth • symptoms more severe • 10% of birthing persons affected • higher risk if depression occurred prior to pregnancy • anxiety or panic attacks • feel worthless, sad, alone; cannot eat, bond with the baby, or take care of the baby • feel an overwhelming despair	• counseling • medications • asking for help

TABLE 21.3 Differences between Baby Blues and Postpartum Depression

LINK TO LEARNING

Watch this [TEDx talk from Auburn Harrison \(https://openstax.org/r/77AuburnHarison\)](https://openstax.org/r/77AuburnHarison) that encourages society to talk about postpartum depression.

Summary

21.1 Postpartum Infections

Postpartum infections can occur with both vaginal and cesarean birth. The nurse assesses for signs of infection beginning in recovery directly after birth until discharge home. The nurse is aware that infection can progress quickly and cause morbidity and mortality. Education on prevention of infection is key and also begins in recovery and ends in discharge instructions.

21.2 Postpartum Hemorrhage

Postpartum hemorrhage is an emergency that is treated by a multidisciplinary team. The nurse is the first line in prevention of PPH by recognizing risk factors and close monitoring of uterine consistency and lochia, encouraging frequent voiding, and assessing the incision and perineum. Nurse monitoring often interrupts the postpartum person's ability to rest. When a PPH occurs, the nurse monitors vital signs, performs fundal massage, calls for additional assistance, and prepares for administration of medications or blood products. The nurse assesses for a full bladder, hematoma, boggy uterus, or trauma to the reproductive tract. With the nursing interventions directed at preventing and minimizing blood loss, the nurse assists in decreasing the morbidity and mortality related to postpartum hemorrhage.

21.3 Breasts and Breast-Feeding

Breast-feeding persons need emotional and physical support while learning to breast-feed, especially when difficulties arise. The nurse provides education, support, and treatment for these difficulties. The nurse ensures a good latch, treats cracked nipples, educates regarding engorgement and mastitis, and supports the person with an infant in the NICU. The nurse also provides lactation referrals and community resources for assistance with breast-feeding.

21.4 Cesarean Birth Discomforts

Nurses are aware of the discomforts related to recovery after a cesarean birth. The nurse educates the postpartum person on common discomforts and relief measures. The nurse demonstrates how to hold the newborn to prevent incision pain. The nurse also provides discharge instructions to promote healing and rest in the postpartum period.

21.5 Postpartum Mood Disorders and Psychiatric Disorders

The nurse assesses the postpartum person for signs and symptoms of PPD and PPP. Assessment for those disorders begins during pregnancy and continues through postpartum discharge. The difference between baby blues, PPD, and PPP are explained to the postpartum person. If signs of these disorders are recognized, the nurse notifies the health-care provider and social services to begin treatment prior to discharge home. The nurse helps to prevent PPD by providing support and anticipatory guidance on the many adaptations occurring during postpartum.

Key Terms

cognitive behavioral therapy evidence-based therapy that helps people change their thinking patterns

early PPH (also: **primary PPH**) hemorrhage that occurs after birth of the placenta up to 24 hours postpartum

late PPH (also: **secondary PPH**) hemorrhage that occurs after the first 24 hours up to 12 weeks postpartum

mastitis inflammation and/or infection of the breast

postpartum endometritis infection of the uterus in the first 6 weeks after birth

postpartum psychosis (PPP) mood disorder that occurs suddenly and can be very dangerous, with symptoms occurring within a few hours to weeks after birth; characterized by delusional thinking, hallucinations, and other psychotic symptoms

primary PPH (also: **early PPH**) hemorrhage that occurs after birth of the placenta up to 24 hours postpartum

quantitative blood loss (QBL) process of weighing and measuring the amount of blood loss during the birth and immediate postpartum period

secondary PPH (also: **late PPH**) hemorrhage that occurs after the first 24 hours up to 12 weeks postpartum

subinvolution inability of the postpartum uterus to return to its original size

Assessments

Review Questions

1. What postpartum infection is caused by STIs and chorioamnionitis?
 - a. mastitis
 - b. pneumonia
 - c. cesarean wound infection
 - d. postpartum endometritis
2. What postpartum infection can be transferred between the breast-feeding person and newborn if both are not treated appropriately?
 - a. wound infection
 - b. urinary tract infection
 - c. thrush
 - d. mastitis
3. What assessment finding suggests a possible infection?
 - a. painful fundal massage
 - b. breast-feeding every 2–3 hours
 - c. pulse 72
 - d. WBCs 10,000
4. What assessment data increases the risk of postpartum infection?
 - a. precipitous labor
 - b. urinary retention
 - c. breast-feeding
 - d. intact perineum
5. What nursing intervention does the nurse include in the plan of care for a person with mastitis?
 - a. Provide antipyretic.
 - b. Stop antibiotics when redness is resolved.
 - c. Encourage the person to stop breast-feeding.
 - d. Start an IV and prepare for signs of sepsis.
6. What nursing intervention does the nurse include in the plan of care for a person with a wound infection?
 - a. Reassure the postpartum person that infection will resolve without antibiotics.
 - b. Assess for REEDA.
 - c. Call health-care provider when temperature is 99.0° F.
 - d. Scrub the incision vigorously with soap and water.
7. What nursing intervention does the nurse include in the plan of care for a person with a perineal laceration infection?
 - a. Demonstrate the use of a urinary catheter.
 - b. Provide an abdominal binder.
 - c. Encourage use of the peri-bottle for cleaning front to back.
 - d. Discourage use of pain medications.
8. What nursing intervention does the nurse include in the plan of care for a person with postpartum endometritis?
 - a. Monitor for signs of sepsis.
 - b. Discourage breast-feeding.
 - c. Avoid fundal assessment.
 - d. Increase family visiting hours.

9. What is characteristic of an early (primary) PPH?
- occurs after 12 weeks postpartum
 - is not an emergency
 - often occurs due to uterine atony
 - is diagnosed after the person is discharged
10. What is characteristic of a late (secondary) PPH?
- occurs within the first 24 hours
 - is caused by subinvolution of the uterus
 - does not occur after cesarean births
 - cannot be treated with Methergine
11. When referring to the 4 T's of PPH, what does *tissue* refer to?
- Placental tissue or membranes are retained.
 - Tissue of the perineum is torn.
 - Tissue of the uterus is torn.
 - Tissue is not perfused.
12. What is a risk factor for uterine atony?
- small for gestational age
 - primipara
 - multiple gestation
 - intrauterine growth restriction
13. What is a risk factor for PPH found in the prenatal record?
- primipara
 - rubella nonimmune
 - von Willebrand disorder
 - history of appendectomy
14. The nurse notices the uterus is boggy and the bladder is full. What intervention should the nurse perform next?
- Call for help.
 - Start IV bolus.
 - Get the person out of bed to walk to restroom.
 - Massage the fundus and assess the lochia.
15. The nurse notices the person with a PPH looks pale and their capillary refill is >3 seconds. What intervention can the nurse initiate?
- Wrap the person in a warm blanket.
 - Put a pulse oximeter on the patient's finger.
 - Sit the person up at 90 degrees.
 - Start an IV bolus.
16. What assessment finding would indicate a fluid volume deficit?
- skin tenting with testing of skin turgor
 - hypertension
 - bradycardia
 - bounding pulse
17. What nursing diagnosis would be appropriate for the person with a coagulation disorder?
- risk for hypertension
 - risk for bleeding

- c. risk for fluid overload
 - d. risk for breast-feeding failure
- 18.** What is the most common reason for cracked, sore nipples?
- a. hungry infant
 - b. pumping
 - c. ineffective latch
 - d. lack of supportive bra
- 19.** What is a symptom of engorgement?
- a. protuberant nipples
 - b. shiny, hard breast
 - c. insufficient milk production
 - d. soft, lumpy breast
- 20.** The nurse develops a plan to increase a patient's milk supply. What is an intervention they can implement?
- a. Pump between nursing sessions.
 - b. Nurse every 6 hours.
 - c. Keep newborn in bassinet between sessions.
 - d. Offer a pacifier when newborn cries.
- 21.** The nurse educates the person with a newborn in the NICU. What guidance does the nurse provide?
- a. Breast milk is not good for a premature baby.
 - b. Premature babies breast-feed easily.
 - c. Skin-to-skin contact helps both baby and breast-feeding person.
 - d. A bottle is recommended for all feedings.
- 22.** What is one difference between recovery from a cesarean birth versus a vaginal birth?
- a. Breast-feeding is discouraged after cesarean birth due to pain medications taken.
 - b. Lochia will be heavier after a cesarean birth.
 - c. Pain with movement is more intense after a cesarean birth.
 - d. Gas pain is more intense after a vaginal birth.
- 23.** The nurse educates the person recovering from a cesarean birth on how to care for the incision. What education is discussed?
- a. Scrub the incision well twice daily.
 - b. Remove the dressing the day after birth.
 - c. Staples will be removed the day after birth.
 - d. Vertical incisions heal faster with less pain.
- 24.** Why does the nurse encourage ambulation in a patient who has experienced a cesarean birth?
- a. Ambulation helps to prevent DVT.
 - b. Ambulation causes the person to lose weight in the hospital.
 - c. Ambulation helps with breast-feeding.
 - d. Ambulation decreases peristalsis.
- 25.** What is a risk factor for PPD?
- a. vaginal birth
 - b. family support
 - c. traumatic birth
 - d. breast-feeding
- 26.** What symptom can partners of persons with PPD experience?

- a. depression
 - b. psychosis
 - c. bipolar disorder
 - d. mania
- 27.** What symptom differentiates baby blues from PPD?
- a. Baby blues last longer than 14 days.
 - b. Baby blues cause hallucinations.
 - c. Baby blues occur in the first few days of the postpartum period.
 - d. Baby blues are treated with inpatient therapy.
- 28.** What intervention by the nurse can help with PPD?
- a. encouraging the partner to let the postpartum person learn to take care of themselves
 - b. encouraging the family to have support available for the person and partner
 - c. telling the person not to breast-feed if taking antidepressants
 - d. keeping the newborn in the nursery most of the day and night
- 29.** What important assessment should the nurse perform on all postpartum persons?
- a. Screen for PPD with the EPDS.
 - b. Screen for drug use with a urine drug screen.
 - c. Screen for breast-feeding failure.
 - d. Screen for contraception contraindications.
- 30.** The nurse is taking the postpartum patient's vital signs. The newborn is across the room in the bassinet, and the postpartum person refuses to hold the newborn. What should the nurse do?
- a. Call CPS for risk of child abuse.
 - b. Ask the person if they are feeling depressed, hopeless, afraid, or overwhelmed.
 - c. Ask the health-care provider to order an antidepressant.
 - d. Discuss how good parents hold and talk to their newborns.

Check Your Understanding Questions

1. Describe the signs and symptoms of a postpartum UTI.
2. The nurse educates the postpartum person to wash their hands well after changing the newborn's diaper. What other education does the nurse provide to help prevent postpartum infection?
3. List the characteristics of secondary, or late, hemorrhage.
4. List the medications used to manage PPH and their side effects or contraindications.
5. Describe an ineffective latch.
6. List the additional nursing assessments that are performed for a person with a cesarean birth.
7. Describe the risk factors during pregnancy that could lead to postpartum depression.
8. Describe the difference between baby blues and PPD.
9. List three nursing diagnoses pertaining to postpartum psychiatric disorders.

Reflection Questions

1. Describe the discharge education the nurse will provide for a person with a postpartum infection.
2. Explain the risk factors for PPH using the 4 T's.
3. What education would the nurse provide to the breast-feeding person with a newborn in the NICU?
4. Discuss the education provided to the person after having a cesarean birth.

5. Describe how the nurse assesses the postpartum person for PPD.

Critical-Thinking Questions about Case Studies

1. Refer to [Labor and Delivery: Part 3](#).
Brienne is now 12 hours' postpartum and is requesting pain medication and states the pain is currently 5/10 (on a scale of 1 to 10) and located in her perineum. What additional data does the nurse need to obtain at this time?
2. Refer to [Labor and Delivery: Part 3](#).
What potential problem(s) related to the birth does the nurse anticipate?
3. Refer to [Labor and Delivery: Part 3](#).
What can the nurse do to prevent Brienne from having complications from the anticipated diagnosis?

Competency-Based Assessments

1. Develop a plan of care for a person who has a wound infection after a cesarean birth.
2. Develop a plan of care for a person whose QBL is currently 750 mL after a vaginal delivery.
3. What factors might contribute to a breast-feeding person's difficulties in feeding a premature baby? How can the nurse interpret these factors?
4. What immediate interventions can the nurse implement to support breast-feeding a preterm neonate during time spent in the NICU?
5. Develop a video demonstrating abdominal splinting when coughing and deep breathing, getting in and out of bed, and getting in and out of a chair.
6. Develop a nursing care plan for preventive management of a postpartum psychiatric disorder.

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CHAPTER 22

Immediate Care of the Newborn



FIGURE 22.1 First Assessment The newborn is assessed by a nurse seconds after birth. (credit: “Image of Baby, Birth and Healthy Baby” by Sanjasy/Pixabay, CC0)

CHAPTER OUTLINE

- 22.1 Apgar Scoring
- 22.2 Physiological Adaptation and Transition
- 22.3 Neutral Thermal Environment

INTRODUCTION From a fetal perspective, the process of birth is a crisis. In the womb, the fetus was snuggled in a soft, warm, dark, and quiet world. The placenta provided nutrition and oxygen continuously. Suddenly, the contractions of labor and vaginal childbirth forcibly squeeze the fetus through the birth canal, limiting oxygenated blood flow during contractions and shifting the skull bones to accommodate the small space. After birth, the newborn’s system must make drastic adjustments to a world that is colder, brighter, and louder, and where they will experience hunger and thirst. They first must successfully transition to a dry and inhospitable outside world. This includes regulating their own body temperature and breathing independently. It is critical for the nurse to understand the transition to extrauterine life.

22.1 Apgar Scoring

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Describe the purpose of the Apgar scoring assessment
- Define the questions the neonatal nurse needs to ask before an infant is born in the birth room
- Demonstrate all steps to complete an Apgar assessment

Immediately after birth, assessment of the newborn's overall physical condition is imperative to provide the most

appropriate care for them. The **Apgar assessment** is performed by a member of the team caring for the newborn. The results of the assessment completed by the nurse will be shared with the provider and/or team. Though the newborn's Apgar cannot predict morbidity and mortality, it can describe their condition and provide a record and evaluation of their fetal-to-neonatal transition.

In 1953, Virginia Apgar, MD, created a tool for assessing the newborn at 1 minute and again at 5 minutes post birth. This assessment included heart rate, respiration, reflex irritability, muscle tone, and color, all of which evaluate the response of the neonate when transitioning from life inside the uterus, or **intrauterine life**, to life outside the uterus, or **extrauterine life**. The tool is called the Apgar score (American College of Obstetricians and Gynecologists [ACOG], 2015) (Figure 22.2). This assessment score does not predict any neurologic outcome of the neonate, nor does it predict mortality or morbidity. However, if the score is less than 7 at 5 minutes post birth, both the American College of Obstetricians and Gynecologists (ACOG) and the American Academy of Pediatrics (AAP) recommend that another Apgar assessment be performed at 10 minutes (ACOG, 2015). A low score reflects the need for additional resuscitation effort.



FIGURE 22.2 Virginia Apgar Dr. Virginia Apgar created the Apgar assessment tool to increase the survival rate of newborn babies. (credit: "Dr. Virginia Apgar welcoming world's newest guest" by Al Ravenna, World Journal Tribune/Library of Congress, Prints and Photographs Division, NYWT&S Collection, LC-USZ62-131540, Public Domain)

The nurse who assesses the newborn in the labor and delivery room is often referred to as the baby nurse or the nurse responsible for the neonate. The labor nurse must continue to assist the birthing person after birth; therefore, an additional nurse comes into the room at the time of birth and is responsible for the newborn after birth, a second patient who requires individualized care. The neonatal nurse's role includes ensuring a fully stocked, correctly calibrated radiant warmer set to a safe temperature with all items necessary to facilitate resuscitation if needed and to assist with the transition to extrauterine life. Prior to delivery, the neonatal nurse needs to know the answers to the following questions:

- How many babies are expected?
- What is the gestational age of the newborn(s)?
- What is the status (ruptured or intact) of the amniotic membranes, and what is the color of the amniotic fluid?
- Were there any complications during pregnancy, labor, and/or birth?
- Are there any untreated maternal risk factors, including group B streptococcus (GBS)–positive status, lack of prenatal care, hypertension, or hyperglycemia?

- What, if any, medications is the birth parent taking or receiving prior to delivery?
- Were there any congenital findings that would put the newborn at an increased risk at delivery?

The answers to those questions will prepare the nurse for what to expect when the newborn is delivered.

- If there are multiple newborns, each will need a neonatal nurse.
- If this is a preterm newborn, the nurse will need to notify the neonatal intensive care (NICU) team to join the room. Not all facilities offer this level of support and instead will have supportive personnel present to assist with resuscitative efforts. Up to four additional trained staff may be needed for complex birthing situations.
- In some cases, the amniotic fluid shows evidence of **meconium**, the neonate's first bowel movement consisting of amniotic fluid, mucus, lanugo, and bile. Meconium staining indicates the newborn passed the stool while in utero and is therefore at risk for aspirating. The nurse will need to monitor the newborn's airway more closely at birth.
- If other complications occurred during labor and birth, the nurse will need to adjust the plans for postdelivery care based on the complications.

These items must be taken into consideration as the nurse prepares to evaluate the neonate after the birth.

Newborn Muscle Tone (Activity)

The tension of healthy muscles that contribute a slight resistance to passive displacement of a limb is called **muscle tone** (Simon et al., 2023). The nurse assesses the degree to which the newborn is moving their extremities from flexion to extension. To receive the full 2 points for muscle tone/activity in this category, the newborn will have spontaneous, active movements in all extremities. If their arms and legs are flexed with little movement, the score will be a 1. If there is no movement and the newborn appears floppy with very little muscle tone, they will be given a score of zero for this category. This and every category will be reassessed in 5 minutes for any improvements.



LINK TO LEARNING

This video explains the [use of the Apgar score \(https://openstax.org/r/77APGAR\)](https://openstax.org/r/77APGAR) and reinforces the content with NCLEX practice questions.

A healthy term newborn will have elbows and hips that are flexed and have knees flexed up toward the abdomen, thus scoring 2 points on the Apgar assessment. A preterm or ill newborn may have more flaccid extremities and will therefore have points deducted from the Apgar score because they demonstrate less flexion in their muscle tone.

Pulse or Heart Rate

The nurse will auscultate the newborn's heart rate at the apex or palpate at the junction of the umbilical cord and the skin. The average heart rate of a newborn is 110 to 160 beats per minute (bpm) (Children's Hospital of Philadelphia, 2022). If the heart rate is greater than 100 bpm, the nurse will score the newborn 2 points on the Apgar and go on to the next step of the assessment. However, if the newborn does not have a heartbeat or if the heart rate is less than 100 bpm, the nurse will need to initiate neonatal resuscitation immediately and call for more personnel, including the neonatal intensive care team, if the health system offers that level of support. A heart rate of less than 100 bpm receives a score of 1 on the Apgar assessment, whereas a score of zero indicates no heartbeat was found while auscultating or palpating.

Newborn Reflex Irritability or Grimace

The grimace response, or **reflex irritability**, also known as grimace response, describes the newborn's response to stimulation from the nurse. For example, the nurse will assess the response from the newborn when they rub the soles of the newborn's feet or back with a baby blanket to stimulate them. A normal newborn will cry or become agitated, while a compromised newborn won't have much response. A cry or agitated response from a newborn to stimulation will receive the full 2 points; newborns who have mild reactions will receive a 1 on the Apgar assessment. Newborns who have an absent response to stimulation will receive a zero score.

Appearance of Newborn Skin Color

The nurse will assess the newborn for cyanosis, specifically on the trunk, and for pallor of the skin. Newborns will generally have **acrocyanosis**, cyanosis found only on the hands and feet, which is an expected finding that may last up to a week. Observation of acrocyanosis requires a score of 1 on the Apgar assessment. A newborn who is born pale or completely cyanotic is scored zero. The rare newborn who is completely pink is scored with a 2.

Respiration

The nurse must pay careful attention to how the newborn is breathing, observing particularly for any adventitious breath sounds, any retractions or grunting, or a complete absence of breath sounds. Ideally, the nurse wants to see a newborn crying vigorously, and the nurse will work to dry and stimulate a newborn until the vigorous cry is achieved. Lack of spontaneous respiratory effort requires immediate intervention. (See [Table 22.1](#) for a summary of the Apgar chart.)

Indicator		0 Points	1 Point	2 Points
A	Activity (muscle tone)	Absent, loose, flaccid without activity; floppy tone	Arms and legs flexed with little movement	Spontaneous, active motion with flexed muscle tone resisting extension
P	Pulse	Absent	Less than 100 beats per minute	Greater than 100 beats per minute
G	Grimace (reflex or irritability in response to stimulation)	Zero response to stimulation	Limited response to stimulation	Crying, movement, pulling away upon stimulation
A	Appearance (skin color)	Pale or blue	Pink, but extremities are blue	Entirely pink
R	Respirations	Not breathing	Slow and irregular, weak or gasping	Crying vigorously

TABLE 22.1 Apgar Chart

Apgar Scoring and Escalating the Level of Care

If a newborn has a 1-minute Apgar score of 6 or below, care is escalated as needed. A 5-minute Apgar score may be improved because of earlier assistance or, if it is under 7, may require the nurse to continue escalated care. Immediate care often means the 5-minute Apgar shows an improved newborn transition response. The nurse will need to continue resuscitative efforts by adding a 10-minute Apgar score and possibly initiating respiration therapy (more on that topic follows). If a neonate, whether term or preterm, is having difficulty breathing and is without proper muscle tone, they should be brought to the radiant warmer immediately post birth and given additional assessment (Hammer, 2021). Neonates who are having difficulties early in the transitional period need to have a thermometer attached to them to assess thermoregulation. These neonates need to stay between 36.5° C and 37.4° C (97.7° F and 99.3° F), as the risk for hypothermia is increased in newborns who are already struggling with the transition to life.



LINK TO LEARNING

This video shows the original creator of the Apgar assessment, Dr. Virginia Apgar, [teaching a new nurse to complete the assessment on a newborn \(https://openstax.org/r/77TeachAPGAR\)](https://openstax.org/r/77TeachAPGAR) using all five assessment criteria.

The newborn found to have insufficient respiratory effort or increased work of breathing can be supported with nursing interventions to assist during transition. These interventions include nasal suctioning with a bulb syringe, monitoring their oxygen saturations with a pulse oximeter, and repositioning to best maintain an open airway. If these supportive measures do not result in improved respiratory effort, positive pressure can be provided.

UNFOLDING CASE STUDY

Newborn Care: Part 1

Brianne delivered a male infant, Marcus, vaginally. The delivery was complicated by shoulder dystocia. Apgar score was 5 at one minute and 9 at five minutes; birth weight, 3995 g (8 lbs 14 oz); length, 21 inches (52.5 cm).

PMH	Maternal Medical History • Not currently taking any over-the-counter medications or herbal preparations • Negative history for STIs. • Denies any surgeries • Denies any previous pregnancies Social History Parents live in a two-bedroom apartment on the second floor in a building with only a freight elevator. They have a small dog named Candy. Prenatal History BP range 118-128/64-80 Fundal Height at 36 weeks 40 cm Gestational Diabetes 36 years old, G1 P1 No known allergies
Nursing Notes	Delivery Summary After 20 hours of labor, Brianne had a vaginal delivery of a male infant with mild shoulder dystocia. Infant birth weight is 3995 g (8 lbs 14 oz). Placenta delivered spontaneously and intact by inspection. A second-degree vaginal laceration was repaired. Quantitative blood loss 450 mL Father, Trey, present for labor and birth, very supportive Marcus was dried off immediately after birth with warm blankets, and a hat was placed on his head. After the umbilical cord was clamped and cut, Marcus was placed directly on Brianne's chest to begin skin to skin. Marcus and Brianne were covered with a warmed blanket.

Flow Chart	Newborn assessment data at 30 minutes of age Temp: 97.8° F (ax) Heart rate: 160 bpm Resp: 66 breaths Pulse oximetry: 92% Color: pink with acrocyanosis Respirations: shallow, irregular Nasal flaring Marcus has not been interested in nursing. Capillary glucose: 42
Provider's Orders	Observe in Labor and Birth unit VS every 30 minutes x2, then hourly x2, then every 4 hours Erythromycin ointment to both eyes within 1 hour of birth Phytonadione 1 mg IM anterior thigh within 1 hour of birth Encourage skin-to-skin contact until temperature stable Breast feed on demand Monitor intake and output until discharge Initial bath at 4 hours of age

1. The nurse assesses Marcus at 30 minutes of age. Highlight the cues that demonstrate Marcus is having respiratory difficulty.
2. Which data obtained during the newborn assessment is of *most* concern?
 - a. Respirations of 66
 - b. Pulse oximetry of 92%
 - c. Nasal flaring
 - d. Capillary glucose of 42

Positive pressure ventilation is a form of respiratory therapy that involves the delivery of room air or a mixture of oxygen and room air by bag-valve mask into the lungs (Potchileev et al., 2022). Use of the mask requires the nurse to form a tight seal around the newborn's mouth and nose. This is done by making a "C" shape with the thumb and first finger around the mask of the bag-valve mask and applying firm but gentle pressure to the newborn's face while delivering breaths to the newborn at a rate of 30 to 60 per minute ([Figure 22.3](#)). The bag-valve mask should be connected to the oxygen flowmeter using 100% oxygen or blended oxygen and a self-inflating bag (Hammer, 2021). Positive pressure ventilation is initiated if the neonate is apneic, is gasping for air, or has a heart rate of less than 100 bpm. The nurse provides supportive care by way of thermoregulation, stimulation, and oxygenation. After effective respirations and circulation, thermoregulation is the most critical factor for successful transition to extrauterine life. Immature physiologic and anatomic states of the newborn put them at increased risk for hypothermia because they are unable to maintain their own safe body temperature. Additionally, the nurse will need to call a specially trained team, whether that is a neonatal resuscitation team or a pediatric provider, to assess the newborn. All nurses who choose to work in an obstetrics unit will eventually be trained in neonatal resuscitation and know these steps, so that if a newborn needs additional assistance with transition, the nurse will be qualified to help while waiting for the NICU team to arrive. [Figure 22.4](#) shows the steps in the neonatal resuscitation algorithm.



FIGURE 22.3 Neonatal Bag-Valve Masks Neonatal bag-valve masks are smaller than adult bag-valve masks but made in a similar fashion. The nurse uses their thumb and first finger in a “C” shape to ensure the mask forms a tight seal around the neonate’s mouth and nose. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

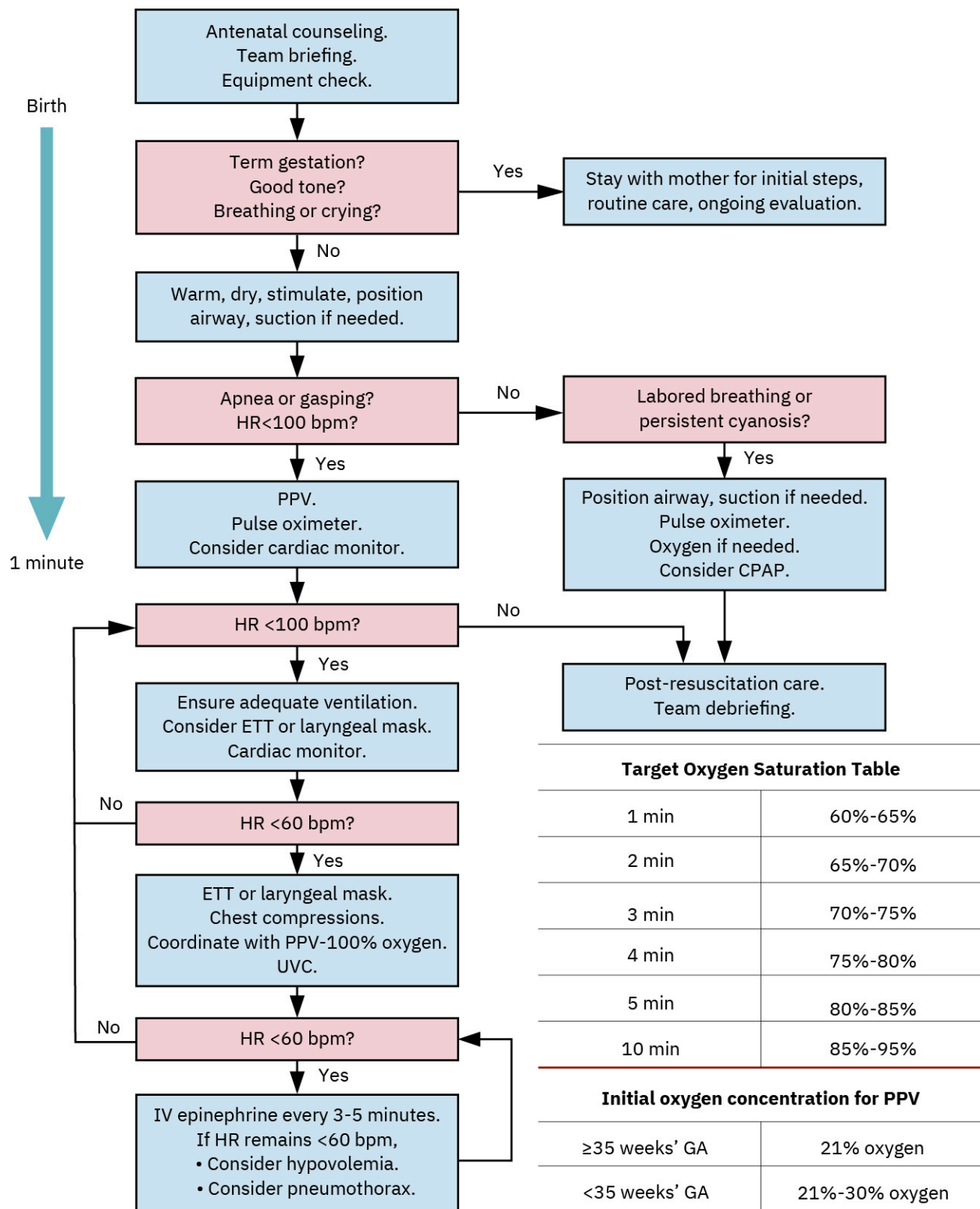


FIGURE 22.4 Neonatal Assessment Algorithm This is the neonatal resuscitation (NRP) guideline algorithm that is used to guide immediate resuscitation in the immediate postbirth period. CPAP, continuous positive airway pressure; ETT, endotracheal tube; GA, gestational age; HR, heart rate; IV, intravenous; PPV, positive pressure ventilation; UVC, umbilical venous catheter. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)



LINK TO LEARNING

This video shows what [neonatal resuscitation \(NRP\)](https://openstax.org/r/77NRP) looks like (<https://openstax.org/r/77NRP>) in action. Every nurse who works on a labor and delivery or a neonatal intensive care unit (NICU) will be certified by the unit in NRP.

22.2 Physiological Adaptation and Transition

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Describe the newborn's physiologic adaptation to extrauterine life
- Identify cardiac and respiratory physiologic adaptation changes that occur during the transition to extrauterine life and stabilization
- Compare and contrast neonatal periods of reactivity in the immediate period post birth

For the nurse to understand and recognize abnormal events in the newborn immediate period after birth, they must first understand the normal changes in physiology that occur within the first several hours of life. In those first hours, tremendous respiratory and circulatory adaptations occur to allow the newborn to transition from intrauterine life to extrauterine life. This transition is the most complex physiologic adaptation that occurs in any human body system in their lifetime. The nurse responsible for monitoring the newborn needs to have a solid knowledge base about normal physiologic adaptation and accurate assessment skills to recognize any alteration in normal adaptation.

Fetal Circulation

While the fetus is in utero, the placenta acts as a gas-exchange organ. The fetal lungs are bypassed during development in the womb. Oxygen from the birthing person's blood crosses the placenta and enters the fetal bloodstream through the umbilical vein. The oxygenated blood in the umbilical vein bypasses hepatic circulation and is delivered to the inferior vena cava (IVC) via the ductus venosus. The ductus venosus is a fetal shunt allowing oxygenated blood in the umbilical vein to bypass the liver. The oxygenated blood is then shunted from the right atrium to the left atrium through a second shunt called the foramen ovale (Elshazzly et al., 2022). From the left atrium, the oxygenated blood then travels to the left ventricle and into coronary arteries and the aorta (Elshazzly et al., 2022). A tiny amount of blood from the right atrium bypasses the foramen ovale and flows through the right atrium to the right ventricle into the pulmonary artery to perfuse the fetal lungs and promote lung development. Most of the blood goes from the pulmonary artery directly to the aorta via a third shunt, the ductus arteriosus. From there, the oxygenated blood is delivered to the fetus's systemic circulation (Elshazzly et al., 2022). [Figure 10.18](#) summarizes fetal circulation.

Many changes occur at the time of birth. The fetal circulation structures become unnecessary as the birthing person draws closer to the actual birthing event. Two main triggers induce the structural changes: cessation of blood flow within the placenta and initiation of respiration. The structural changes that occur are listed in [Table 22.2](#), and [Figure 22.5](#) compares fetal and neonatal circulation.

Structure	Structural Change Occurring	Pathophysiology of Change
Systemic circulation	Lung expansion	- The placenta has low-resistance circulation. When that is lost, it causes systemic vascular resistance to increase. At the same time, the lungs expand, are exposed to high oxygen concentration for the first time, increase pulmonary blood flow, and allow the blood vessels in the lungs to dilate. - This combination of vasodilation and increased pulmonary blood flow causes decreased pulmonary vascular resistance, enhancing the performance of all major body systems. (Elshazzly et al., 2022)
Ductus venosus	This duct stays open at the time of birth, which allows umbilical vein catheterization, if needed. Shortly after birth, this duct will begin to narrow and shrink. The duct will close completely during the first week of life in most full-term neonates but will take longer in preterm neonates.	Once the umbilical cord is cut, the process of duct closing begins. Mechanical pressure and a redistribution of blood in the neonate's body and changes in the cardiac output occur. In simpler terms, closure of this duct forces perfusion of the fetal liver. Anatomic closure of this duct occurs within 2 weeks after birth, at which time the structure is known as the ligamentum venosum connected to the round ligaments of the liver.
Foramen ovale	Increased pressure in the left atrium attempts to reverse blood flow and closes this shunt, making it a one-way valve.	In utero, pressure is greater in the right atrium, with the foramen ovale open, allowing blood to shunt from the right atrium to the left. Decreased pulmonary vascular resistance and decreased umbilical venous return to the right atrium also cause a decrease in right atrial pressure. Pressure gradients are now reversed, allowing left atrial pressure to be greater than right atrial pressure, causing the foramen ovale to close 1–2 hours after birth. Anatomic closure occurs in about half of all 6-month-olds, while one-quarter of the adult population have a patent foramen ovale (PFO), though they are unaware of it.
Ductus arteriosus	Due to increased systemic vascular pressures and increased left atrial pressure, a reversal of blood flow and aorta-to-pulmonary artery (or left-to-right) shunting occurs, closing the shunt. It will functionally close within a few days after birth.	- Closure of the ductus arteriosus is caused by an increase in oxygen or newborn blood PaO_2, the partial pressure of arterial oxygen, which then triggers constriction. While in utero, the placenta had produced prostaglandins that triggered vasodilation of the same vessel. - With the loss of the placenta and an increase in blood flow, prostaglandin levels drop dramatically, leaving unopposed vasoconstriction. - Anatomic closure of the ductus arteriosus starts within hours of birth and completes 2–3 months later.

TABLE 22.2 Structural Changes Occurring as Fetal Circulation Transitions to Newborn Circulation Sources for data: Marty et al., 2022; Pradbit & Forshing, 2022; Hampton et al., 2022; Elshazzly et al., 2022.

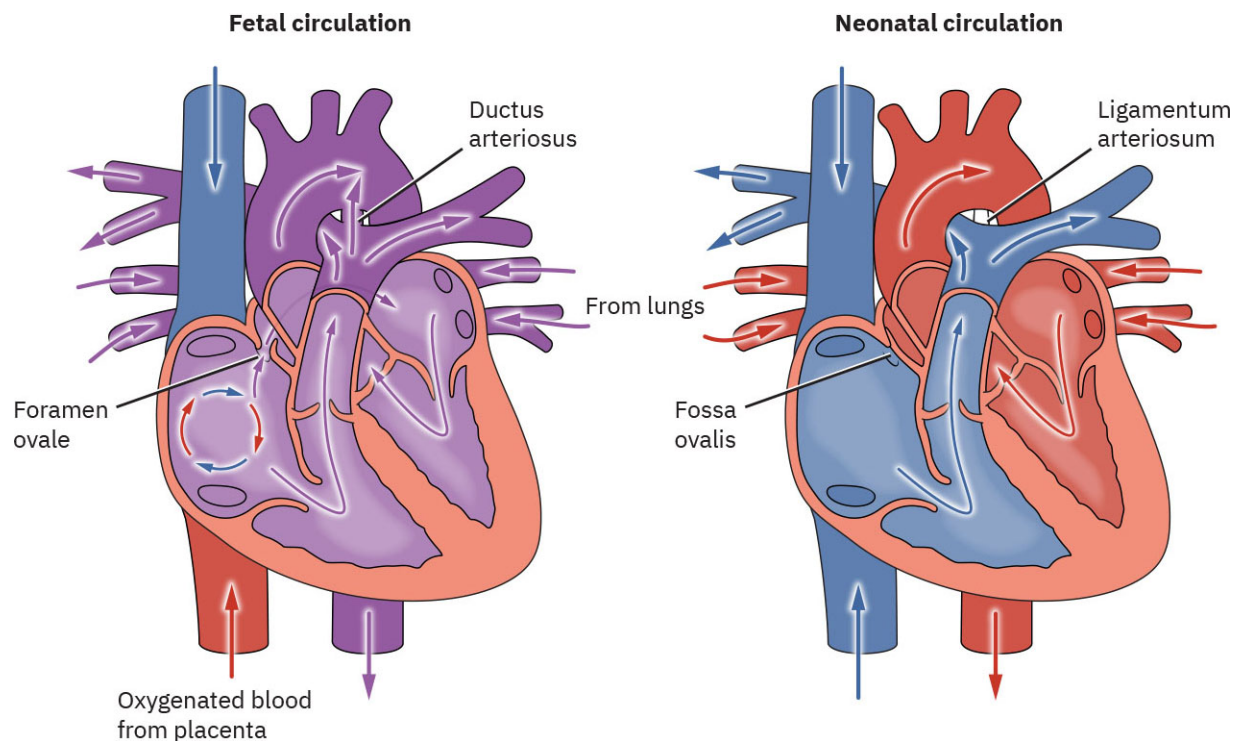


FIGURE 22.5 Comparison of Fetal and Neonatal Circulation Fetal circulation: During fetal development, the ductus arteriosus shunts the blood away from the lungs and directly into fetal circulation through the aorta. Neonatal circulation: At birth, the foramen ovale and the ductus arteriosus are both forced closed because of increased systemic vascular resistance due to loss of the placental blood flow. (credit: modification of work from *Anatomy and Physiology 2e*. attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Ductus Venosus

The primary function of the ductus venosus is to direct oxygenated blood from the umbilical vein to the inferior vena cava and eventually to the left heart for circulation. This duct also supplies oxygenated blood to the fetal liver (Pradbit & Forshing, 2022). Fetal hydrops, chromosomal aberration, in utero heart failure, and portal vein absence can be caused by absence or dysfunction of the ductus venosus (Pradbit & Forshing, 2022).

Ductus Arteriosus

The ductus arteriosus is a shunt that allows the fetal circulation to avoid the lungs by shunting blood from the right ventricle, bypassing pulmonary circulation and entering the descending aorta. Progressive increase in oxygenation (increased partial pressure of oxygen [PO_2]) and elimination of prostaglandin as a ductal relaxant cause the functional closure of the ductus arteriosus. At the time of birth, the newborn's lungs fill with air, causing pulmonary vascular resistance and leading to blood flowing from the right ventricle to the lungs for oxygenation. The shunt then constricts due to increased arterial oxygen tension and the decreased flow-through, causing anatomic closure within 2 to 3 weeks.

Foramen Ovale

The foramen ovale directs intra-arterial blood flow from right to left in the fetal heart, bypassing the fetal lungs from the right atrium directly into the left atrium. The blood travels through the foramen ovale to the left atrium through the mitral valve to the left ventricle and out to the aorta and body. It finally flows to the ascending aorta, entering the systemic circulation.

Neonatal Circulation

Neonatal circulation is the same as adult circulation, once the newborn has completed the transition to extrauterine life. However, some things can go wrong, and the nurse needs to be able to identify those issues through assessment and accurate history taking. Some cardiac defects that a newborn might experience can be congenital (i.e., related to family history), so it is important that the nurse knows to assess for family congenital defects, cardiac issues, or issues during the pregnancy. During the postpartum period, the nurse must monitor the newborn for any signs or symptoms of cardiopulmonary dysfunction, such as apnea, cyanosis, and respiratory distress.

Patent Ductus Arteriosus and Murmur

When the ductus arteriosus of the newborn remains open after birth, it is called a **patent ductus arteriosus (PDA)** (Figure 22.6). As a result, blood flows from the descending aorta, across the PDA, and into pulmonary circulation, which can cause pulmonary edema (Gillam-Krakauer & Mahajan, 2022). The nurse will hear a murmur upon assessment of a newborn with a PDA, which will sound like a continuous, machine-like rumble below the clavicle, radiating to the back. Clinical manifestations will appear as tachycardia, bounding peripheral pulses, possible increased respiratory distress, and hypoxia, if pulmonary edema is present (Gillam-Krakauer & Mahajan, 2022).

Patent ductus arteriosus

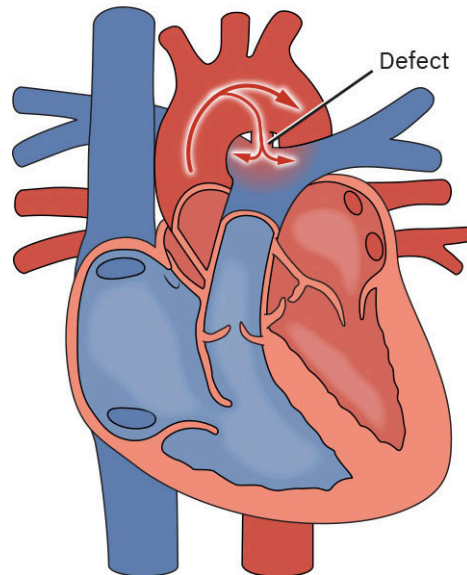


FIGURE 22.6 Patent Ductus Arteriosus A patent ductus arteriosus allows blood to bypass circulation to the lungs. (credit: modification of work from *Anatomy and Physiology 2e*. attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Patent Foramen Ovale and Murmur

The foramen ovale closes completely in only about 75 percent of newborns (Marty et al., 2022). In the other 25 percent, a patent foramen ovale occurs. A **patent foramen ovale (PFO)** appears as a flap-like opening between the atrial septum secundum and primum at the fossa ovalis (Hampton et al., 2022) (Figure 22.7). Because left atrial pressure in the heart is higher than right atrial pressure, only a minuscule amount of blood may be shunted back to the right atrium, usually without any clinical significance for the newborn. This is generally a benign finding during the newborn period. However, if it persists into adulthood, it can lead to right-to-left shunting of deoxygenated blood and be symptomatic or asymptomatic.

Patent foramen ovale

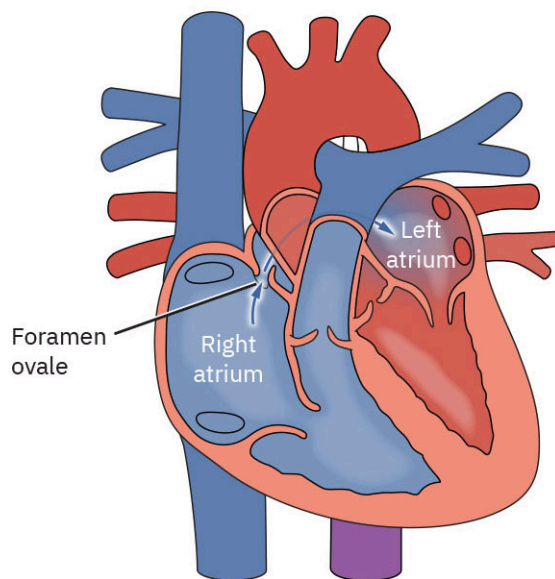


FIGURE 22.7 Patent Foramen Ovale A patent foramen ovale (PFO) allows blood to flow between the right and left atria. (credit: modification of work from *Anatomy and Physiology 2e*. attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

However, the nurse may hear a murmur upon auscultation during a cardiac assessment that sounds like a quiet, muffled extra heart sound at the apex. Neonates have a 75 percent chance that these are transient and not associated with any other anomalies (Children's Hospital of Philadelphia, 2022). Nonetheless, the nurse will report this finding to the health-care provider on call for the newborn.

Patent Ductus Venosus and Murmur

Failure of the ductus venosus to close leads to a condition called patent ductus venosus, which causes **galactosemia**, or galactose in the blood. This is an inherited disorder preventing the newborn from breaking down the sugar galactose, causing a buildup to toxic levels in their bloodstream. These newborns must avoid dairy products, breast milk, and most baby formulas. Additional problems from lack of closure of the ductus arteriosus are hypoxia, hepatic dysfunction, and **encephalopathy with hyperammonemia**, high levels of ammonia in the blood that cause brain damage (Marty et al., 2022).



LINK TO LEARNING

This video from the Khan Academy shows a [visual interpretation of the fetal to neonatal transition in circulation](https://openstax.org/r/77fetalcirculatn) (<https://openstax.org/r/77fetalcirculatn>), including all the changes that happen during the moments immediately after birth.

Cardiopulmonary Adaptation

Many additional changes occur in the cardiopulmonary system after birth of the newborn. Late in gestation, the newborn completes lung development, fluid secretion in the lungs decreases, and surfactant production increases. In the lungs, surfactant is a phospholipid that lowers alveolar surface tension, prevents alveolar collapse at expiration, and maintains functional residual capacity. Production of catecholamines, causing fetal pulmonary epithelial cells to reabsorb fluid from alveolar spaces, is caused by the onset of labor (Rehman & Bacha, 2022). The first breath of air initiates a sequence of events that helps to expand the lungs, establish lung volume, clear the airways of amniotic fluid, and help the newborn transition from fetal circulation to newborn circulation. The first breath generates a high negative pressure system, filling the alveoli with air and removing any fluid in those spaces. Once the neonatal lungs expand fully with high concentrations of room air, pulmonary vascular resistance falls, which triggers pulmonary vasodilation increasing blood flow to the newly inflated lungs (Rehman & Bacha, 2022).

Approximately 10 percent of neonates do not sustain effective respiratory effort in the immediate transition period.

Respiratory distress is a common complication seen in the neonatal period and is a major cause of morbidity and mortality (Reuter et al., 2014). The cause of neonatal respiratory distress varies, but the result is inadequate ventilation and impaired oxygenation, accompanied by retained carbon dioxide and alterations in acid-base balance. Respiratory distress syndrome can be an isolated incident that requires supportive care, or it can be a product of a functional abnormality of the pulmonary system that requires more intensive care. [Table 22.3](#) shows common causes of neonatal respiratory distress, clinical findings, and their causes.

Diagnosis	Cause	Incidence	Clinical Signs
Meconium aspiration syndrome (MAS)	Aspiration of meconium during vaginal or cesarean birth that interferes with surfactant activity	2%–10% of term and postterm infants exposed to meconium-stained amniotic fluid; 5%–30% of postterm and term births have meconium-stained amniotic fluid	- Progressive disorder with symptoms increasing from inflammation to inability to ventilate/oxygenate - Tachypnea, grunting, nasal flaring, retracting, hypoxemia, acidosis
Transient tachypnea of the newborn (TTN)	Failure to clear lung fluid by usual mechanism	0.3%–0.5% of term and late-preterm infants Onset within the first 24 hours of life	Self-limiting condition presenting with tachypnea and no other abnormalities, lasting 12–72 hours
Respiratory distress syndrome (RDS)	Insufficient surfactant production	Inversely related to gestational age: Less than 28 weeks: 60% Older than 34 weeks: 5%	Tachypnea, grunting, nasal flaring, retracting, hypoxemia, hypercarbia, respiratory acidosis beginning soon after birth
Persistent pulmonary hypertension of the newborn (PPHN)	Failure to relax the pulmonary vasculature after breathing oxygen at birth	1:500–1:5000 live births Affects term and postterm newborns due to pulmonary and nonpulmonary issues, though many times is idiopathic in nature	Tachypnea, grunting, nasal flaring, retracting, hypoxemia, hypercarbia, respiratory acidosis; often hypoxic and intractable

TABLE 22.3 Common Causes of Neonatal Respiratory Distress in the Immediate Care Period (Hermansen & Mahajan, 2015)



REAL RN STORIES

Nurse: Clare, BSN

Years in practice: 5

Clinical Setting: OBGYN unit of an academic medical center hospital

Geographic location: Urban center

I was assigned to be the baby nurse for a scheduled cesarean section of a 35-year-old cisgender woman G1P0 at 36 weeks and zero days' gestation. She had placenta previa with an active bleed over the prior 48 hours.

Upon arrival in the preoperative area, the fetal heart tones were 130 to 135 bpm, with moderate variability, no accelerations, and no decelerations. The patient, Kelsey, was experiencing no contractions. The clinical team

determined that a cesarean section was necessary, and the patient agreed.

I helped my coworker Kaitlyn, a labor and delivery nurse, prepare the patient for the cesarean section by educating the patient and her partner about all the things they might see and hear in the operating room. My coworker placed Kelsey into a hospital gown, started an 18-gauge intravenous line in her right antecubital space, and initiated lactated Ringer's solution at 125 mL/hour. Kelsey received consultations from the anesthetist and her obstetrical surgeon, and then it was time to deliver the baby.

In the operating room, the decision was made that there should be two nurses responsible for the neonate because of the preterm gestational age of the baby. In addition, the main nurse called the neonatal intensive care unit to notify them that there was a preterm delivery happening in labor and delivery just in case they were needed. Furthermore, because the presence of placenta previa increases the risk of postpartum hemorrhage, I called my charge nurse and asked her to come to the cesarean section with a postpartum hemorrhage kit. I also asked the blood bank for two units of packed red blood cells in Kelsey's correct blood type to be placed on hold for her following the provider's orders.

Once the surgery was underway, I monitored the fetal heart tones, watching for any signs of distress, and prepared the radiant warmer for the arrival of the baby. I made sure to have all the equipment that I would need, including the following: suction connected to the wall; oxygen with bag-valve mask and neonatal-size mask; nasal bulb; warm blankets; laryngoscope and ET tubes appropriate for a 35-week fetus; pulse oximetry; temperature sensor; hat; and diaper.

The baby arrived, was given to me, and placed under the radiant warmer. The neonate was very small, had very poor tone, was pale and cyanotic, gasping for breaths, had shallow breathing, but responded to stimulation and had a heartbeat of 140. I immediately started stimulating and drying the baby off while my coworker auscultated for breath sounds and placed a pulse oximeter on the neonate's foot. After getting a pulse ox reading of 40 percent, my coworker rolled a baby blanket into a log and placed it under the neonate's neck to point the chin of the neonate toward the ceiling. This allowed the infant's jaw and airway to fall open, which facilitated more efficient breathing. The airway was assessed and cleared using a bulb syringe. At that point, Apgar scores for the neonate were 7. Blow-by oxygen was provided, and I continued stimulating and drying the baby. The baby continued to gasp for breaths, was still pale, and had poor tone; the heart rate was 145, and the newborn responded to stimulation. At 5 minutes, the Apgar scoring total was still 7, and I called the NICU for additional assistance. The baby was placed in an incubator and taken to the NICU for help with transition. The neonate's distress was likely due to early gestational age and being small. The infant is 5 pounds, 3 ounces and named Genevieve.

Hematologic Adaptation

The hematologic adaptations of the newborn happen because of the dramatic changes in circulation and oxygenation that occur after placental detachment. Mean hemoglobin levels in cord blood are 15 g/dL (Eslami et al., 2012), and hemoglobin and hematocrit levels in the newborn will continue to rise in the first several hours post birth. Higher than normal hemoglobin and hematocrit levels will usually self-correct by day 3 to 5. This is when the movement of plasma from intravascular to extravascular spaces is completed (Eslami et al., 2012).

Oxygen Saturation Levels in the Newborn

Blood oxygen in the immediate newborn is significantly lower than in a newborn that is 24 hours old (Lara-Canton, et al., 2022). Partial pressures of the oxygen gradient between maternal, placental, and fetal blood are thought to be the driving force that regulates fetal oxygen supply. In the uterus, the fetus grew in a relatively low oxygen environment due to fetal hemoglobin's high affinity for oxygen (Lara-Canton, et al., 2022) and due to the mixing nature of the fetal circulatory system. Delayed cord clamping has been associated with improved fetal-to-neonatal transition and increased newborn oxygen saturation levels by 85 percent to 90 percent (Lara-Canton, et al., 2022). Delayed cord clamping at birth can also lead to fewer episodes of tachycardia in the immediate transition period for the newborn. As seen in [Table 22.4](#), in the period immediately following birth, oxygen saturation rates of 60 percent to 65 percent are expected in the newborn, rising to 85 percent to 90 percent at 10 minutes post birth, according to the American Academy of Pediatrics (AAP), American Heart Association (AHA), and the Guidelines for Neonatal Resuscitation (NRP) (Hammer, 2021).

Time after Birth	Oxygen Saturation Level
1 min	60%–65%
2 min	65%–70%
3 min	70%–75%
4 min	75%–80%
5 min	80%–85%
10 min	85%–95%

TABLE 22.4 Target Preductal SpO₂ after Birth

American Academy of Pediatrics, American Heart Association and Guidelines for Neonatal Resuscitation (NRP) all agree that the guidelines for saturation of peripheral oxygen (SpO₂) should be used to determine the need for initiating supplemental oxygen or increasing/decreasing its concentration (Hammer, 2021).



PHARMACOLOGY CONNECTIONS

The Vitamin K Injection

Neonates do not have enough vitamin K stored in their bodies at birth because very little of it passes from the birthing person through the placenta. Therefore, newborns need a supplement to increase clotting factors and to prevent hemorrhagic disorders and vitamin K deficiency bleeding. The American Academy of Pediatrics recommends that all newborns receive a one-time intramuscular shot of vitamin K within 6 hours after birth. Neonates who do not receive the vitamin K injection are at 81 times greater risk of developing vitamin K deficiency bleeding than neonates who receive this intramuscular injection, compared to 1/100,000 when vitamin K is given at birth (Hand & Noble, 2022)

Generic Name: phytonadine, phytomenadione

Trade Name: Mephyton

Class/Action: vitamin, fat soluble

- **Route/Dosage:** oral, subcutaneous (SubQ; administer undiluted), intramuscular (IM; 1 mg/0.5 mL), intravenous (IV; 1 mg/minute)
 - *Oral:* May be administered with or without food in older children and adults. Parenteral formula may also be used for small oral doses or situations in which tablets cannot be swallowed.
 - *Parenteral:* Limit IV administration to situations where an alternative route of administration is not feasible and the benefit of therapy outweighs the risk of hypersensitivity reactions. Allergic reactions have occurred with IM and SubQ injections.
- **High Alert/Black Box Warning:**
- **Indications:** Prophylaxis and treatment of vitamin K deficiency bleeding (formerly known as hemorrhagic disease of the newborn (injection only).
- **Mechanism of Action:** Promotes liver synthesis of clotting factors (II, VII, IX, X); however, the exact mechanism of this stimulation is unknown. Menadiol is a water-soluble form of vitamin K; phytonadione has a more rapid and prolonged effect than menadione; menadiol sodium diphosphonate (K4) is half as potent as menadione (K3).
- **Contraindications:** Hypersensitivity to phytonadione or any component of the formula.
- **Adverse Reactions/Side Effects:** [Table 22.5](#) lists adverse drug reactions derived from product labeling unless otherwise specified.

Category	Adverse Reaction
Cardiovascular	Chest pain, flushing, hypotension, tachycardia, weak pulse
Central nervous system	Dizziness
Dermatologic	Diaphoresis, eczematous rash, erythema, erythematous rash, pruritic plaques of the skin, urticaria
Gastrointestinal	Dysgeusia
Hepatic	Hyperbilirubinemia
Hypersensitivity	Anaphylactic reaction (anaphylaxis)
Local	Injection site reaction (pain, swelling, tenderness)
Respiratory	Cyanosis, dyspnea
Miscellaneous	Lesion (scleroderma-like)

TABLE 22.5 Adverse Drug Reactions of Vitamin K Administration

- **Nursing Implications:** Witness parental consent. Review patient education with the family. Administer the IM injection in the middle vastus lateralis muscle. Document in the patient's chart.
- **Parent/Family Education:** The nurse will provide education to the parents before providing intramuscular injection to neonate. It is mandatory that while providing this information to the parents the nurse provide a written information statement to them so that they can follow along and make an informed decision.

Newborn Coagulation

Platelet values in a neonate are comparable to those of an adult patient; however, the neonate is at risk for complications with platelet function. If the neonate was born to a birthing person who experienced severe hypertension or HELLP syndrome (hemolysis, elevated liver enzymes, and low platelet count), or a birthing person with idiopathic isoimmune thrombocytopenia, the newborn is at increased risk for a platelet dysfunction called **transient neonatal thrombocytopenia**, or thrombocytopenia (decreased platelets) that develops in neonates. (See [Chapter 19 Complications of Labor and Birth](#) for a discussion of HELLP syndrome in depth.) The absence of vitamin K in the newborn gut causes a quick decrease in coagulation factors II, VII, IX, and X after birth. Vitamin K levels do slowly increase but do not reach adult levels for several weeks, which is one reason a vitamin K injection in the immediate period after birth is recommended. The American Academy of Pediatrics recommends that all newborns receive a one-time intramuscular injection of vitamin K within 6 hours after birth. The intramuscular administration of vitamin K (Aquamephyton) effectively prevents vitamin K deficiency disease of the newborn, as well as excessive bleeding after circumcision for the newborn males who have this procedure. (Hand & Noble, 2022).

Newborn Transitional Period

The neonate shows a very predictable pattern of behavior during the first several hours after birth. Based on these periods of reactivity, the nurse plans activities with the birthing person and the neonate to maximize the attachment between them. The three periods of reactivity the neonate will experience are the first period of reactivity, the period of decreased responsiveness, and the second period of reactivity (Hernandez & Thilo, 2005).

First Period of Reactivity

The **first period of reactivity** begins with birth and lasts around 30 minutes. In this period, the nurse can expect to see alertness, activity, and responsiveness to interaction from the neonate to the birthing person, their partner, nurses, clinicians, and anyone else who interacts with them (Hernandez & Thilo, 2005). This is an optimal time for

the nurse to teach the birthing person about breast-feeding. The neonate is often rooting for food, very interested in their environment, and open to attempting the first latch session during this time. (Hernandez & Thilo, 2005). When this period is over, the neonate will fall into a deep sleep.

The Period of Decreased Responsiveness

In the **period of decreased responsiveness**, the neonate will be in a deep sleep or have marked decrease in activity for 30 minutes to 2 hours. Their muscle tone will return to normal; they will have fast, shallow respirations (60 breaths per minute) with no dyspnea occurring. The nurse will note that the color of the neonate is pink with excellent perfusion and capillary refill of less than 3 seconds. During assessment, the nurse will note a heart rate between 100 and 120 beats per minute, and the neonate will be less responsive to external stimuli (Hernandez & Thilo, 2005). Additionally, the nurse may assess spontaneous jerks and twitches or an occasional Moro reflex; however, the neonate will return to rest very quickly (Hernandez & Thilo, 2005).

The Second Period of Reactivity

The third and final stage of newborn transition is called the **second period of reactivity**. This is when the nurse will note the return of responsiveness from the neonate, lasting from 2 to 8 hours. The neonate will experience periods of tachycardia and abrupt changes in tone, color, and bowel sounds. The neonate can experience an excess of oral mucus, sometimes appearing as vomiting, gagging, and choking on amniotic fluid left over from birth. This is an expected finding, and the nurse will reassure the parents and educate them that this may occur for the next 7 days as the newborn clears their airways. Upon assessment during this time, the nurse will note that the neonate often has passed their first meconium stool. During this final stage of reactivity, the nurse will also notice that the neonate demonstrates increased hunger cues, making this an excellent time for another breast-feeding session. During increased alert periods, parent-infant bonding can be established.

Abnormal Transition

Neonatal assessment findings indicating abnormal transition include the following:

- Persistent tachycardia, longer than the first hour of life; fixed bradycardia
- Diffuse and persistent rales upon auscultation, retractions, grunting, nasal flaring lasting longer than the first hour of life
- Persistent cyanosis and pulse oximetry less than 90 percent on room air and requirements for supplemental oxygen after the first hour of life
- Episodes of prolonged apnea (longer than 20 seconds) and bradycardia (less than 80 beats/min)
- Marked pallor
- Temperature instability persistently after 2 to 3 hours of life lower than 36.5° C (97.7° F)
- Poor capillary refill (greater than 3 seconds)
- Unusual neurologic behavior (lethargy, hypotonia, excessive tremors, jitteriness, inconsolable crying, poor feeding)
- Excessive oral secretions (choking, excessive drooling, cyanosis with coughing) (Fraser, 2002)

When the nurse identifies a neonate who is experiencing abnormal transition, they must support the newborn in whatever area the newborn is having difficulty moving through. Suctioning for an open airway, maintaining a stable neutral temperature, or encouraging skin-to-skin would all be independent nursing interventions, while persistent desaturations and marked pallor may require a specialist and further diagnostic evaluation. The nurse needs to know when the newborn requires interventions beyond independent nursing interventions.

22.3 Neutral Thermal Environment

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Illustrate the importance of maintaining a neutral thermal environment when caring for a newborn patient
- Compare and contrast all four ways that a newborn can lose heat and verbalize ways a nurse can help maintain a neutral thermal environment
- Discuss the importance of the Ten Step Warm Chain and how it impacts the care given to a neonate
- Summarize the signs and symptoms of cold stress and how to care for a newborn with cold stress

One of the most vital goals for a nurse caring for a neonate is providing support to maintain their temperature while they transition from intrauterine to extrauterine life.

Thermoregulation in the Newborn

The thermal balance created by the loss of heat to the environment at a rate equal to the heat being produced is called **thermoregulation**. Neonates have a poor ability to maintain thermoregulation because they have very little brown adipose tissue that stores the energy useful for creating heat. The neonate is also unable to shiver, which is a reflex helpful in raising temperatures. Maintaining a thermoneutral environment, between 36.5° C (97.7° F) and 37° C (98.6° F), throughout the transitional period is essential for a neonate. An appropriate temperature environment can be maintained via radiant warmer, swaddling ([Figure 22.8](#)), and skin-to-skin contact with the birthing person, the partner, or available extended family (Fraser, 2014).



FIGURE 22.8 The Swaddled Newborn This newborn is swaddled appropriately to encourage thermoregulation. (credit: “Baby Wrapped in White Cloth” by Jonathan Borba/Pexels, Public Domain)

Heat Loss in the Newborn

Neonates can experience heat loss in the hospital or home environment in four ways: radiation, evaporation, convection, and conduction. Neonates are **homeothermic**, meaning that they attempt to stabilize their core internal temperature despite significant temperature variations in their environment (Fraser, 2014; Trevisanuto & Sedin, 2016). A **neutral thermal environment** is the minimum temperature range necessary for heat production to maintain normal body temperature (Fraser, 2014; Trevisanuto & Sedin, 2016) ([Figure 22.9](#)). Term and postterm neonates require higher environmental temperatures than adults to maintain a neutral thermal environment, between 20° C and 22° C (68° F and 72° F).

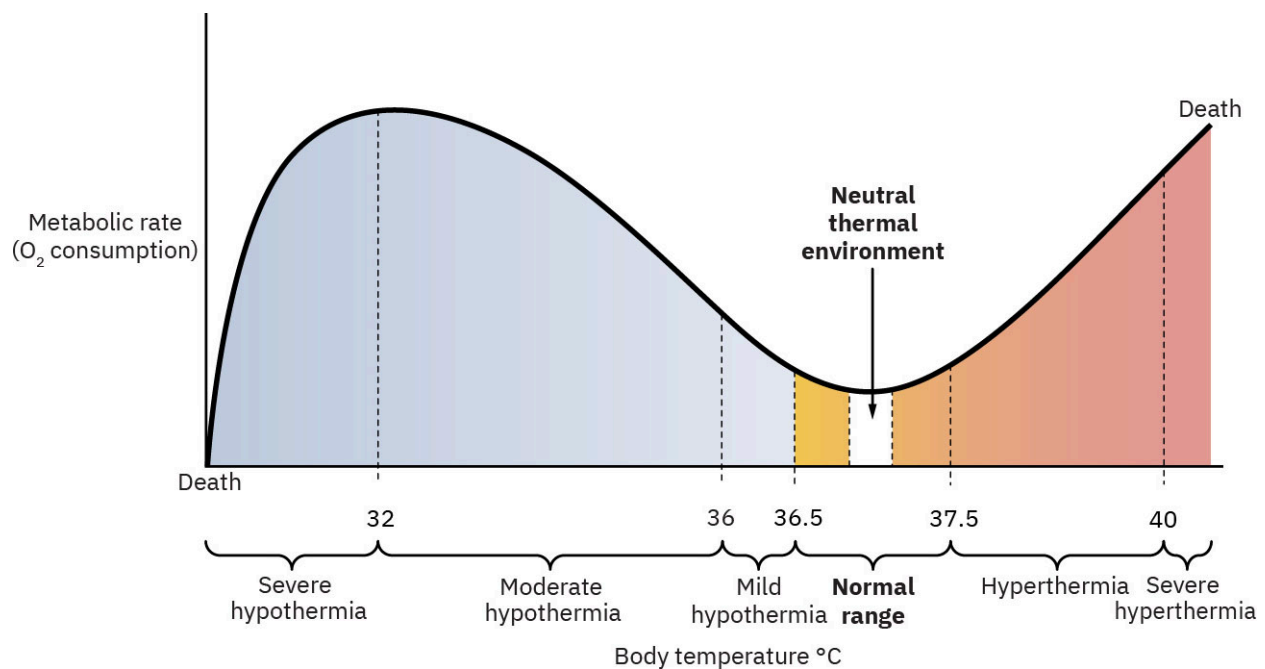


FIGURE 22.9 Neutral Thermal Environment for the Neonate Newborns have a very narrow therapeutic range for the neutral thermal environment. Exceeding that in either direction can raise metabolic needs and may cause death (Al-Taweel, 2006). (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Several neonatal characteristics affect thermal stability:

- Heat transfer from the newborn's organs to skin surface is increased compared to that of adults because of the neonate's decreased subcutaneous fat and large body surface-to-weight ratio (Fraser, 2014; Trevisanuto & Sedin, 2016).
- The blood vessels in the neonate are closer to the skin than those of an adult. This causes the circulating blood to be more readily influenced by environmental temperatures, thus influencing the hypothalamic temperature-regulating center in the brain (Trevisanuto & Sedin, 2016).
- Newborns rely on nonshivering thermogenesis for heat production via metabolism of brown adipose tissue (Fraser, 2014).
- At birth, the newborn prefers to stay in a fixed posture, decreasing the surface area exposed to the environment, reducing heat loss (Trevisanuto & Sedin, 2016).

Evaporation

One of the most common ways that a neonate experiences heat loss in the birthing room and on the postpartum unit is **evaporation**, which is heat loss that occurs when liquid is converted to vapor. The amniotic fluid and/or blood on the infant holds water that cools the neonate when exposed to the cooler environment ([Figure 22.10](#)). Evaporation can also occur if the neonate is tachypneic and exhaled moisture or water is escaping from the respiratory tract. Radiant warming beds and phototherapy can also cause evaporation heat loss (Fraser, 2014; Interprofessional Education and Research Committee of the Champlain Maternal Newborn Regional Program, 2013). Neonates are at particular risk of heat loss via evaporation at the time of birth and during their newborn bath. In the birthing room, the nurse can use warmed blankets to dry the neonate, discarding wet ones and replacing them with dry ones as needed. At the newborn bath, the nurse exposes only the necessary areas of the neonate and ensures that they have had stable temperatures before bathing.



FIGURE 22.10 Heat Loss due to Evaporation Immediately after birth, this newborn starts to lose heat via evaporation due to being wet in a cold room. Therefore, the nurse will begin drying them off with a warm blanket. (credit: "Image of Baby, Newborn and Child" by Engin Akyurt/Pixabay, CC0)

Convection

The loss of heat from the body surface to the surrounding air by a current, like a fan in a room, is called **convection**. This can be caused by a fan, an air-conditioned room, removing a neonate from an incubator for a procedure or feeding, or even unwarmed oxygen in a mask. The impact on the neonate depends on the amount of time they are exposed to the cooled air, the velocity of the moving air, the temperature difference between the neonate's skin and the air, and the amount of body surface exposed. (Lubkowska et al., 2019).

Conduction

The loss of heat when in direct contact with a cooler surface is called **conduction**. Nurses caring for a newborn can prevent this loss of heat by warming their hands, using warm blankets on scales and examination tables before placing the newborn on them, warming stethoscopes, and prewarming the warmer or incubator (Isolette) prior to placing the infant on the bed. Placing a neonate skin-to-skin with the birthing person, their other parent, or an extended family member is a very effective way to warm the neonate and prevent conductive heat loss.

Radiant Heat Loss

Another way that a neonate experiences heat loss is through **radiation**, which is heat loss occurring from transfer of heat to cool solid objects not in direct contact with the newborn. The walls or windows in a room, for example, can transfer heat from the neonate's body if the crib or incubator is placed too close to a cold space (Fraser, 2014; Interprofessional Education & Research Committee, 2013). If a nurse places a bag of ice near the newborn in the crib or incubator while preparing to draw blood gases, that will increase radiant heat losses. Placing a hat on the newborn conserves heat, decreasing radiant heat loss. The nurse and parents must be very aware of where the newborn is placed because radiant heat loss for a newborn can happen quickly.

[Figure 22.11](#) summarizes the methods of heat loss.

Neonatal heat loss

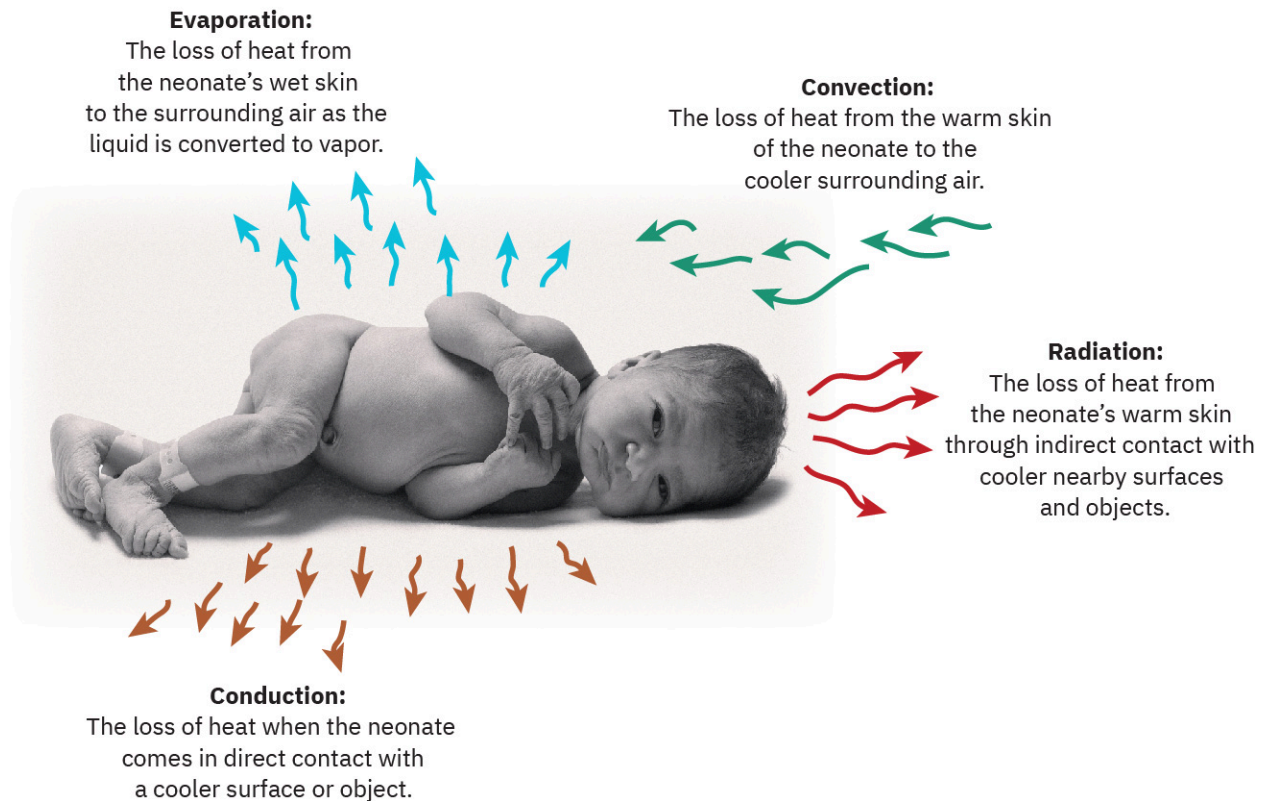


FIGURE 22.11 Neonatal Heat Loss Convection, conduction, evaporation, and radiation are four ways neonates lose heat in the transitional period. (credit: modification of work “Danderyd Hospital newborn baby” by SCA Svenska Cellulosa Aktiebolaget/Wikimedia Commons, CC BY 2.0)



CULTURAL CONTEXT

South African Cultural Attitudes about Neonatal Baths

In the Vhembe District, Limpopo province of South Africa, indigenous people do not bathe newborns only for hygienic purposes. They mix indigenous herbs with the bath water for protection from evil spirits carried by people, as well as general well-being and relaxation. The traditional bath that occurs in the first three to four days of life, *gumululo*, contains three traditional medicines that are boiled with water and added to the bath in place of soap. The bath is given to neonates to make them strong and protect them. At the end of the bath, they offer a small amount of the bath water to the neonate to drink (Tuelo & Mulaudzi, 2021).

Ten-Step Warm Chain

The **ten-step warm chain** was developed in 1997 by the World Health Organization in advocating for a more standardized approach to support thermal stability in the newborn (World Health Organization, 1997). While not the standard of care in the United States, the ten-step model is still widely used in low-resource countries. The ten steps include

1. warm delivery room,
2. immediate drying,
3. skin-to-skin contact,
4. breast-feeding,
5. bathing and weighing postponed,
6. appropriate clothing and bedding,
7. mother and baby together,
8. warm transportation,

9. warm resuscitation, and
10. training/awareness-raising (World Health Organization, 1997).

According to the ten-step warm chain, the delivery room should be at least 25° C (77° F) with no drafts, with no fans moving air around, and with all supplies needed to keep the newborn warm prepared ahead of time (World Health Organization, 1997). At no time should the birthing person, visitors, or nurses change the temperature of the delivery room. Immediately after the birth, the nurse can prevent heat loss in the neonate by drying the newborn with a warm blanket or cloth to prevent evaporation (World Health Organization, 1997). After drying the infant, the nurse will place the newborn on a warm surface, such as skin-to-skin with the birthing person's chest or abdomen or in the radiant warmer to prevent conductive heat losses. This is when the nurse should encourage the birthing parent to initiate breast-feeding, according to the ten-step warm chain (World Health Organization, 1997). Bathing must wait until at least 6 hours post birth or by 24 hours of age and when the newborn's temperature has been consistently stable (Association of Women's Health, Obstetric and Neonatal Nurses [AWHONN], 2019; World Health Organization, 1997). Bathing should be done quickly with warm water. The newborn should be dried thoroughly, dressed in appropriate clothing, and given to the birthing person to be kept warm. If transportation is necessary, skin-to-skin with the birthing person is safest and recommended. If that is not possible, the next best option is a fully clothed newborn, swaddled, and in the arms of another adult or a transport device (World Health Organization, 1997).

Cold Stress in the Newborn

When a neonate loses more heat in a period than they can reproduce, they experience **cold stress** (AWHONN et al., 2023), which requires them to use compensatory mechanisms (increased respirations and nonshivering thermogenesis) to maintain core body temperature. When a neonate experiences excessive heat loss, they use stores of energy to compensate and maintain core temperature in the normal range. An increase in metabolic heat production above the basal metabolism that is not associated with muscle activity is called **nonshivering thermogenesis (NST)**. This occurs mostly through metabolizing brown fat and, to a much lesser degree, through the metabolization of skeletal muscle, the liver, the brain, and white fat. Brown fat mass peaks at birth and decreases in size over the first few weeks of life. Its metabolism is initiated with a catecholamine release. A newborn's responsiveness to the release of catecholamines is increased by cutting the umbilical cord. Cutting the cord, release of catecholamines, and the stimulation of brown fat tissue are the driving factors in neonatal thermogenesis (Dattani & Gevers, 2016).

The metabolic consequences of cold stress are increased oxygen and glucose requirements and decreased cardiac output causing a decreased pulmonary blood flow leading to pulmonary hypertension and decreased surfactant production. These consequences result from activation of the sympathetic nervous system and are potentially fatal if not caught and reversed in time. Because of these major metabolic changes, the neonate goes into respiratory distress, sometimes experiences intraventricular hemorrhage, and has a higher risk of mortality than newborns who have not experienced cold stress (AWHONN et al., 2023). Preterm neonates and those who experienced intrauterine growth restriction are at increased risk for cold stress and higher mortality due to their decreased adipose tissue, brown fat, and glycogen available for metabolism (Gardner, 2020).

Causes of Cold Stress

As discussed earlier, heat loss can occur in a neonate from four different mechanisms: evaporation, convection, conduction, and radiation. The ways in which a neonate can lose heat during the immediate care period are numerous, and only some of the most frequent are listed here. Through evaporation, the newborn loses heat quickly immediately post birth in the birthing room and must be dried vigorously by the nurse, wrapped in a warm blanket, or placed skin-to-skin with the birthing person. Heat loss can also be caused by newborn baths, and for this reason, it is generally recommended that the bath be given between 6 hours and 24 hours after birth, when the newborn has had multiple temperatures over 37.5° C (99.5° F). Baths should use warm water and be as short as possible. The nurse should plan to use appropriate rewarming measures after bathing, including skin-to-skin contact (New, 2019). Placing the crib too close to a drafty window or a cold wall accelerates neonatal heat loss, as does having a ceiling fan or circulating fan in the room.

Signs and Symptoms of Cold Stress

It is critical that the nurse be aware of the signs and symptoms of cold stress developing in the neonate so that they

can recognize subtle changes. The most obvious sign is an axillary temperature reading below 36.5° C (97.7° F). (See [Chapter 23 Newborn Assessment](#) for a discussion of taking axillary temperatures in the newborn.) Neonates should have temperatures monitored often during the first hour after birth and every 4 hours after that. Beyond a low axillary temperature, a neonate experiencing cold stress will appear acrocyanotic, irritable, and hypotonic (Gardner, 2020). Additionally, the neonate will become hypoglycemic due to the increased metabolic demand on their body brought on by the cold stress.



CLINICAL SAFETY AND PROCEDURES (QSEN)

Neonatal Cold Stress: Management

Management of hypothermia in a neonate is vital to keep them thermodynamically stable. The nurse caring for the neonate needs to know the steps to take to correct hypothermia before it escalates to cold stress.

- 1. Radiant Warmer:** Warmers limit heat loss because of ease of access and constant temperature monitoring and control. During the immediate care period, neonates are subjected to many interventions that require them to be away from the birthing person and away from skin-to-skin temperature protection. Therefore, anytime the neonate is away from that protection, they should be wrapped in warm blankets, wear a hat, and be placed under the radiant warmer.
- 2. Handling and Temperature:** Neonate temperatures should be monitored hourly for the first 4 hours post birth and then every 4 hours after that if they are stable. If they are not stable, temperatures need to be monitored more frequently while corrective measures are being taken. Temperatures should be taken before an intervention is done and then after. If the nurse uses corrective measures to increase a hypothermic neonate's temperature, they should always recheck the temperature and document any change.
- 3. Glucose monitoring:** Infants that are small-for-gestational age or large-for-gestational-age, will need blood glucose monitoring every 4 hours. Knowing that metabolic requirements increase for neonates in hypothermic states, the nurse will recognize that if a neonate is hypoglycemic, the nurse should also check their temperature.
- 4. Clothing:** Neonates are sensitive to changes in airflow and evaporation, as well as changes in environment, and should be dressed and swaddled appropriately in the first 28 days. Hats, T-shirts or footed pajamas, and warm blankets are the very least they should be dressed in to ensure temperature regulation.
- 5. Respiratory Changes:** Two of the first signs of cold stress are irritability and changes in respiration, so thorough and accurate assessment of the respiratory system is key to recognizing subtle changes in the neonate. Assessment of the respiratory system will be done hourly in the first 4 hours and after that every 4 hours until discharge. (Fellows, 2010)

Prevention and Management of Cold Stress

Prevention of cold stress is the focus for the nurse and includes keeping the neonate dry after birth and wrapped in warm blankets or in skin-to-skin contact with the birthing person if possible. If the newborn's temperature is unstable with skin-to-skin contact, the nurse will swaddle the newborn in warm blankets and place them under the radiant warmer, rechecking their temperature in 30 minutes. If the neonate is already experiencing cold stress, the nurse will check the blood glucose of the newborn with a point of care machine and work diligently to rewarm the baby with swaddling and radiant warmer. Other interventions include ensuring that the newborn is dry and has a hat on their head, that all steps of the ten-step warm chain have been followed, and that a health-care provider has been notified of this critical change for the newborn.

When to Call for Help

The nurse will call the pediatrician or the NICU for help if, upon recheck in 30 minutes, the newborn's temperature is still below 36.5°C; the infant loses consciousness; or the infant experiences respiratory distress signs, such as grunting, nasal flaring, retractions, tremors, or jitteriness along with inconsolable crying. Close glucose monitoring may be required for at-risk neonates because symptoms can be subtle.

Summary

22.1 Apgar Scoring

Assessing a newborn as they transition from intrauterine to extrauterine life is a critical job for the nurse. To do it competently, the nurse must know what normal newborn behavior is in order to recognize what is not normal. The nurse auscultates newborn heart tones quickly and efficiently and recognizes lung sounds that are normal. The nurse also recognizes and reports sounds that are adventitious, and has situational awareness in the birthing room to quickly assess newborn tone, color, respiratory effort, and reflex responses in the first moments after birth. Most postbirth moments now occur on the birthing person's chest or abdomen (as discussed in the [Chapter 23 Newborn Assessment](#) chapter) unless there is an emergency or the newborn needs additional attention. The nurse who assesses for Apgar scores has a challenging role and needs their assessment skills to be effective and accurate. With competence and capability, a nurse can make a huge difference in this new person's life.

22.2 Physiological Adaptation and Transition

The neonatal transition period is an important time for careful assessment, early recognition of neonatal distress, and initiation of proper management. Successful transition from the intrauterine to extrauterine environment provides a solid foundation for continued normal neonatal transition. The nurse providing surveillance of the neonatal transition has a responsibility to keep the neonate safe, but also to keep the neonate with the birthing person, if possible, to achieve parent-newborn attachment in the first hours of life. Recognizing normal changes that occur in the newborn provides a foundation for initial, ongoing, and supportive care. It is critical for the nurse to perform accurate and frequent assessments to have early recognition of deviations from normal. Generally, within the first 4 hours after birth, the nurse will determine if the neonate has transitioned successfully or will need additional support. The infant should be monitored carefully during the first 4 hours of life. In general, however, the initial resuscitation period (the first 10 minutes or so of life) are the most critical.

22.3 Neutral Thermal Environment

Neonatal hypothermia and cold stress are a global concern, significantly affecting neonatal morbidity and mortality, especially for newborns who are premature or experienced growth restriction. Neonates have a limited ability to thermoregulate, and they experience heat loss rapidly in the immediate care period through four different avenues: radiation, evaporation, conduction, and convection. Prevention is the key to avoiding cold stress. By understanding thermoregulation, cold stress, and the complications and causes of cold stress, the nurse can be well equipped to prevent this fatal complication.

Key Terms

acrocyanosis cyanosis occurring only on the hands and feet, an expected finding in a newborn, that lasts up to a week

Apgar assessment standardized assessment to evaluate the response of the newborn's transition to extrauterine life based on heart rate, respiration, reflex irritability, muscle tone, and color at 1 minute and 5 minutes post birth

cold stress occurs when excessive heat loss requires the infant to use compensatory mechanisms (increased respirations and nonshivering thermogenesis) to maintain core body temperature

conduction heat loss occurring from direct contact with a cooler surface

convection heat loss occurring when heat is transferred from the body surface to the surrounding air by a current

encephalopathy with hyperammonemia high levels of ammonia in the blood that cause brain damage

evaporation heat loss that occurs when liquid is converted to vapor

extrauterine life life outside the uterus

first period of reactivity initial episode of neonatal behavior beginning at birth, lasting about 30 minutes, and characterized by activity, alertness, responsiveness, and interaction with anyone nearby

galactosemia buildup of galactose in the blood

homeothermic attempting stabilization internally despite significant temperature variations in the environment the neonate is presently in

intrauterine life life inside the uterus

meconium first stool the newborn passes, consisting of amniotic fluid, mucus, lanugo, and bile

muscle tone tension of healthy muscles that contributes a slight resistance to passive displacement of a limb

neutral thermal environment the temperature range necessary for heat production to be at a minimum to maintain normal body temperature

nonshivering thermogenesis increase in metabolic heat production above the basal metabolism that is not associated with muscle activity

patent ductus arteriosus (PDA) cardiac defect that occurs when a fetal anatomic shunt, the ductus arteriosus, fails to close after birth

patent foramen ovale (PFO) cardiac defect that occurs when a fetal anatomic shunt, the foramen ovale, fails to close after birth

period of decreased responsiveness secondary episode of neonatal behavior, lasting about 30 minutes to 2 hours, characterized by a marked decrease in motor activity, decreased vital signs, and deep sleep

radiation heat loss occurring from transfer of heat to cool solid objects not in direct contact with the newborn

reflex irritability newborn's response to stimulation from the nurse

second period of reactivity third and final episode of neonatal behavior lasting about 2 to 8 hours, characterized by increased activity, alertness, oral secretions, and an interest in feeding and parental-neonatal bonding; this is the final stage in neonatal transition

ten-step warm chain standardized program developed in 1997 by the World Health Organization to support thermal stability in the newborn

thermoregulation maintenance of thermal balance by the loss of heat to the environment at a rate equal to the heat being produced

transient neonatal thrombocytopenia condition of decreased platelets that develops in neonates

Assessments

Review Questions

1. The Apgar assessment tells the nurses and clinicians on the labor and delivery unit what information about the newborn?
 - a. The Apgar assessment and score tells the team how the newborn is doing neurologically and physically after the birth.
 - b. The Apgar assessment and score predicts the newborn's overall morbidity and mortality moving forward after birth.
 - c. The Apgar assessment and score tells the team how the newborn is transitioning to the extrauterine world after birth.
 - d. The Apgar assessment and score tells the team how the newborn handled the birth overall.
2. When thinking about scoring an Apgar assessment, the nurse knows that grimace is an assessment of what in a newborn?
 - a. Grimace is an assessment of a newborn's response to taking their first breath.
 - b. Grimace is an assessment of the flexion of hips and legs in the newborn.
 - c. Grimace is an assessment of the response to seeing their birthing person's face.
 - d. Grimace is an assessment of the response to stimulation from the nurse.
3. What kind of muscle tone does a preterm newborn have compared to a full-term newborn?
 - a. firm
 - b. abnormal
 - c. normal
 - d. flaccid
4. A nurse has just been asked to be the baby nurse for a coworker who is working with a birthing woman at 35 weeks, 3 days. The patient has preeclampsia, has had a very hard labor with multiple decelerations on her fetal heart monitor, and her amniotic fluid had meconium when her water was broken earlier in the day. In anticipation of this birth, what resources will the nurse need to gather? Select all that apply.
 - a. another baby nurse to help
 - b. Neonatal Intensive Care team

- c. radiant warmer for the newborn
 - d. intubation kit
 - e. tracheotomy kit
5. A full-term newborn has been delivered by a physician after a lengthy labor and delivery. The newborn has poor tone, minimal respiratory effort, and central cyanosis. The cord is cut, and the patient is placed in an infant warmer. What data does the nurse need to notice that are clinically significant? Select all that apply.
- a. Assess ABCs in newborn.
 - b. Apgar score is determined.
 - c. Temperature is measured.
 - d. Vaccination is ready for administration.
 - e. Length is measured.
 - f. Head circumference is measured.
 - g. Single IM injection of vitamin K is ready for administration.
6. Transient tachypnea of the neonate develops due to what pathophysiologic phenomenon?
- a. failure to clear lung fluid by the usual mechanism
 - b. failure of the patent ductus arteriosus to close
 - c. insufficient surfactant production
 - d. aspiration of meconium during vaginal or cesarean birth that interferes with surfactant activity
7. The most effective time to initiate breast-feeding is in which stage of reactivity for the neonate?
- a. period of decreased reactivity
 - b. first period of reactivity
 - c. second period of reactivity
 - d. after the end of the second period of reactivity
8. Of the three fetal shunts, which one moves fetal blood from the lungs through the right atrium to the left atrium?
- a. ductus venosus
 - b. foramen ovale
 - c. ductus arteriosus
 - d. foramen venosus
9. Blood flow connection between the systemic, aorta, pulmonary blood flow, and pulmonary artery is which fetal shunt?
- a. ductus venosus
 - b. foramen ovale
 - c. ductus arteriosus
 - d. foramen venosus
10. What assessment findings indicate abnormal transition in a neonate? Select all that apply.
- a. prolonged apneic episodes
 - b. marked pallor
 - c. excessive oral secretions
 - d. crackles upon auscultation
 - e. blue hands and feet
 - f. poor capillary refill (longer than 3 seconds)
11. A newborn at 20 minutes of age has an axillary temperature of 36° C (96.8° F). What intervention should the nurse perform?
- a. ensure skin-to-skin contact until temperature is 37° C (98.6° F)

- b. give the baby a warm bath and then return to the birthing parent for skin-to-skin contact.
 - c. place the baby under the radiant warmer until skin temperature is 37.5° C (99.5° F)
 - d. check the baby's rectal temperature
- 12.** The nurse recommends skin-to-skin contact immediately following the birth of a newborn because it reduces what type of heat loss?
- a. radiation
 - b. convection
 - c. conduction
 - d. evaporation
- 13.** After birth, the nurse immediately dries a neonate's face and hair with a clean, prewarmed towel. After drying, the nurse covers the neonate's hair with a cap. What type of heat loss is the nurse preventing?
- a. convection
 - b. conduction
 - c. evaporation
 - d. radiation
- 14.** The nurse is caring for a neonate born at 36 weeks, 2 days by primary cesarean birth and weighing 6 pounds, 4 ounces. The infant cried at delivery, had flexion in all extremities, had a heart rate of 135, had acrocyanosis in hands and feet, and was pale. The infant was placed skin-to-skin with the birthing person and has been latching and cuddling for the past 15 minutes. At 45 minutes, the neonate is found grunting and cool to the touch. What are the nurse's next steps?
- a. Stimulate the neonate to take some deep breaths.
 - b. Ask the birthing person to wrap the baby in their blankets and cuddle them closer.
 - c. Take the neonate to the radiant warmer and check their temperature.
 - d. Call the NICU staff and activate the staff assist light in the birthing room.
- 15.** What steps are included in the QSEN steps for rewarming a neonate at risk for cold stress? Select all that apply.
- a. placing the neonate under the radiant warmer
 - b. putting a pulse oximeter on the neonate
 - c. assessing a blood glucose level
 - d. calling the NICU team for assessment
 - e. making certain the neonate is dressed appropriately to ensure warmth in the birthing room
 - f. assessing respiratory status often
- 16.** What characteristics are directly related to the newborn's decreased ability to maintain thermal stability?
- a. A neonate has decreased subcutaneous fat and a large body surface-to-weight ratio.
 - b. The blood vessels in the neonate are farther from the skin than those of an adult.
 - c. Newborns are unable to rely on brown adipose tissue for heat production.
 - d. The newborn prefers to be in constant motion, increasing the surface area exposed to the environment.

Check Your Understanding Questions

- 1.** An infant at a gestation of 36 weeks and 1 day is born on the labor and delivery unit in the OR, and you are working as the baby nurse. You receive the baby from a 27-year-old G1P0 who gave birth today because she has a placenta previa and is actively bleeding. When the baby is given to you, she is limp, not making any noises, and pale. You bring her to the radiant warmer quickly. Please list what you will do when you receive the neonate.
- 2.** A birthing person just vaginally delivered at 38 weeks and 2 days' gestation. The infant has blue hands and feet, a heart rate of 110, slow breaths, and some flexion in the extremities. The infant pulls his foot away when the nurse rubs it and has flexed arms and legs. What is his Apgar score?

3. Explain the relevance of the Apgar score and why nurses use it as an assessment tool in the birthing room.
4. List five assessment findings that would indicate a neonate in respiratory distress in the immediate postbirth period.
5. Describe three ways that fetal circulation varies from neonatal/newborn circulation.
6. Define the importance of understanding the phases of reactivity for the neonate.
7. Explain the role of the baby nurse in the birthing room.
8. Name some of the metabolic requirements that increase or decrease with cold stress in the newborn.
9. Discuss the steps a nurse should follow to assess and manage cold stress in the newborn.
10. Verbalize the importance of the ten-step warm chain and list all ten steps in the chain.

Reflection Questions

1. What can a nurse do to improve the safety of babies in the birthing room?
2. Prior to a birth, what type of equipment should the nurse confirm is adjacent to the radiant warmer in order to ensure the safe care of the neonate?
3. What information would the baby nurse want to know about the birthing person, the labor, and medications the birthing person received before the neonate is born?
4. In what ways would the nurse prepare the birthing room to prevent cold stress in the neonate?
5. In what ways would the nurse prepare the postpartum room to prevent cold stress in the neonate?
6. What are some educational topics the nurse would discuss with the new parents to prevent cold stress in the newborn when they take their baby home?

Competency-Based Assessments

1. Why is the Apgar scoring assessment performed, and how does it contribute to the immediate care and decision making for a neonate? Provide examples of situations where a low Apgar score might prompt specific interventions.
2. As a neonatal nurse, what specific questions would you ask the obstetric team or gather information about before a neonate is born in the birthing room? How does this information contribute to preparing for the immediate care of the newborn?
3. A newborn has just been delivered and is undergoing the transition to extrauterine life. As a nurse caring for a newborn in the first moments after birth, why is it crucial to understand and anticipate the physiologic adaptations occurring? Provide examples of nursing interventions that support these adaptations.
4. In a scenario where a newborn is experiencing respiratory distress, how do you differentiate between normal adaptation changes and signs of potential complications? Provide examples of nursing actions that address both respiratory and cardiac aspects of stabilization.
5. A neonate is at risk of heat loss. Outline the four ways a newborn can lose heat and explain how these mechanisms differ. Provide examples of nursing interventions for each type of heat loss, emphasizing the importance of a comprehensive approach to maintaining a neutral thermal environment.
6. A newborn is exhibiting signs of cold stress. How does cold stress impact physiologic functions, and what nursing interventions are essential to caring for a newborn experiencing cold stress? Provide examples of how a nurse can effectively warm a cold-stressed neonate.

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CHAPTER 23

Newborn Assessment



FIGURE 23.1 Assessment of the Newborn The nurse's assessment is critical for the care and management of a newborn. (credit: "A Doctor Assessing a Newborn Child" by Lemniscate L/Pexels, CC0)

CHAPTER OUTLINE

23.1 Physical Assessment of the Newborn

23.2 Estimation of Gestational Age of the Newborn and Newborn Behavioral Assessment

INTRODUCTION The nurse is typically the first person to assess the newborn. This is the first time the newborn has been touched outside the womb. Though ultrasound scans and imaging can be done to make educated estimates of gestational age and development, the true assessment can now occur with the newborn. It is important to estimate the gestational age and complete a physical assessment of the newborn within the first few minutes to hours of birth. A behavioral assessment is completed by the nurse to help determine the temperament of the newborn and to best support attachment between the parent and newborn. These early assessments help the health-care provider determine the newborn's need for future care and evaluations for any findings of concern. In most cases, the newborn assessment is conducted in the presence of the parents, so this is an excellent opportunity for the nurse to explain in lay terms how newborn physiology differs from that of adults and older children.

23.1 Physical Assessment of the Newborn

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Summarize newborn vital signs and implement techniques learned in the clinical setting with minimal disruption to the newborn
- Identify and demonstrate the components of a head-to-toe newborn physical examination
- Distinguish between different newborn skin variations, both normal and abnormal
- Identify newborn neurologic reactions to maternal substance misuse and recognize the appropriate next steps for safe newborn care

The nurse's assessment of the newborn focuses on knowing and understanding the language of the newborn, their behavioral cues, and normal newborn anatomy and physiology. With that knowledge, the nurse can identify the slightest changes in the condition of the newborn in their care. Neonatal nurses' expertise in newborn behavior and communication and their ability to assess newborn behavior through vital signs, head-to-toe assessment, and neurologic behavior are imperative to caring for neonates.

Newborn Vital Signs

Obtaining newborn vital signs is a skill that takes practice. Auscultation may be challenging because of newborns moving and crying during the assessment. Focus on starting with the least invasive assessment item and saving the most invasive for last to decrease the chance of crying. Auscultation is a skill that new nurses will need to practice often, but it is vital to the care and management of a newborn. Newborn vital signs are best obtained in a warm, well-lit place where the newborn is quiet and comfortable. Start with the heart rate and respirations. If the nurse can complete those while the newborn is sleeping or in a calm, relaxed state, that is the best time to obtain them. Heart rate is always counted at the apex, which can best be found at the fourth intercostal space. This will be the same from birth to about 3 years of age.

Listen with a stethoscope for 1 full minute, followed by counting respirations with a stethoscope for 1 full minute. Normal newborn heart rates are 120 to 160 beats per minute (Stanford Medicine, Childrens Health, 2022). If no stethoscope is available in the first few minutes after birth, the base of the umbilicus can be used to assess the heart rate, although the most accurate method is with the use of a stethoscope (Johnson & Schmölzer, 2020). For new nurses, it is sometimes easier to listen for a minute with the stethoscope and put their other hand on the newborn's abdomen while watching for breaths to correlate with what they are hearing. Normal respirations are 30 to 60 respirations per minute (Stanford Medicine, Childrens Health, 2022) and may increase with crying. Temperatures are obtained by the axillary method, with the thermometer being placed vertically under the arm with the tip in the axilla ([Figure 23.2](#)). Expected temperatures are 36.5° C to 37.5° C (97.7° F to 99.4° F) (Stanford Medicine, Childrens Health, 2022). Pain should be assessed as a vital sign, evaluated with a neonatal pain evaluation tool. Blood pressures are not usually assessed on newborns unless they are in the neonatal intensive care unit. [Table 23.1](#) lists expected normal newborn vital signs (Stanford Medicine, Childrens Health, 2022).

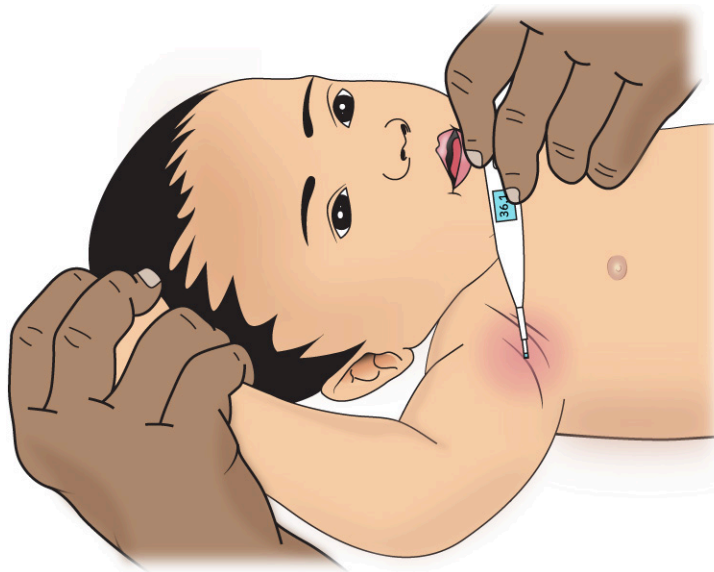


FIGURE 23.2 Axillary Temperature Temperatures of newborns are obtained by the axillary method, with the thermometer being placed under the arm with the tip in the axilla. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Temperature	Respirations	Heart Rate
36.5° C–37.5° C (97.7° F–99.4° F) • Axillary: 36.5° C–37.5° C (97.7° F–99° F) • Skin: 36° C–36.5° C (96.8° F–97.7° F) • Rectal: 36.6° C–37.2° C (97.8° F–99° F)	• 30–60 respirations/minute • Primarily diaphragmatic with abdominal movements • Obligate nose breathers • Respirations counted for 60 seconds	• 120–160 beats per minute (bpm) (Stanford Medicine, Childrens Health, 2022) • During deep sleep, may decrease to 70–90 bpm, can increase to 180 bpm during crying • Apical pulse counted for 1 full minute with a stethoscope

TABLE 23.1 Newborn Vital Signs

Pain in the newborn cannot be expressed in the way an adult can verbally describe and locate their pain. Pain scales developed specifically for the neonatal or nonverbal population have been created and evaluated to assess this vital sign in the newborn population. The Neonatal/Infant Pain Scale (NIPS) (Sarkaria & Gruszfeld, 2022) and the Face, Legs, Activity, Cry, and Consolability (FLACC) scale are examples of pain scales specifically used in nonverbal patient populations.

LINK TO LEARNING

The [Neonatal/Infant Pain Scales \(https://openstax.org/r/77KidPainScale\)](https://openstax.org/r/77KidPainScale) is a pain assessment tool used in children less than 1 year of age. Caregivers and health-care providers can use the child's body language to determine their degree of pain.

Assessment of General Appearance

The nursing assessment is the part of the nursing process whereby a nurse gathers patient health information using evidence-informed tools to learn more about a patient's overall health, symptoms, and concerns (Toney-Butler & Unison-Pace, 2022). Newborn assessment begins with an evaluation of the general appearance of the newborn. A typical newborn will have a head that is disproportionately large for their body, with a neck that appears short

because their chin rests on their chest. Their abdomen will be round and protruding, the chest will appear small and thin, and their arms and legs will be flexed. They will have an umbilical cord in the center of their abdomen that has a cord clamp on it. Newborns will have their hands tightly clenched, and their hands and feet may remain blue for the first 24 to 48 hours, a common finding called *acrocyanosis*. Their bodies should be a color that is appropriate for their ethnicity, but in general, melanin takes a while to appear after birth.

Weight and Measurements

Full term weights of newborns vary greatly depending on the race of the parents. Newborn infants of Black, Asian, and Hispanic heritage generally are somewhat smaller when born at term than White newborns (Ro et al., 2019). The average weight of a newborn in the United States in the past decade is between 5 pounds, 8 ounces (2,500 grams), and 8 pounds, 13 ounces (3,850 grams) (Desiraju, 2018). Maternal factors that can influence the weight of a newborn are health; nutrition during the pregnancy; intervals between pregnancies; use of substances including tobacco, nicotine, narcotics, and alcohol; gestational diabetes; and the size of both parents. The newborn will initially lose weight—up to 10 percent of their birth weight—in the first 3 days after birth (Figure 23.3). They are expected to regain their birth weight by 2 weeks of life (DiTomasso, 2019).

LINK TO LEARNING

The U.S. Centers for Disease Control and Prevention (CDC) recommends that health-care providers follow World Health Organization (WHO) growth standards for children zero to 2 years of age. The World Health Organization has established breast-fed newborns as the norm for growth and therefore have recommended this as the standard for infant feeding. The [chart reflects growth patterns \(https://openstax.org/r/77growthpattern\)](https://openstax.org/r/77growthpattern) for children who were predominantly breast-fed for at least 4 months and still breast-feeding at 12 months. Clinicians and nurses still use this CDC growth chart as a standard on how children should grow, and this begins in the hospital at the time of birth. Nurses will document the newborn's weight and length in the chart, and this will be the first measurements plotted on the newborn's growth chart.



FIGURE 23.3 Weighing the Newborn The nurse will weigh the newborn at birth and again before discharge to ensure weight loss has not been excessive. (credit: “Newborn Weight” by Robyn Alvarez/Flickr, CC BY 4.0)

During the initial newborn period of the first week, the newborn will have a physiologic weight loss of approximately 5 to 10 percent due to fluid shifts. This occurs because about 75 percent of the newborn's body is made of water. Keep in mind that larger babies will have larger weight losses because they have more fluid in proportion to their birth weight. However, a weight loss of more than 10 to 12 percent requires further evaluation (Children's Hospital of Philadelphia, 2022). After regaining their birth weight, the infant will double their weight in the first 5 or 6 months. The newborn will increase their weight by approximately 5 to 7 ounces (140 to 200 grams) per week (Children's

Hospital of Philadelphia, 2022). If the newborn is breast-feeding, the nurse will need to assess feeding effort and coordination, along with collaborating with the care team that includes a lactation consultant and the pediatrician. Typically, birth weight is regained in 14 days (Levinson, 2020).



CULTURAL CONTEXT

Health-Care Disparities of the Newborn

Cultural, racial, and ethnic related disparities in newborn medical care is a chronic issue within health care. Newborn infants, particularly preterm infants, who are from Black, Hispanic, Native American, and Puerto Rican populations have been shown to be more likely to experience serious complications or disparities in health outcomes. The long-term possible consequences of disparities in health care include increased risks of morbidity, poor neurodevelopmental outcomes and behavioral deficits that influence health and quality of life over the lifetime (Ravi et al., 2021).

To measure the length of the newborn, the nurse will place the newborn in a supine position with their legs extended as much as possible, remembering that newborns prefer to keep their legs flexed and tense ([Figure 23.4](#)). The average length is 50 cm (20 inches), with a range of 46 to 56 cm (18 to 22 inches) determined by a combination of genetics and environmental factors. The newborn will grow approximately one-half inch to one inch (1.5 to 2.5 cm) per month (Stanford Medicine, Children's Health, 2022). During their lifetime, this is the period of most rapid growth.

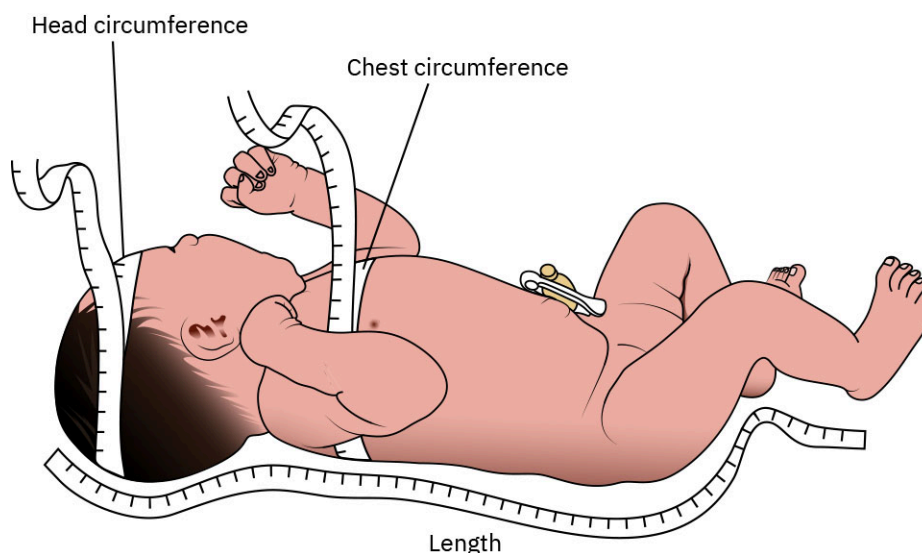


FIGURE 23.4 Newborn Measurements The nurse will measure the length of the newborn at birth, their head circumference, and their chest circumference. To measure the full length of the newborn, place the tape measure at the top of the newborn's head, stretching the newborn's legs out to ensure accurate length. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Head circumference is measured at birth and regularly during the first 2 years of life. Growth averages 0.5 cm a week during the first 2 months of life and then slows to half that rate. Place the measuring tape at the widest point of the head, from the most prominent point of the forehead around to the back of the head.

Chest circumference is measured at birth or shortly after by using a measuring tape aligned to the nipples (Azevedo et al., 2019). This measurement can help determine if an infant is small for gestational age from intrauterine growth retardation with a small chest-to-head circumference ratio. The infant of a person with gestational diabetes would have a relatively large chest-to-head ratio (Nichols, 1996).

Monitoring Temperature in the Newborn

Newborns are unable to regulate their temperatures. For the first 24 hours of their lives, it is important that the nurse monitor the temperature and assist the parents in maintaining the newborn's temperature. Keeping newborns in a thermal-neutral environment, between 36.5° C and 37.5° C (97.7° F–99.4° F), is a high priority for nurses. This is a vital function and one that is reflective of physiologic maturity. The earlier the gestational age of the infant, the

more difficult it is for them to maintain their temperature (Gardner, 2020).

The nurse's responsibility in thermoregulation is to monitor the newborn's temperature and provide an environment that reduces heat loss and avoids cold stress (Gardner, 2020). Thermoregulation by the nurse and caregivers is necessary due to the unique physiologic mechanisms competing within the newborn.

Ideally, placing the newborn skin to skin with one of the parents can aid in thermoregulation. However, if a newborn's temperature drops too low, the nurse will need to move the infant to a warmer or incubator (Isolette) because skin-to-skin care cannot reverse hypothermia quickly enough.

Excessive heat loss triggers compensatory mechanisms in the newborn, including increased respirations and nonshivering thermogenesis, which are indications of cold stress. These behaviors are the infant's effort to produce heat and maintain core body temperature. If the newborn is not kept warm, cold stress can lead to hypoglycemia, poor feeding, and even respiratory distress. While inside the uterus, the fetus's temperature was the same as or slightly higher than that of the pregnant person. When a newborn enters the world, their temperature drops significantly, and the newborn is unable to thermoregulate for themselves. Newborns have very thin skin, their blood vessels are very close to the surface, they have very little brown or subcutaneous fat, and their ratio of body surface to body mass is three times that of adults. Therefore, it is important that the nurse manage the newborn's environment to help maintain their body temperature.

CLINICAL JUDGMENT MEASUREMENT MODEL

Take Action: Maintaining Normothermic Temperature in a Newborn

The nurse is preparing to settle a newborn in a bassinet next to their parent in the shared delivery and postpartum room. The nurse knows that the newborn is unable to thermoregulate themselves well and that the environment may decrease their body temperature by evaporation, convection, conduction, and radiation. By both placing a hat on the newborn's head and swaddling them in a thin blanket, the nurse is modeling behavior for home caregiver behavior and managing the newborn's environment to maintain their body temperature.

Newborns lose heat in their environments in four ways: evaporation, convection, conduction, and radiation (see [Figure 22.11](#)). When heat is lost from liquid on the newborn's skin, converting to a vapor in the air, it is called evaporation (Gardner, 2020). For example, after the newborn bath when they are wet, they are losing heat in the room by the water evaporating off their skin. That is the reason postpartum nurses will provide sponge baths for newborns around 24 hours of age while keeping most of their bodies covered. When heat is transferred from the body surface to the surrounding air by a current, like a fan in a room, it is called convection. When heat from a newborn is transferred because the newborn is lying naked on something very cold, like a newborn scale that is metal, it is called conduction. And finally, radiation is the transfer of heat to cool, solid objects not in direct contact with the newborn. An example of radiation would be placing a newborn crib too close to a cold hospital wall. It is imperative that a newborn's temperature be checked often and that nurses manage those temperatures. The nurse can do this by drying the newborn as soon as possible after birth or a bath to prevent evaporation, warming any items that will touch the newborn, keeping the newborn out of drafts and keeping preterm newborns in incubators, and keeping all newborns away from walls and windows.



LEGAL AND ETHICAL ISSUES

What Are the Ethical Obligations of the Maternal-Newborn Nurse?

More than four million births occur annually in the United States, making childbirth the most common reason people are hospitalized. The nurse in a maternal-newborn care role will be faced with ethical challenges nearly daily, often in an emotionally charged environment. In these instances, it is important to understand the nurse's ethical obligations for their patients' safety and privacy, which are described in the [American Nurses Association Code of Ethics \(https://openstax.org/r/77NurseCdEthics\)](https://openstax.org/r/77NurseCdEthics) for Nurses.

Auscultation

Auscultation is the act of listening, with a stethoscope, to the chest for both heart and lung sounds, and to the abdomen for abdominal activity. When the nurse assesses the heart, auscultating on the left side of the chest while listening is focused on heart rate, rhythm, regularity, and heart sounds. The stethoscope is moved to the front and back of the chest along with moving it left and right laterally to assess breath sounds, listening for equal clear air entry on both sides. The nurse listens for a full minute to count the respirations over a full minute. Abdominal assessment also includes auscultation of the four quadrants, starting with the right lower quadrant. The nurse listens for bowel sounds from each quadrant up to 5 minutes each.

Before conducting a respiratory or cardiovascular assessment of the newborn, the nurse must ensure that the bell of the stethoscope is warmed. A cold stethoscope can startle the newborn, artificially increasing heart and respiratory rates. In addition, the newborn can lose heat due to the cold instrument.

Respiratory Assessment

Normal respirations will be easy, nonlabored, and without the use of accessory muscles, with no evidence of grunting, retractions, or nasal flaring. There should be no adventitious lung sounds auscultated, though fluid may be noted in the lungs of an infant delivered via cesarean section. The normal newborn respiratory rate is 30 to 60 breaths per minute, and newborns are obligate nose breathers. Periodic breathing in newborns is expected (Kondamudi et al., 2023), along with diaphragmatic breathing. This is a good time for the nurse to give anticipatory guidance to new parents about newborn periodic breathing to avoid panic when they notice irregular breathing at home. Newborns have periodic breathing where the rate of breaths changes over time, sometimes faster and sometimes pausing. When breathing has stopped for 20 seconds or longer, it is considered **apnea**.

Upper airway noises and bowel sounds in a newborn can be heard over the chest wall, making auscultation of newborn breath sounds more difficult. Listening for a full minute with a stethoscope and watching the abdomen rise and fall with the breaths can help the nurse identify what they are hearing. For new nurses performing a newborn respiratory assessment, it is sometimes easier to listen for a minute with the stethoscope while placing the other hand on the newborn's abdomen to watch for breaths. This will help correlate what they are hearing and seeing.

UNFOLDING CASE STUDY

Newborn Care: Part 2

See [Newborn Care: Part 1](#) for a review of the patient data.

Flow Chart

Newborn assessment data at 30 minutes of age

Temp: 97.8° F/36.5° C (ax)

Heart rate: 160 bpm

Respiration rate: 66 breaths/min

Pulse oximetry: 92%

Color: acrocyanosis present

Respirations: shallow, irregular

Nasal flaring

Marcus has not been interested in nursing.

Capillary glucose: 42

1. Fill in the blanks using one choice for options 1 and 2 from each of the lists. Based on the prenatal problems and newborn assessment data, the nurse identifies the *priority* problem for Marcus is OPTION 1.
 - a. hypoglycemia
 - b. respiratory distress
 - c. periodic breathing

The priority diagnosis is supported by OPTION 2.

- a. newborn's color and mild shoulder dystocia
 - b. nasal flaring and gestational diabetes
 - c. capillary glucose and gestational diabetes
2. Based on the assessment data at 30 minutes of age, the nurse notifies the HCP.

What recommendations would the nurse include when providing the SBAR to the HCP at this time? Select 5 that apply.

- a. encourage skin-to-skin contact with parent
- b. continuous oxygen
- c. transfer infant to transitional (intermediate care) nursery
- d. transfer to admission nursery
- e. place infant under radiant warmer
- f. NPO
- g. continuous pulse oximetry
- h. breast-feeding on demand

Cardiovascular Assessment

Heart rate in a newborn can be as rapid as 180 beats per minute if the newborn is crying or moving. The normal newborn heart rate is 120 to 160 beats per minute (Tveiten et al., 2021). Auscultating a newborn heart rate is done with the stethoscope at the apex of the heart for 1 full minute. The nurse will listen for rate, rhythm, and intensity and will count the beats, preferably when the newborn is quietly awake or sleeping. The heart is relatively large at birth and is located mid to left chest and high in the chest, with the apex somewhere between the fourth and fifth intercostal spaces.

Assessing a Newborn's Cry

Newborns' primary way of communication is crying. Cries should be of normal pitch, steady, and consolable by a nurse or the parents. High-pitched cries that are piercing and not consolable can be, and often are, a sign of narcotic withdrawal, birth injury, genetic anomaly, and/or other neurobehavioral insults. A weak cry would indicate the newborn may need resuscitation measures.

Heart Murmurs

Normally, the heart has a "lub dub" sound, but because of the physiologic fetal shunts that close functionally during the newborn's transition from intrauterine life to extrauterine life, a murmur often remains. All the fetal shunts close functionally at birth but will not close structurally for another 3 to 7 days after delivery. Physiologic murmurs in newborns are an expected finding. When auscultated, they will sound like whooshing in addition to the "lub dub" on S1 and S2. It can be difficult to differentiate heart sounds from lung sounds in a newborn. The nurse must monitor the respiratory pattern to isolate the heart sounds. Ninety percent of murmurs are temporary, lasting only 90 days or so. Many are secondary to closing of the patent ductus arteriosus or the patent foramen ovale. Normally, those will close 1 to 2 days after birth. Rarely, aortic or pulmonary stenosis occurs, or a congenital defect is found. All murmurs must be evaluated by a health-care provider.

Head-to-Toe Physical Assessment

Once auscultation is complete, the head-to-toe physical assessment can begin. This is the first time this person will have ever been examined. A systematic, thoughtful, and thorough approach is the best way to comprehensively examine the entire infant.

Head

For the newborn that moved through the vagina, the head may have some molding and bruising. The evolution of bruising and the return to typical head shape will occur over the first 24 to 48 hours. A newborn delivered via cesarean section may or may not have molding, depending on whether there was a second stage of labor or if the fetus spent time low in the pelvic cavity. The size of the newborn's head is one-fourth the size of an adult's head, and the circumference is approximately 32 to 37 cm (12.6 to 14.6 inches). The nurse will measure the newborn's head by placing the tape over the most prominent part of the occiput, just above the ears, and bring it just above the

eyebrows. The circumference of the newborn's head should be greater than that of the newborn's chest at birth and will remain that way for the next few months. If the newborn experienced significant trauma during birth, the nurse should reassess the shape of the head and remeasure the head circumference the next day (see [Figure 23.4](#)).

Fontanelles

A **fontanelle** is one of the soft spots located on the newborn's head where the cranial bones meet and leave openings to allow for molding of the head during birth. Over the first 24 months of life, the anterior and posterior fontanelle will close. Fontanelles should be palpated during this part of the assessment. The **anterior fontanelle** is the larger of the two that the nurse will assess and can be felt as a diamond shape ranging in size from 0.6 cm to 3.6 cm between the two frontal bones. The **posterior fontanelle** is a triangle shape approximately 0.5 cm in size and located at the junction of the parietal bones and the occipital bone on the newborn. The average time of closure for the anterior fontanelle ranges from 13 to 24 months. In contrast, the posterior fontanelle will close within approximately 6 to 8 weeks after birth (Lipsett et al, 2022). Both fontanelles should feel soft and flat upon palpation. Bulging or tense fontanelles indicate issues such as hydrocephalus, increased intracranial pressure, meningitis, trauma, or hemorrhage. A sunken or depressed fontanelle indicates dehydration. Pulsatility may be noted later in infancy as an expected variability.

Abnormal Variations Commonly Occurring in Newborns

Abnormal variations that are commonly seen in newborn heads include caput succedaneum and cephalohematoma. The condition in which edema is observed on a newborn's scalp at birth and is related to the labor and birth process is **caput succedaneum**. This is a benign condition in which the edema crosses cranial suture lines and feels soft and boggy (spongy). It is often related to extended pushing during vaginal births because the fetal head is subjected to pressure from the uterine contractions and the vaginal walls as it passes through the cervix. This condition has also been associated with forceps-assisted and vacuum-assisted births. Caput succedaneum usually resolves within the first few days following birth with no complications (Lipsett et al, 2022) ([Figure 23.5](#)). (For more on the topic of forceps-assisted birth and risk for trauma, see [Chapter 25 Care of the Newborn at Risk](#).)



FIGURE 23.5 Caput Succedaneum Caput succedaneum can occur after extended pushing during vaginal births or with forceps- or vacuum-assisted births. (credit: "Caput succedaneum" by "Muago"/Wikimedia Commons, CC0 1.0)

The condition in which serosanguineous or bloody fluid accumulates below the periosteum of the skull is called **cephalohematoma** ([Figure 23.6](#)). This can result from instrument-assisted births, when the fetus's head is occiput-posterior or occiput-anterior, or when a scalp electrode has been placed during labor. However, it can also occur spontaneously (Remien & Majmundar, 2022). This is a much deeper injury than caput succedaneum, it does *not* cross the suture lines, and it requires assessment after birth by the nurse for signs and symptoms of increased or

prolonged bleeding, jaundice, and infection. Cephalohematoma should resolve in 2 to 6 weeks after birth (Lipsett et al, 2022; Remien & Majmundar, 2022).



FIGURE 23.6 Cephalohematoma Related to Birth Trauma This 5-week-old newborn suffered trauma during birth, resulting in a cephalohematoma that became infected, as shown in magnetic resonance imaging. (credit: "Clinical presentation and magnetic resonance imaging findings of the 5-week-old girl with infected cephalhaematoma" by Petra Zimmermann and Andrea Duppenhaler/*BMC Infectious Diseases*, CC BY 4.0)

Hair

The nurse assesses the amount of hair, color, hairlines, and any cowlicks in the pattern. There will be very dramatic differences in newborn hair. Some newborns have a lot of hair at birth, and some have almost none. *Lanugo* is a soft, fine body hair covering a fetus while inside the uterus that may still be present right after birth. It helps to protect the fetus and keeps them warm while they grow. It is more commonly found in newborns born prematurely. The nurse should document what is observed, including hairline, quantity of hair, quality of hair, whether curly or straight, and color.

Face

Newborns' faces are designed to help them breast-feed, so their chins are recessed, their lips are sensitive to touch, and they demonstrate the rooting reflex when the nurse touches the cheek. Eyes and ears should be symmetrical, as should facial movements. Any facial asymmetry or facial paralysis is not an expected variation. This abnormal finding may appear when the newborn cries and would require follow-up with a pediatrician or other health-care provider.

Eyes

Eye examination should be done when the newborn is in a quiet, awake, alert state. Tipping a newborn backward slightly can result in slight eye opening. Eyes should be equal in size bilaterally and align with the ears. Term newborns can fix and focus on an object that is 8 to 10 inches from their face and can sometimes follow it vertically and horizontally. The nurse will assess the eyes for the ability to fully open, pupil size and shape, and placement on the face. Facial swelling or edema may prevent the newborn from opening their eyes fully in the first few hours after birth. The sclera, the area of the eye around the iris and pupil, should be whitish or white, or have a blue tint; and the iris is often blue, gray, or brown. Pupils should be equal, round, and reactive to light. Permanent eye color may appear in 9 months but can take up to 3 years to be fully permanent (Boyd, 2022).

Nose

Assessment of size, shape, and patency of each nostril is important during the assessment of the newborn's nose. The nose should be symmetrical and midline on the face. The nurse will use a finger to close one of the newborn's nostrils and assess patency of the other, then repeat on the opposite side. It is important that the nurse assess this soon after delivery because infants are obligate nose breathers (i.e., they can breathe only through their nose) with an acute sense of smell that assists them in learning to breast-feed. Naris patency is supported by observing continued respiratory effort or by feeling the presence of air movement during breaths. Newborns also use sneezing to clear mucus or to indicate they are overstimulated.

Mouth

All newborns will have their mouth assessed for mobility and anatomy. The mouth should be moist, without drool,

pink, and mobile. The nurse places a gloved finger into the newborn's mouth, assesses the hard and soft palate continuity, and assesses whether the mucous membranes are pink and moist, indicating adequate hydration and oxygenation. The nurse assesses the gums for **Epstein pearls**, which are small, harmless, firm white cysts that contain keratin and which will resolve spontaneously within 1 to 2 weeks. However, if the Epstein pearls are loose, they should be reported to a provider so that they can be removed to prevent choking.

The **frenulum** of the tongue is a tiny fold of mucous membrane that runs from the floor of the mouth to the midline of the tongue's underside. Its purpose is to regulate tongue movements. An abnormally short frenulum or a frenulum that is attached near the bottom of the tongue is a condition known as **tongue-tie**, or ankyloglossia. This can be a cause for feeding issues ([Figure 23.7](#)). The nurse checks the newborn's frenulum to assess for tongue-tie to avoid issues with breast-feeding. The clinician should be notified early if the nurse notices this during assessment so that an intervention can occur. With intervention, the breast-feeding person can improve the breast-feeding latch and improve the feeding relationship with the newborn. However, intervention is not always necessary at this age.



REAL RN STORIES

Nurse: Jan, MSN, NP

Years in practice: 33

Clinical setting: Cardiology unit

Geographic location: Inner city of a medium-sized city in Ohio

We serve a diverse patient population, but many of our patients are middle class, college-educated, and engaged parents who want to advocate for their newborn. In meeting a new birthing parent with a 5-day-old baby boy, we learn that the birthing parent wants to breast-feed but is having difficulties. The new parent has done multiple Google searches and is worried that they do not have enough breast milk supply and that they are doing “something wrong” when attempting to help their newborn latch. A lactation consultation was placed and the trained lactation consultant evaluated both the hold and latch of the newborn during an attempted breast-feeding. Finding a significant tongue-tie led to an ENT consultation and a concrete answer for the parent as to why they were having difficulties with breast-feeding. Ultimately, after working with both ENT and the lactation consultant, the newborn was able to breast-feed successfully.



FIGURE 23.7 Tongue-tie Condition This child has a mild tongue-tie due to a frenulum that is attached near the bottom of the tongue. (credit: “Frenulum linguae” by Klaus D. Peter/Wikimedia Commons, CC BY 3.0)

Ears

Newborn ears should feel firm, flexible, and pliable, and recoil briskly when assessed. The nurse will assess placement of the ear by imagining a line that is parallel to the outer and inner canthus of the eye. If the pinna of the ear is touching the top of the imaginary line, it is correctly placed. If not, the top of the pinna will be below the line, and the ears are deemed low set ([Figure 23.8](#)). Ears should be symmetrical, similar in size, and in the same position. Ears can be an indicator of many congenital and chromosomal disorders, like renal agenesis, because kidneys and ears develop at the same time in the womb. Newborns will all have a hearing screen completed before discharge.

from the hospital, and if they do not pass, they will be rescreened at their pediatrician's office or referred to a pediatric audiologist after discharge. Nurses are responsible for ensuring that the hearing screen is complete. Knowing that language development begins at birth, it is vital that the nurses assess newborns for hearing loss.



FIGURE 23.8 Ear Placement The newborn's eyes are appropriately placed in relation to the top of the ears. (credit: "Newborn Sleeping" by Vera Kratochvil/PublicDomainPictures, Public Domain)

Neck

All newborns have a short neck that should be freely movable in all directions with no webbing present. Asymmetry of the neck is usually due to positioning in utero. The nurse performs range of motion of the neck. The thyroid cannot be palpated.

Chest

The newborn chest should be cylindrical, symmetrical, and have an anterior-posterior diameter of 1:1. Chest circumference should be measured by placing the measuring tape flat on the warmer and laying the newborn supine on top of it with the tape at the scapulae. The tape will then be brought around anteriorly, directly over the nipple line (see [Figure 23.4](#)). Average chest circumference in a newborn is 33 cm (13 inches), or 2 cm (1 inch) less than the head circumference. Due to maternal hormones still circulating in the newborn's body, breast buds will appear enlarged and swollen, and female newborns may experience breast discharge. The nurse should assess the clavicles for crepitus, lumps, or masses, which could indicate an injury during birth.

Assessment of Abdomen

Upon inspection, the newborn's abdomen is symmetrical, round, cylindrical and protruding. The newborn's abdomen should move with respiration. Abnormal findings include distention, hernias ([Figure 23.9](#)), and visibly engorged vessels. Upon auscultation, the nurse hears bowel sounds present in all four quadrants by 1 to 2 hours of life. On palpation, the abdomen is soft, and the liver can be palpated 1 to 2 cm below the right costal margin.

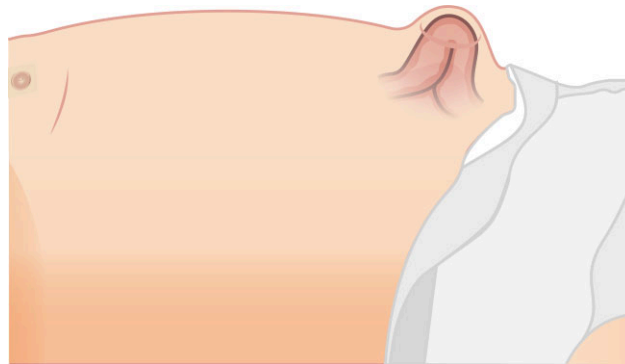


FIGURE 23.9 Umbilical Hernia This is a newborn with an umbilical hernia. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

The umbilical stump contains three vessels: two arteries and one vein (AVA). The cord will begin drying soon after birth. It should remain free of redness and drainage. The nurse will provide education to the family to keep the umbilical stump open to air to facilitate drying. The cord will fall off independently in 7 to 10 days. Along with educating the parents about care of the umbilical stump, the nurse also instructs the parents to call their health-care provider if they notice any redness, persistent bleeding, or bad smell coming from the umbilical stump ([Figure 23.10](#)).



FIGURE 23.10 Umbilical Clamp Newborn with a clamped umbilical cord. (credit: modification of “Untitled - panoramio - Pedro Martha (7)” by Pedro Marth/Wikimedia Commons, CC BY 3.0)

Genitourinary Assessment

It is important that the nurse perform a complete and thorough assessment of the genitalia of the newborn. This assessment should be completed at the end of the physical examination, since this is often the most invasive part. If this is the parents' first child, it is also an appropriate time to teach them how to change a diaper.

Female

The nurse should assess the labia majora, which are slightly swollen from maternal hormones and cover the labia minora and clitoris. Milky discharge and even a reddish discharge, called pseudomenstruation, from the vagina are expected findings for the first 3 to 4 days after birth due to maternal hormones. There may be a vaginal tag, which can be normal and representative of a visible hymenal ring. This will disappear in a few weeks. It is important for the nurse to educate parents about these normal findings in female newborns because they can cause concern if red discharge is found in diapers and parents have not heard this is expected.

Male

Assessment of genitalia in male newborns includes the placement of the urethra, to ensure that it is at the tip of the penis, midline, and patent. Abnormal variations in male genitalia include **hypospadias**, which occurs when the urethral meatus is located on the ventral side of the penis; alternatively, **epispadias** is an abnormal condition in which the urethral meatus is located on the dorsal side of the penis. Male newborns with epispadias and hypospadias are not candidates for circumcision until they have a pediatric urology consultation to ensure that there are no additional anatomic abnormalities. Once the newborn is seen by pediatric urology providers after discharge from the hospital, the pediatric urologist will schedule a surgery to correct the meatus and, if the parents choose, may perform a circumcision at the same time. Another abnormal variation in male genitalia the nurse should assess for is **phimosis**, a condition in which the opening of the foreskin is small and cannot be pulled back over the tip of the penis at all. This can interfere with urination and needs immediate intervention.

Assessment of the scrotum includes noting whether both testes have descended and can be palpated. The abnormal assessment finding in which the testes have not descended is called **cryptorchidism**. In a newborn, this can be a normal variation that should be followed by the health-care provider to ensure that they do descend in the future. There should be no evidence of **hydrocele**, which is an abnormal collection of fluid in the scrotal sac.

For newborn boys having a circumcision, that surgical procedure is often performed prior to discharge. The nurse will provide the parents with education regarding care of the surgical site. The nurse will explain to the parents that it is vital not to allow any gauze to adhere to the surgical site and disrupt the clotting that occurs on the tip of the penis. Some circumcision sites may have a device that is left in place until it falls off in 7 to 10 days. Parents will be instructed to use unscented, clear ointment on the tip of the newly circumcised penis and then place a 2-inch × 2-inch gauze pad gently over the surgical site. When it is time to change the dressing, they should remove the gauze and very gently wipe off any meconium or stool waste, using caution not to disrupt the clot. It is not necessary to remove all the ointment. Then, the parents will be told to apply fresh ointment and gauze with every diaper change for the next 7 to 10 days. Newborns would likely have had vitamin K prior to the procedure. If bleeding occurs that will not stop, the parents will be told by the nurse to take the newborn to the emergency department (ED) or for evaluation immediately. (See [Chapter 22 Immediate Care of the Newborn](#).)

Atypical Genitalia

Some newborns are born with enlarged clitoris, labial fusion, and/or urethral openings not ventral to vaginal openings, making it difficult for the nurse to assign their sex. These newborns are among the one in 4,500 births that have atypical genitalia (Cleveland Clinic, 2022). The most common cause of atypical genitalia (sometimes called intersex genitals) in XX chromosome newborns is congenital adrenal hyperplasia (in the United States the overall incidence is 1:13,000 to 1:16,000 live births) (Krone & Arlt, 2009). Genital ambiguity in XY chromosome newborns is rare (de Omena Filho et al., 2022.)



LINK TO LEARNING

Atypical genitalia in newborns are an uncommon occurrence and are often related to abnormalities in chromosomal formation. Read [this article about assessing atypical genitalia \(https://openstax.org/r/77atypgenitalia\)](https://openstax.org/r/77atypgenitalia) for additional information.

Anus

The nurse will inspect the anal area to verify that it is patent and has no fissure. A missing or blocked opening to the anus is abnormal and is termed an **imperforate anus**. This is ruled out by visual assessment; no digital exam is necessary by the nurse. The passage of meconium can also be noted. When there is no passage of meconium in the first 24 to 48 hours after birth, the newborn is diagnosed with **meconium ileus** with obstruction, an abnormal finding in the newborn (Cleveland Clinic, 2022).



LEGAL AND ETHICAL ISSUES

Nurse's Response to Parents' Refusal of Vitamin K Injection for Newborn

Imagine you are the nurse caring for a newborn who is 12 hours old. The parents of that newborn have declined administration of a vitamin K injection, despite education from the labor and delivery nurse and the midwife about the important medical benefits of the injection. As a nurse, you know that vitamin K is given to newborns to remedy their lack of clotting factors and thus prevent potentially fatal bleeding events.

The new parents are asking you when their baby boy can be circumcised. They are adamant that this must be done in the hospital before discharge and that they will not accept the vitamin K injection for their child. You again educate them about the potential for a catastrophic bleed during the procedure. If their newborn does not receive the vitamin K injection beforehand, the newborn is not eligible for this procedure. You explain to them that the American Academy of Pediatrics has recommended this as a routine preventive measure for nearly 60 years. Studies show that newborns are at risk for serious bleeding up to 2 weeks post birth (American Academy of Pediatrics, 2020). Nonetheless, the parents continue to refuse the injection, they ask to move forward with the circumcision, and they demand that the physician performing the procedure come in.

If a health-care provider agrees to perform the circumcisions despite the parents' refusal of the vitamin K injection, your role as the nurse would require you to witness the parents' consent for this procedure. However, you have serious concerns about the safety of this newborn under these circumstances.

It is not the nurse's job to judge. It is the nurse's job to advocate, provide evidence-based resources, and maintain confidentiality. Nurses respect the *autonomy* of childbearing people, pregnant people, and those who have given birth to make decisions that they feel are right for themselves and their children. Ethical nursing practice should include *beneficence*, the obligation to do good and *nonmaleficence*, the obligation to do no harm. Additionally, the nurse will need *confidentiality*, *justice* (treating everyone fairly and equitably), and *veracity*, demonstrating integrity and truth at all times. Maintaining these ethical principles is especially important when the nurse is in an emotionally charged environment.

Ultimately, in a situation like this, all the nurse can do is document the extensive teaching that was provided to the parents on multiple occasions. It is, by law, the parents' decision to make, whether the nurse agrees or not. Ethical issues in maternal-health nursing occur frequently; the nurses' job is to provide evidence-based education,

advocate for their patients, and support the families they serve (Callister & Sudia-Robinson, 2011).

Musculoskeletal

In the musculoskeletal assessment, the nurse inspects the newborn's extremities for gross deformities. The nurse assesses for extra digits, webbing, clubfoot, range of motion, short extremities, flexibility, and symmetrical movement. During the first few weeks of life and specifically in the first 24 hours, the newborn's preferred position will be one that resembles their position in the uterus. They will remain in the fetal position with arms and legs flexed closely to the front of their body, hands clenched, with elbows and knees bent. This posture will change as the newborn develops more control over their body movements and becomes more comfortable with the outside world. Hypotonia, laxity, or a relaxed overall position may be related to maternal medication or an underlying genetic condition.

Arms and Hands

In a full-term newborn, fingernails will extend beyond the end of the fingertip and are often slightly adhered to the skin. The nurse counts all the digits in each hand. The abnormal condition of extra digits in the hand is known as **polydactyly**. Another abnormal finding of the hand, **syndactyly**, is the presence of webbing, or fusion, of fingers and toes that can be associated with trisomy 21 (Down syndrome) or be the result of heredity ([Figure 23.11](#)). Hands are assessed for palmar creases. A single palmar crease is associated with newborns with trisomy 21.

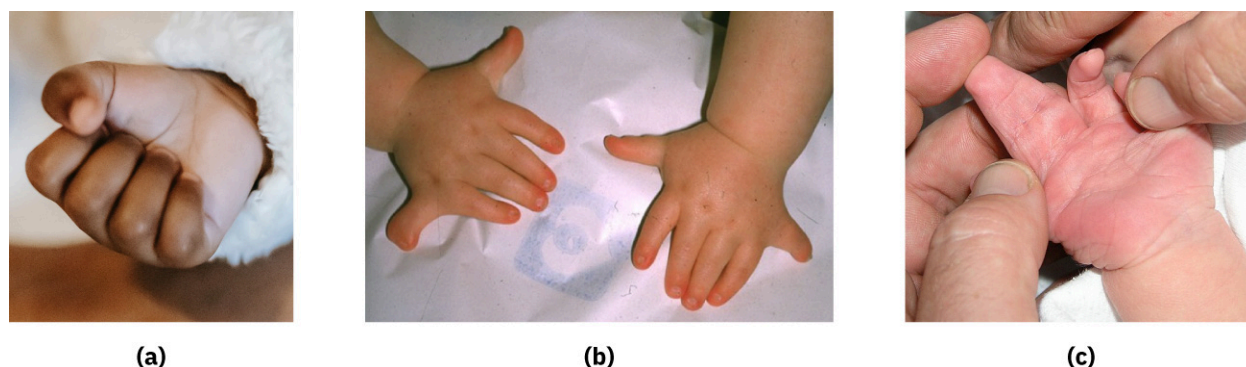


FIGURE 23.11 Abnormal Conditions of the Hand. (a) This newborn's clenched fist is a normal hand. (b) This infant exhibits the condition of polydactyly. (c) This infant exhibits the condition of syndactyly. (credit: (a) "Hand of crop black infant on leg of anonymous African American mother" by William Fortunate/Pexels, CC0; (b) "Bilateral polydactyly with short fingers in Ellis-van Creveld syndrome patient" by G. Baujat and M. LeMerer/*Orphanet Journal of Rare Diseases*, CC BY 2.0; (c) "New born baby hand showing complete complex syndactyly of two fingers (III & IV)" by Duplestilskin/Wikimedia Commons, Public Domain)

A partial or complete paralysis of portions of the arm that results from trauma to the brachial plexus nerve is called **brachial palsy**. This can be caused by too much downward pressure being applied during the delivery of the head to deliver the shoulders. From this same motion, it is possible to fracture the clavicle. A fractured clavicle does not always indicate brachial plexus injury. It is important that the nurse assess for full range of motion in both limbs. Brachial palsy occurs most often when there is strong traction applied to the newborn's head to dislodge the shoulder behind the symphysis pubis in the presence of shoulder dystocia. The portion of the arm affected is determined by the nerves damaged.

Erb-Duchenne paralysis, also known as Erb palsy, involves damage to the upper arm and is the most common nerve injury for newborns. With this injury, the newborn's arm may lie limply at the side of the body, or the newborn may avoid moving their arm when encouraged to do so. The nurse can see this by initiating the startle reflex. The nurse will place their fingers on the newborn's clavicle, starting in the center of body and then palpating to the outer body and feeling for crepitus, lumps, or masses on the clavicle, paying attention to grimaces or crying from the newborn. (For a full discussion of Erb-Duchenne paralysis and brachial plexus injury, see [Chapter 25 Care of the Newborn at Risk](#).)

Assessment of Legs and Feet

Newborn legs should be of equal length and with symmetrical folds. The newborn's legs will likely still be in a flexed position, but the nurse should be able to extend the legs with ease. Range of motion should be symmetrical. The nurse performs the **Barlow maneuver** to assess the newborn for congenital hip dysplasia by placing the newborn in a supine position in a warm, well-lit place. The nurse will then bring the newborn's thighs to their chest, adducting

the hip while applying pressure on the knee to direct the force posteriorly. If the hip can be dislocated, it will pop out of the socket, and the nurse will hear and feel a click or pop. This is considered a positive test that needs to be reported and documented. The **Ortolani maneuver** is the second assessment for congenital hip dysplasia, in which the nurse keeps the newborn's thighs at the midline in the Barlow position, places anterior pressure on the greater trochanters, then uses their thumbs to abduct the newborn's legs gently and smoothly. If the hips can be dislocated, the nurse will hear or feel a pop. That is considered a positive test that needs to be documented and, though it is not highly sensitive, reported to the health-care provider. A negative exam is free of clicking.



LINK TO LEARNING

Examination of the newborn includes [the Ortolani and Barlow maneuvers \(https://openstax.org/r/77hipmaneuvers\)](https://openstax.org/r/77hipmaneuvers) for assessing for hip dysplasia.

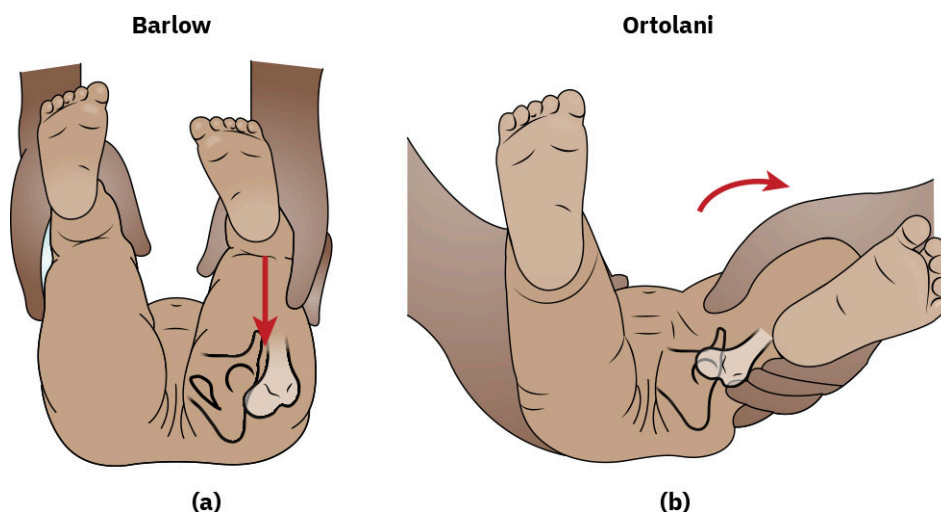


FIGURE 23.12 Barlow and Ortolani Maneuvers (a) In the Barlow maneuver, the provider adducts the newborn's hip. (b) In the Ortolani maneuver, the provider abducts the newborn's hip. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

The nurse assesses the newborn feet for symmetry and mobility. An abnormal finding of asymmetry or lack of movement may indicate a talipes deformity, also known as clubfoot. If this condition is noted (see [Figure 25.11](#)), the nurse should document it and notify a clinician for follow-up. See [Chapter 25 Care of the Newborn at Risk](#) for more information on this topic.

Back and Spine

To assess the back and spine, the nurse rotates the newborn to a prone position. The nurse places one finger on either side of the newborn's spine, gently pressing as they run their fingers down the length of the spine. In doing so, the nurse assesses that the spine is straight and flat, with no deviations to the right or left. At the base of the spine, there should be no hair tufts, dimples, or breaks in the skin. During fetal development the spinal column comes together caudal to pedal (head to toe). If this process is stopped prior to full alignment, a dimple, cyst, or opening may be found at the base of the spine, potentially indicating misplacement of the nerves found at the base of the spinal column, or spina bifida. Spina bifida is a condition that may not be diagnosed until late childhood, but it will be monitored by pediatric health-care providers. Any deviations should be reported to the health-care provider.



PHARMACOLOGY CONNECTIONS

The Hepatitis B Vaccine

A large part of the nurse's responsibility during their time with the new family on the postpartum unit is providing education about the newborn's first vaccination, hepatitis B. The hepatitis B vaccine is given to the newborn within the first 24 hours after birth and is the first in a three-dose series the newborn will receive over an 18-month period. The nurse should allow plenty of time to answer any questions from the new parents before administering the

injection to the newborn.

- **Generic Name:** Hepatitis B immune globulin
 - **Trade Name:** Engerix-B, Recombivax HB, Heplisav-B
 - **Class/Action:** vaccines, inactivated, viral
 - **Route/Dosage:** 5 mcg/0.5 mL (Recombivax HB), 10 mcg/0.5mL (Engerix-B).
 - The hepatitis B vaccine is given to the infant as a 0.5 mL intramuscular injection in the anterior thigh. It is a three-dose immunization: The first dose is administered to the newborn within 24 hours of birth, the second between 1 and 2 months of age, and the third and final dose between 6 and 18 months of age.
 - **High Alert/Black Box Warning:**
 - **Indications:** The Centers for Disease Control and Prevention (CDC) recommends administration of the hepatitis B vaccine to all newborns within 24 hours of birth or at hospital discharge, whichever comes first.
 - **Mechanism of Action:** Immunization with hepatitis B vaccine stimulates the immune system to produce specific humoral antibodies (HBsAG) against the hepatitis B virus.
 - **Contraindications:** hypersensitivity to yeast
 - **Adverse Reactions/Side Effects:** soreness at the site of the injection, severe itching, redness at the injection site, weakness, feeling unwell, nausea, vomiting
 - **Nursing Implications:** Witness consent. Review patient education with the family. Administer the IM injection in the middle vastus lateralis muscle. Document in the patient's chart.
 - **Parent/Family Education:** The nurse will provide education to the parents via the CDC vaccine information statement (VIS). It is mandatory that, while providing this information to the parents, the nurse provide a copy of the VIS statement to them so that they can follow along and make an informed decision. The nurse should educate the parents that the risk of reaction for this injection is soreness at the site of the injection. The nurse will also advise the parents that they will need to follow up with their pediatrician and schedule the next appointment for immunization between 1 and 2 months of age and then again for the newborn's final dose between 6 and 18 months.
-

Skin Assessment

Newborn skin should look well perfused and an appropriate color for the race of the newborn. Capillary refill for newborns should be less than 3 seconds (Singh, 2015), and well-hydrated newborns have flat fontanelles and moist mucosal membranes. It is a normal variation to see dry, cracked skin on hands, legs, and feet. Some variations in newborn skin are identified and defined in [Table 23.2](#).

Skin Presentation	Assessment Findings	Comments
Acrocyanosis  (credit: modification of "Cyanotic neonate" by Jules Atkins/Wikipedia Commons, Public Domain)	Bluish discoloration of hands and feet after birth	Peripheral cyanosis is normal in the first 24–48 hours after birth and resolves on its own. This is due to an immature cardiac system. If this is seen after that period, it is due to cold stress or sepsis and requires further evaluation.
Erythema toxicum  (credit: "Erythema toxicum neonatorum" by F. T. T. S. Haveri and A. C. Inamadar/ISRN Dermatology, CC BY 1.0)	Normal newborn rash abruptly occurring as yellow or white papules over an erythematous base on the newborn's body except the palms; occurs in 30%–70% of newborns	This condition is of unknown cause but thought to be an awakening of the immature immune system.
Milia  (credit: "Newborn Milia (Milk Spots)" by "Serephine"/Wikimedia Commons, CC0)	Exposed sebaceous glands that look like "baby acne" on the newborn's face, nose, or chin, or all three	Milia disappear within the first month of life; no additional treatment is needed.
Telangiectatic nevus (stork bite)  (credit: "Here's Maddie's 'stork bite' birth mark." By Abigail Batchelder/Flickr, CC BY 2.0)	Pale pink or reddish discoloration at the base of the neck, lower axilla, nasal bridge, or eyelids	Stork bites are often more noticeable when the newborn is crying or upset; they usually disappear by the second birthday but sometimes do not; they require no intervention.

TABLE 23.2 Newborn Skin Variations

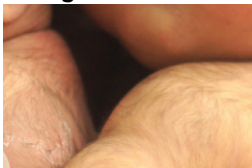
Skin Presentation	Assessment Findings	Comments
Dermal melanocytosis  (credit: "6 month old Taiwanese baby girl!" by Abby Lu/flickr, CC BY 2.0)	Formerly referred to as Mongolian spots, bluish-gray spots that can occur across the shoulders, on the hips, on the lower back near the buttocks, and on the legs	Commonly seen in newborns with darker skin, these spots will resolve on their own in the first few years of life; they resemble bruising and so can be confused with nonaccidental trauma, so the nurse should document location and size during neonatal assessment.
Strawberry hemangioma  (credit: "Capillary haemangioma" by "User:Zeimusu"/Wikimedia Commons, Public Domain)	Raised capillary nevi, occurring anywhere on the body, that often increase in size for the first few months of life, slowly decreasing in size over time, and disappearing by 10 years of age	No referral is needed unless these are interfering with vision or are very close to the eyes.
Lanugo  (credit: "Lanugo" by "Raumka"/Wikimedia Commons, CC BY 1.0)	Fine, soft hair that covers the newborn's back, shoulders, cheeks, forehead, and scalp; more common in newborns that are born early and often disappears within the 4 weeks after birth	No referral is needed.
Vernix caseosa  (credit: "Vernix feet" by "Np0x"/Wikimedia Commons, Public Domain)	Cheesy, white substance covering and protecting the skin during intrauterine life; coverage at birth related to gestational age	Vernix caseosa diminishes the closer to term the fetus gets.

TABLE 23.2 Newborn Skin Variations



CULTURAL CONTEXT

Skin Color in Black and Biracial Newborns

Newborns of Black or biracial descent are born with variations in skin color. These newborns often have very sensitive skin that is prone to dryness and hyperpigmentation. Their skin is likely to be a shade or two lighter than their eventual skin color will be. This is so because it takes melanin 2 to 3 weeks to appear at the surface of the skin.

after being produced by cells called melanocytes (Lucock, 2023). If parents are concerned about the newborn's light skin color, the nurse can use this as a teaching opportunity.

Assessing Jaundice in a Newborn

The condition of **neonatal jaundice** arises from an excess of bilirubin in the blood due to an increase in breakdown of red blood cells and manifests in a newborn as a yellowish discoloration of the skin, sclera, and mucous membranes. Approximately 75 percent of jaundice cases in newborns is caused by physiologic jaundice, which results from an increased bilirubin load, decreased ability to clear the bilirubin, and impaired activity from the enzyme needed for bilirubin conjugation in immature newborn livers. Physiologic jaundice typically appears after 24 hours of age, peaks at around 48 to 96 hours, and resolves by 2 to 3 weeks in full-term newborns.

To assess for newborn jaundice, the nurse will press on the newborn's forehead and nose for 1 second with a gloved finger and observe for any underlying yellow tinge to the skin. If there is a yellow tinge, the nurse will also assess the sternum, palms, and soles by blanching the skin. In darker skinned newborns, jaundice may be more difficult to assess. Under the tongue and the sclera of the newborn's eyes are other areas that should be assessed for jaundice or yellowing, as those areas work equally well for all skin colors. Jaundice progresses from head to toe. Jaundice is observable in the face and neck when bilirubin levels reach 4 to 8 mg/dL and can be seen on hands and feet when levels are greater than 15 mg/dL. The first notable finding is often seen in the sclera, and it is also the last area to clear. If the newborn appears jaundiced, a total serum bilirubin or transcutaneous bilirubin (TcB) level needs to be checked with the transcutaneous bilirubin meter ([Figure 23.13](#)). A diagnosis of pathologic jaundice, or nonphysiologic jaundice, occurs if the jaundice is present on the first day of life, and the newborn's total serum bilirubin (TSB) rises by more than 5 mg/dL, more than 0.2 mg/dL/hour, or is higher than 17 mg/dL, or when the newborn has signs and symptoms suggestive of serious illness, like lethargy, respiratory distress, and decreased feeding. (For further discussion, refer [24.2 Care of Common Problems in the Newborn.](#))



FIGURE 23.13 Transcutaneous Bilirubinometer A transcutaneous bilirubinometer is used to measure bilirubin levels in the subcutaneous tissue in a newborn. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Assessment of Neurologic Status

The assessment of neurologic status should be ongoing throughout the entire assessment of the newborn and throughout the nurse's shift. Neurologic assessment of a newborn is different from a neurologic assessment in an adult. In the newborn, the nurse assesses physical characteristics including resting posture, muscle tone, motor activity, state of alertness, cry, and, most importantly, the ability to be consoled. Newborns like to be in a flexed position and should be using their extremities bilaterally. Typical newborns move their upper extremities erratically with uncoordinated movements. Any decreased, absent, or unilateral movements need further evaluation, as they may be indicative of a neurologic issue.

Any observation of consistently long-lasting, ongoing tremors or jitteriness in a full-term newborn must be evaluated

for a cause. Tremors can be related to hypoglycemia, hypocalcemia, substance withdrawal, or convulsions. Neonatal seizures can look like many things but can also simply be chewing or swallowing movements, deviations of the eyes, rigidity, or flaccidity due to immaturity of the central nervous system.

To assess the sucking reflex, the nurse will insert a gloved finger into the newborn's mouth to elicit a response. Once the newborn is sucking, the nurse will assess hearing and vision responses by noting sucking changes in the presence of noise by a rattle or voice, and a change in sucking when a penlight is shined near the newborn's eyes. The newborn responds with a brief stop in sucking followed by restarting sucking.

A normal neurologic examination indicates a functional neurologic system in the newborn. Nurses will be on alert for neurologic changes to be recognized as possible alterations and injuries that have occurred. [Table 23.3](#) lists possible injuries that could occur during birth or after and the signs that a nurse may observe during a physical examination.

Immaturity of the central nervous system in the newborn is demonstrated by reflex responses. The newborn's movements are uncoordinated, and methods of communication are very limited, so reflexes in newborns serve specific purposes. Some of them are protective, like blink, gag, and sneeze. Some newborn reflexes help with feeding, such as rooting and sucking, and some are for stimulating human interaction, such as yawning. Additionally, newborns can draw back from pain (protective), and they can even push up and try to crawl (prone crawl).

Potential Injury	Example
Eye injuries	Subconjunctival and retinal hemorrhages
Intracranial hemorrhage	Subdural, subarachnoid
Bone fracture	Clavicle, facial bone, skull, humerus, femur
Nasal injuries	Dislocation, fractures
Scalp laceration abscess	Fetal scalp electrode, scalpel injuries related to cesarean birth
Soft-tissue injuries	Cephalohematoma, brachial plexus

TABLE 23.3 Possible Injuries That Can Occur in Newborns

Moro Reflex

The Moro, or startle, reflex is present at birth and usually disappears around 2 months of age. This is a primitive protective reflex that occurs when the newborn is startled by a loud sound or sudden movement. The newborn will throw back their head, extend arms and legs, and sometimes begin to cry. A lack of Moro reflex warrants a call to the primary health-care provider for further evaluation ([Figure 23.14](#)).



FIGURE 23.14 Moro Reflex This startled newborn extends their arms, demonstrating the Moro reflex. (credit: “Moro reflex” by “Patty 2”/Wikimedia Commons, Public Domain)

Palmar Grasp Reflex

The palmar grasp reflex, present at 16 weeks' gestation in utero, is a primitive reflex that can be elicited in preterm newborns as early as 25 weeks (Anekar & Brodoni, 2022). This reflex integrates with other newborn behaviors at 4 to 6 months to allow grasping of objects. It is possible that this reflex began as a way create interaction and bonding

between the newborn and the parent (Anekar & Brodoni, 2022). The nurse can assess for the grasp reflex by placing their finger into the newborn's palm. The newborn will grasp hard enough bilaterally that the nurse will be able to raise the newborn's trunk for a few seconds ([Figure 23.15](#)).



FIGURE 23.15 Palmar Grasp Reflex New parents are often surprised by the strength of their newborn's palmar grasp reflex. (credit: "A Person Touching an Infant's Hand" by Steven Morissette/Pexels, CCO)

Rooting Reflex

The rooting reflex that assists the infant in eating is present at birth and disappears around 3 to 4 months of age. The nurse can elicit this response by stroking the newborn's cheek or the corner of the newborn's mouth. The newborn will turn toward the nurse and open their mouth, anticipating the nipple or a bottle ([Figure 23.16](#)). Lack of response can indicate facial paralysis or neurologic depression, and the nurse should contact the primary care practitioner for follow-up.



FIGURE 23.16 Rooting Reflex The rooting reflex aims the infant's mouth toward a possible source of food. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

Sucking Reflex

The sucking reflex begins in utero around 23 weeks' gestation but does not fully develop until 36 weeks' gestation. Premature newborns may have a weak, uncoordinated sucking ability, and it may be difficult for them to feed (Stanford Medicine, Childrens Health, 2022). The nurse can elicit this response by placing a gloved finger in the newborn's mouth and assessing the strength of the suck ([Figure 23.17](#)). During this assessment, the nurse can also assess for any soft and hard palate abnormalities. Absence of a suck reflex may indicate neurologic depression from CNS conditions, neonatal abstinence syndrome, or developmental immaturity, and the nurse will report this to the primary care practitioner for further follow-up.



FIGURE 23.17 Suck Reflex The newborn's suck reflex responds to anything placed in the mouth. (credit: "Newborn Baby Breastfeeding" by Jonathan Borba/Pexels, CC0)

Tonic Neck Reflex

The tonic neck reflex is present at birth and integrates at 4 to 6 months with other newborn behaviors like rolling over, sitting up, and developing hand-eye coordination to reach for items (Frothingham, 2020). Some hypotheses suggest that this reflex occurs to help the fetus move down the birth canal (Frothingham, 2020). The nurse can assess for tonic neck reflex by placing the newborn supine, gently rotating the head to one side, and holding it in position for 15 seconds. A positive response is when the arm and leg extend on the facial side and flex on the other ([Figure 23.18](#)). No response to the assessment indicates the need to report that finding to the newborn's primary clinician.



FIGURE 23.18 Tonic Neck Reflex This newborn demonstrates a positive response to assessment of the tonic neck reflex. (credit: "Asymmetrical tonic neck reflex (ATNR) at Two Months" by "Mjllissner"/Wikimedia Commons, CC0)

Stepping Reflex

The final reflex assessed is the stepping reflex, present from birth and designed to assist the newborn in moving to the birthing person's breast to begin feeding. The nurse can assess this reflex in two ways. They can leave the newborn prone on the birthing person's abdomen and observe the newborn crawl to the birthing person's breast using the toes and knees, as though they are taking steps (Stanford Medicine, Childrens Health, 2022). Alternatively,

the nurse can hold the newborn, place their feet on the bed, and observe the newborn try to stand on their feet and take steps ([Figure 23.19](#)). This reflex will disappear at around 8 weeks of age.



FIGURE 23.19 Stepping Reflex Parents often enjoy having their newborn demonstrate the stepping reflex for family and friends. (credit: (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license))



CLINICAL SAFETY AND PROCEDURES (QSEN)

QSEN Competency: Patient-Centered Care: Use of a Pacifier

Definition: Recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patients' preferences, values, and needs.

Knowledge: The nurse integrates understanding of multiple dimensions of patient-centered care:

- patient/family/community preferences, values
- coordination and integration of care
- information, communication, and education
- physical comfort and emotional support
- involvement of family and friends
- transition and continuity

Describe how diverse cultural, ethnic, and social backgrounds function as sources of patient family and community values

Skill: Communicate patient values, preferences, and expressed needs to other members of health-care team. The nurse will do the following:

- Listen to the patient and explore any concerns they may express.
- Share the preference the birthing parent has for the newborn to utilize a pacifier to self-soothe when not feeding.
- Provide the materials requested.

Attitude: Respect and encourage individual expression of patient values, preferences, and expressed needs.

23.2 Estimation of Gestational Age of the Newborn and Newborn Behavioral Assessment

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Identify ways to estimate the gestational age of a newborn according to physical and neurologic maturity by using the Ballard estimation of gestational age tool
- Determine a newborn's social adequacy and capabilities by utilizing the Brazelton Neonatal Behavioral Assessment Scale

Estimating gestational age as well as assessing newborn behavior is another aspect of the complete exam of a newborn. The Ballard Score (Ballard et al., 2014) and the Brazelton Neonatal Behavioral Assessment Scale are included only in the newborn period and are specific tools of the nurse caring for newborns. When handling and touching the newborn, it is important the nurse wear gloves until the newborn has received their first bath and all the amniotic fluid, vaginal secretions, and blood on the skin are removed.

Estimating Newborn Gestational Age by Maturity Rating: The Ballard Score

The nurse uses the Ballard maturity rating to establish the accuracy of the age of the newborn in the first 4 hours after birth. The two components of clinical gestational age assessment are external physical characteristics and neuromuscular maturity. Assessing gestational age can be especially important when the birth parent has had limited prenatal care and the gestational age is unknown or unclear. Neurologic examination is done to assess physiologic maturation in addition to physical development. However, the newborn's nervous system is often unstable during the first 24 hours of life, and therefore their reflexes may be unstable. If their neurologic findings deviate from the gestational age derived by evaluation of external characteristics, it is recommended that a second evaluation be completed in 24 hours. The neurologic assessment, especially reflexes, are especially important in newborns at less than 34 weeks' gestation. That is because neurologic changes are significant between 26 and 34 weeks' gestation, while significant physical changes are less evident. It is also important that the nurse complete the assessment during quiet, calm times for the newborn so that their neurologic status can be assessed accurately.



LINK TO LEARNING

With this [interactive online Ballard Assessment Calculator \(https://openstax.org/r/77BallardCalc\)](https://openstax.org/r/77BallardCalc) Tool, the nurse can go through the Ballard Assessment and click on each assessment finding as they work their way through. The online tool will add up the score as you go. Nurses can download this link to their phone so that they can use this tool in the clinical setting.

Ballard et al. (1991) developed the estimation of gestational age by maturity rating, or **Ballard Score**, in which each physical and neuromuscular finding is assigned a point value. Those points are then totaled, and the total score is matched to a gestational age scale to determine the approximate gestational age of the newborn. The maximum score on the Ballard scale is 50, which correlates to a gestational age of 44 weeks. For example, on completing a gestational assessment of a one-hour-old newborn, the nurse gives a score of 2 to all the physical characteristics, for a total of 12, and gives a score of 3 to all the neuromuscular assessments for a score of 18. That would equal a score of 30, indicating a gestational age of 36 weeks' gestation. Usually, the nurse will not score all 3s or all 2s because most newborns vary in development of physical and neuromuscular characteristics, unlike this example.

Some maternal conditions or medications used during labor can affect gestational assessment components and cause the need for further evaluations by the nurse. Maternal diabetes, while it can accelerate fetal physical growth, decelerates fetal maturation. Maternal hypertension usually slows fetal physical growth and accelerates fetal maturation. Use of magnesium sulfate in pregnant people with preeclampsia is correlated with poor muscle tone and edema in newborns. Use of analgesia and anesthesia may cause the newborn to have respiratory depression, and therefore the newborn may show flaccid limbs and demonstrate a frog-like posture. These characteristics affect the neuromuscular portion of the Ballard scoring and should be taken into consideration when the overall scoring is

completed.

Estimating by Physical Maturity

The first part of the Ballard Assessment is to observe the newborn without disruption. The following physical characteristics are assessed in specific order from least invasive to more invasive.

Posture

To assess posture, the nurse will assess the newborn lying in the crib in their preferred position. The position of comfort is noted by the nurse on the Ballard Assessment ([Figure 23.20](#)). This is a neuromuscular assessment, but the nurse is assessing this during the physical assessment in order not to disrupt the newborn.



FIGURE 23.20 Newborn Posture The nurse assesses the newborn's posture in a relaxed state during gestational assessment. (credit: "Back sleep 6" by National Institute of Child Health and Human Development/Flickr, Public Domain)

Skin

Assessment of the skin is a visual assessment. Mature newborn skin loses its protective coating, vernix caseosa. The nurse will see thicker, dryer skin with wrinkles that peels as the newborn matures. In a preterm newborn, the nurse will note that the skin is thin and transparent with veins that are prominent, especially over the abdomen.

Lanugo

Lanugo is fine hair that covers the body of the newborn. In a very premature newborn, the nurse will discover very little lanugo. Lanugo appears at approximately 24 to 25 weeks' gestation and is most abundant on the back between the scapulae. By the 28th week, it is abundant; and by 38 to 39 weeks, it is mostly gone, disappearing first from the face and then the trunk and extremities (see [Table 23.2](#)).

Plantar Surface

This assessment evaluates the plantar surface and the creases on a newborn's feet. Sole creases appear on the anterior ball of the feet. When the feet begin drying, superficial creases appear, and peeling may occur. Preterm newborns have almost no creases. The nurse measures the distance from the back of the heel to the tip of the great toe.

Breast

The nurses will assess each breast's diameter in millimeters after inspecting the areola. At term gestation, the tissue should measure between 0.5 and 1 cm (5 to 10 mm). As the gestation progresses, the breast bud and areola enlarge. In a large for gestational age (LGA) newborn, the nurse will note accelerated breast bud development as a reflection of subcutaneous tissue deposits. Small for gestational age (SGA) newborns will have utilized all their subcutaneous tissue to survive in utero and will lack breast tissue (Rosenberg, 2008).

Eyes and Ears

Cartilage in the ears develops with gestational age. Cartilage in the ears is what gives them their shape, so in very

premature newborns, the pinna of the ear will remain folded when bent and released. In newborns at less than 34 weeks' gestation, ears are very flat and have little shape. Additionally, premature newborns may have partially or fully fused eyelids.

Male Genitals

The nurse will assess the male genitals for size of the scrotum, presence of rugae (wrinkles and ridges in the scrotum), and descent of the testicles. During the 30th week of gestation, the testicles descend into the scrotal sac. Before 36 weeks, the scrotum will have very few rugae, and the testes are palpable in the inguinal canal. By term, the testes should have descended, there should be rugae present, and the scrotum should be pendulous.

Female Genitals

Assessment of female genitalia can be difficult due to edema caused by maternal hormones. The clitoris may vary in size. Subcutaneous fat deposition varies as a result of fetal nutritional status, making it difficult sometimes to determine the sex of the newborn. In **adrenogenital syndrome** (also known as congenital adrenal hyperplasia) excessive amounts of androgen and other hormones are secreted by the adrenal gland and can present as edema of the genitalia. In extremely premature female newborns, the labia are flat, and the clitoris is very prominent. As the infant grows, the labia will grow larger and cover the clitoris.

Estimating by Neuromuscular Maturity

Neuromuscular assessment is best performed when the newborn has stabilized. One significant neuromuscular change is that muscle tone progresses from extensor tone to flexor tone and from the lower to the upper extremities as the neurologic system matures in a tail-to-head progression. In this part of the evaluation, the nurse is looking for responses involving the newborn's tone.

Square Window Sign

The nurse can assess for the **square window sign** (measuring wrist flexibility) by flexing the newborn's hand downward toward the ventral forearm until resistance is felt. The nurse will measure the angle formed at the wrist and document it.



LINK TO LEARNING

Review these [visual instructions on the square window sign \(https://openstax.org/r/77SqrWindowSign\)](https://openstax.org/r/77SqrWindowSign) for more information on how to perform this part of the Ballard Assessment.

Arm Recoil

To assess for **arm recoil** (measuring passive flexor tone of biceps), the nurse will place the newborn in a supine position with one of the nurse's hands beneath the newborn's elbows for support. The nurses will take the newborn's hand and briefly set the elbow in flexion, then momentarily extend the arm before releasing the hand. The angle of recoil with which the forearm springs back into flexion is noted.



LINK TO LEARNING

Review these [visual instructions on the arm recoil \(https://openstax.org/r/77ArmRecoil\)](https://openstax.org/r/77ArmRecoil) for more information on how to perform this part of the Ballard Assessment.

Popliteal Angle

To assess the popliteal angle, which involves measuring the maturation of passive flexor tone about the knee joint, the nurse must remove the newborn's diaper and place the newborn in a supine position. Then, the thigh is placed gently on the abdomen, with the knee fully flexed. After the newborn is relaxed in this position, the nurse will gently grasp the foot at the sides with one hand while supporting the thigh with the other. This will be done until a definite angle of extension can be determined. The angle formed at the knee by the upper and lower leg is measured.



LINK TO LEARNING

Review these [visual instructions on assessing the popliteal angle \(https://openstax.org/r/77poplitealangle\)](https://openstax.org/r/77poplitealangle) for more information on how to perform this part of the Ballard Assessment.

Scarf Sign

Assessment of the scarf sign is done to evaluate the passive tone of the flexors above the shoulder girdle. This assessment is completed while the newborn is lying supine, and the nurse adjusts the newborn's head to a midline position. The nurse gently guides the newborn's arm over the chest to the other side of the body until resistance is felt. A preterm newborn's elbow will cross the midline of the chest, whereas a full-term newborn's elbow will not cross midline.



LINK TO LEARNING

Review these [visual instructions on the scarf sign \(https://openstax.org/r/77scarfsign\)](https://openstax.org/r/77scarfsign) for more information on how to perform this part of the Ballard Assessment.

Heel to Ear

In assessing heel to ear, the nurse places the newborn supine and flexes a lower extremity laterally alongside the body with the palm of their hand. The nurse pulls the newborn's foot toward the ear of the same side until resistance is felt. A very preterm newborn's leg will remain straight, and the foot will go to the ear or beyond. With increasing gestational age, the newborn will demonstrate resistance to this maneuver.



LINK TO LEARNING

Review these [visual instructions on performing the heel-to-ear assessment \(https://openstax.org/r/77heeltoearsmnt\)](https://openstax.org/r/77heeltoearsmnt) for more information on how to perform this part of the Ballard Assessment.

Determining the Newborn's Placement on the CDC Weight Scale

Once the gestational assessment is complete, the nurse will plot the gestational age with the newborn's length, head circumference, and weight on the appropriate growth chart from the World Health Organization's growth charts to determine if these measurements fall within range, the 10th to the 90th percentile for the corresponding gestational age based on gender. The placement of the newborn's data on this growth chart is imperative to monitoring the infant's weight gain and growth over the first year. The ranges for measurements are grouped as follows:

- **small for gestational age (SGA):** a newborn whose weight and/or length measures below the 10th percentile compared to all other newborns their age, according to the CDC growth chart
- **appropriate for gestational age (AGA):** a newborn whose weight and/or length measures within the 10th and 90th percentile compared to all other newborns their age, according to the CDC growth chart
- **large for gestational age (LGA):** a newborn whose weight and/or length measures above the 90th percentile compared to all other newborns their age, according to the CDC growth chart. (For information on special care of the LGA newborn born to a parent with gestational diabetes, see [25.2 Congenital, Genetic, and Acquired Complications](#).)



CULTURAL CONTEXT

Cultural Norms Surrounding the Weighing of the Newborn

Most cultures have traditions or beliefs surrounding childbirth and newborn care. One tradition that postpartum

nurses may encounter with Hindu parents concerns the weighing of newborns. Nearly two-fifths of Hindu mothers have concerns about babies being weighed regularly or being weighed in front of people. In a survey about this practice, 64 percent of the women said the newborn could not be weighed in front of anyone except the doctor, 27 percent said they did not want the newborn weighed frequently, and 9 percent said they did not want the infant weighed at all in the hospital for fear that the infant would get ill (Upadhayay et al., 2012). It is always best practice for the nurse to assess for any cultural beliefs and practices before doing procedures with the newborn.

Behavioral Assessment of the Newborn: The Brazelton Neonatal Behavioral Assessment

The first few days after birth are a period of behavioral disorganization for the newborn as they adjust to the outside world and its new noises, smells, and sounds. In utero, the newborn only knew muffled sounds and no light or smells; now the newborn is in a sensory-overload environment. As a result, the personality of their newborn may not be readily apparent until day 2 or 3, when they have adjusted to their new environment.

The **Brazelton Behavioral Assessment** is a psychologic assessment completed on a newborn to assess their capabilities for social relationships (Chin & Teti, 2013). The Brazelton Behavioral Assessment should be completed by the nurse on the second or third day post birth to elicit the best response from the newborn. As newborns are often discharged at 24 hours of life, this assessment may not be performed prior to discharge. This assessment should be completed in a warm, quiet room with as much involvement from the parents as the nurse can incorporate to facilitate parental attachment. The results are relevant up to 2 months of age. The concepts from this behavioral assessment tool have been used by nurses to plan care regarding interactions between newborns and their parents, especially those who are at risk for delayed attachment styles (Chin & Teti, 2013). This assessment's scale identifies individual differences based on levels of stimulation, handling, and interactions between the newborn and the parent. Four categories are assessed: interactive processes, motoric processes, organizational processes, and physical response to stress. The response is identified as exceptionally good, average, or poor in each of the categories.

The newborn must be in the quiet, alert state when the assessment is performed. The selected maneuvers in the Brazelton scale include having the newborn fix, follow, and find the source of noise and visual stimuli, such as a face or an inanimate object. Demonstrating that the newborn recognizes the parents' voices and will turn toward them rather than a stranger's voice is exciting and reassuring for the parents or caregivers to see. During the assessment, the nurse can provide strategies for handling the newborn, soothing and comforting, and pointing out when the newborn is self-soothing. The Brazelton assessment includes four categories, Dimensions I through IV.

Dimension I: Interactive Process

Dimension I: Interactive Process includes assessment of alertness, orientation, and responsiveness to visual and auditory cues. The newborn would receive an exceptionally good score if they could stay alert and focused for most of a 30-minute exam. The newborn would need to focus on an object, turn their head and follow it, and turn their head toward an auditory sound they recognize, like a parent's voice. A poor score would be given if the newborn did not recognize and acknowledge the auditory cue by turning their head, could not stay awake, and/or was crying and couldn't be consoled (Basdas et al., 2018).

Dimension II: Motoric Process

Dimension II: Motoric Process focuses on motor tone and the newborn's activity level. The newborn would score exceptionally well if they had good tone when they were touched or handled by the examiner or parent, could relax in between those interactions, and if they had good reflexes with moderate activity. The newborn would also show head control, hand-to-mouth activity, and no hyper- or hypotonic movements. If the newborn had hyper- or hypo-reflexes, hypo- or hypertonic movements, poor head control, low activity or inconsolability, jerking, tremors, or other immature movements, this would be reflected in poor scores (Basdas et al., 2018).

Dimension III: Organizational Process

Dimension III: Organizational Process assesses the newborn's ability to achieve and maintain a state of alertness, not be irritable, and not be disturbed by stimuli. To obtain exceptionally good scores, the newborn will need to stay alert and, when drowsy, shut down body responses to stimuli (Basdas et al., 2018). The newborn will demonstrate self-quieting techniques, return to alertness after crying, and have low irritability. Conversely, high irritability or excessively depressed mood would result in low scoring. Flat, depressed newborns would appear drowsy when they

were encouraged to wake and be irritable to unpleasant stimuli. High irritability newborns would demonstrate mood swings, inconsolability, and an inability to self-soothe (Basdas et al., 2018).

Dimension IV: Physical Response to Stress

Dimension IV: Physical Response to Stress is focused on physical symptoms in the newborn related to being handled and dressed. If the newborn cries and has significant changes in skin color, a slow recovery of good color, or is startled frequently, this would indicate a poor score. A newborn who has no skin color changes or whose skin recovers quickly from color changes is experiencing good reactions to stress and therefore will receive good scores (Basdas et al., 2018).

Implications and Mitigating Factors for Poor Behavioral Assessment Scores

Some identifiable reasons exist for newborns to score poorly on the behavioral scale and be identified as high-risk. For example, those who are born preterm are more likely to sleep for longer periods. But much more research needs to be done in this area of maternal-child health (Malak et al, 2021). Low-scoring newborns may be hard to wake up to feed, may not bond with parents as easily as other newborns, may have poor breast-feeding initiation and 6-month success rates, and may require early intervention and follow-up (Basdas et al., 2018). Some causal factors for poor scores on the behavioral scale can be phototherapy treatments, excessive maternal medications, low birth weight, young parents, inattentive parenting, inappropriate parental perceptions of infant behaviors, or newborns born to people with narcotic addiction (Basdas et al., 2018).

Summary

23.1 Physical Assessment of the Newborn

It is important for the nurse to know how to complete a comprehensive and accurate physical assessment on a newborn. Performing the physical assessment with the new parents in the room is a good opportunity for the nurse to educate the parents on safety issues in handling and caring for their newborn. New parents and even experienced ones will look to the nurse for guidance before discharge about how to integrate the newborn into their family, how to feed and soothe their newborn, and how to recognize when their newborn needs help. The nurse's assessment should always work from the least invasive to the more invasive to avoid irritating the newborn and to maintain thermoregulation. Assessment begins with passive observations, then moves into a hands-on physical examination. The nurse should have a broad knowledge base of expected findings in a newborn, including weights and measurements, vital signs, commonly elicited reflexes, and expected and unexpected variations to look out for. Nurses are the experts in newborn care and should advocate for safe, timely discharge home for the newborn and their family.

23.2 Estimation of Gestational Age of the Newborn and Newborn Behavioral Assessment

A complete newborn assessment must consider the gestational age of a newborn. While that can be obtained by the date of a pregnant person's last menstrual period, there are times when that is not accurate or is unknown. At those times, the nurse can utilize the Ballard scoring tool to determine the newborn's approximate gestational age, allowing the clinical team to be prepared for any age-related issues that the newborn may experience. One of the greatest responsibilities of the nurse in caring for a newborn and their family is health promotion and risk reduction, which is the purpose of estimating gestational age.

The Brazelton Neonatal Behavioral Assessment gives nurses an opportunity to assess the newborn's personality but also to assess the bonding that is (or is not) occurring between the parents and the newborn. Early intervention and a referral to a social worker is key if there is a problem, and providing resources before the couplet leaves the hospital is best practice. Additionally, this assessment gives the parents time to observe and interact with their newborn's personality for the first time, while allowing the nurse one more chance for anticipatory guidance and discharge education.

Key Terms

adrenogenital syndrome (also: *congenital adrenal hyperplasia*) syndrome in which excessive amounts of androgen and other hormones secreted by the adrenal gland can present as edema of the genitalia

anterior fontanelle larger of the two fontanelles, located in the anterior of the fetal skull, diamond shaped

apnea condition occurring when breathing has stopped for 20 seconds or longer

appropriate for gestational age (AGA) newborn whose weight and/or length measures within the 10th and the 90th percentile compared to all other newborns their age, according to the CDC growth chart

arm recoil part of the Ballard estimation of gestational age assessment, assessing passive flexor tone of the biceps

Ballard Score (also: *estimation of gestational age by maturity rating*) tool developed by Ballard that measures physical and neuromuscular findings to determine the approximate gestational age of the newborn

Barlow maneuver assessment of the newborn for congenital hip dysplasia done by adducting the hip while applying pressure on the knee to direct the force posteriorly

brachial palsy partial or complete paralysis of portions of the arm resulting from trauma to the clavicle during the birth process

Brazelton Behavioral Assessment comprehensive psychologic assessment completed on a newborn to assess their capabilities for social relationships

caput succedaneum benign condition that crosses the suture lines in which edema is observed on a newborn's scalp shortly after birth and is related to trauma during the delivery

cephalohematoma condition in which there is an accumulation of serosanguineous or bloody fluid below the periosteum of the skull that does not cross the suture line, typically from an instrument-assisted birth

cryptorchidism condition in which the testes do not descend

dermal melanocytosis bluish-gray spots of the skin occurring on the back across the shoulders, hips, near the

buttocks, and legs (formerly called Mongolian spots)

Dimension I: Interactive Process assesses the newborn's alertness, orientation, and responsiveness to visual and auditory cues

Dimension II: Motoric Process assesses the newborn's motor tone and activity level

Dimension III: Organizational Process assesses the newborn's ability to achieve and maintain a state of alertness, not be irritable, and not be disturbed by stimuli

Dimension IV: Physical Response to Stress assesses physical symptoms in the newborn in response to being handled and dressed

epispadias condition in which the urethral meatus is located on the dorsal side of the penis

Epstein pearls small, firm, white cysts containing keratin that are sometimes found on the gums of a newborn's mouth

erythema toxicum normal newborn rash abruptly occurring as yellow or white papules over an erythematous base on the newborn's body except the palms; occurs in 30 percent to 70 percent of newborns

fontanelle soft spot located on the newborn's head where the cranial bones meet and leave openings to allow for molding of the head during birth

frenulum tiny fold of mucous membrane that runs from the floor of the mouth to the midline of the tongue's underside

hydrocele condition in which there is a collection of fluid in the scrotal sac

hypospadias condition in which the urethral meatus is located on the ventral side of the penis

imperforate anus condition in which the opening to the anus is missing or blocked

lanugo fine, soft hair that covers the newborn's back, shoulders, cheeks, forehead, and scalp; more common in newborns that are born early and often disappears within 4 weeks after birth

large for gestational age (LGA) newborn whose weight and/or length measures above the 90th percentile compared to all other newborns their age, according to the CDC growth chart

meconium ileus condition in which there is no passage of meconium in the first 24 to 48 hours after birth

milia exposed sebaceous glands that look like baby acne on the newborn's face, nose, or chin, or all three

neonatal jaundice condition that arises from an excess of bilirubin in the blood due to an increase in breakdown of red blood cells and that manifests in a newborn as a yellowish discoloration of the skin, sclera, and mucous membranes

Ortolani maneuver assessment of the newborn for congenital hip dysplasia done by placing anterior pressure on the greater trochanters, then gently and smoothly abducting the newborn's legs

phimosis condition in which the opening of the foreskin is small and cannot be pulled back over the tip of the penis

polydactyly condition in which there are more than five digits in the newborn's hands

posterior fontanelle smaller of the two fontanelles, located at the junction of the parietal bones and the occipital bone on the fetal skull

small for gestational age (SGA) newborn whose weight and/or length measures below the 10th percentile compared to all other newborns their age, according to the CDC growth chart

square window sign part of the Ballard estimation of gestational age assessment, assessing passive flexor tone of the biceps muscle

strawberry hemangioma raised capillary nevi, occurring anywhere on the body, that often increase in size for the first few months of life, slowly decreasing in size over time, and disappearing by 10 years of age

syndactyly condition in which there is a presence of webbing or fusion of fingers or toes

telangiectatic nevus (also: *stork bite*) pale pink or reddish discoloration at the base of the neck, lower axilla, around the nasal bridge, and on the eyelids

tongue-tie (also: *ankyloglossia*) abnormally short frenulum or a frenulum that is attached near the bottom of the tongue

vernix caseosa cheesy, white substance covering and protecting the skin during intrauterine life; coverage at birth directly related to gestational age

Assessments

Review Questions

1. A new parent asks the nurse why the 36-hour-old newborn has a yellow skin tint. What should the nurse explain to the parent?

- a. The newborn's liver is not functioning as well as it should.
 - b. The yellow color indicates possible brain damage.
 - c. The infant's bowels are not excreting bilirubin.
 - d. The color is a sign of physiologic jaundice, a normal finding.
2. At birth, a newborn weighed 6 pounds, 12 ounces. Three days later, the newborn weighs 5 pounds, 10 ounces. What conclusion should the nurse draw regarding this newborn's weight?
- a. This weight loss is within normal limits.
 - b. This weight gain is within normal limits.
 - c. This weight loss is excessive.
 - d. This weight gain is excessive.
3. The nurse is completing an initial assessment of the newborn. The newborn's ears appear to be parallel to the outer and inner canthus of the eye. How does the nurse document the ear placement?
- a. low set
 - b. high set
 - c. a normal position
 - d. facial paralysis
4. A new parent is concerned about a mass on the newborn's head. The nurse assesses this to be a cephalohematoma based on what characteristics?
- a. The mass just appeared.
 - b. The mass is on one side of the head and does not cross suture lines.
 - c. The head is boggy and the crosses suture lines.
 - d. The mass increases when the infant cries.
5. What condition can result from a long, difficult labor and is characterized by a localized, soft area on the newborn's head?
- a. caput succedaneum
 - b. molding
 - c. depressed fontanelles
 - d. cephalohematoma
6. During an assessment of a 12-hour-old newborn, the nurse notices pale pink spots on the nape of the neck. How does the nurse document this finding?
- a. nevus vasculosus
 - b. Mongolian spots
 - c. nevus flammeus
 - d. telangiectatic nevi
7. How would the nurse elicit a rooting reflex in a newborn?
- a. Gently rub a finger on the side of the newborn's cheek.
 - b. Put a finger into the palm of the newborn's hand and wait for them to grab on.
 - c. Put a gloved finger into the newborn's mouth and stimulate the roof.
 - d. Grab both arms, pulling upward, and let them go, watching for a startle response bilaterally.
8. The nurse notices that a 6-hour-old newborn patient's urethral opening is on the dorsal side of the penis. The nurse knows that this is called what?
- a. hypospadias
 - b. epispadias
 - c. phimosis
 - d. unispadias

9. The nurse is completing a gestational assessment on a newborn whose parent was treated for preeclampsia during labor. The neonate is demonstrating “frog-like” posturing. The nurse knows this is likely due to what medication during labor?
- fentanyl in the epidural
 - penicillin for treatment of group B strep infection
 - magnesium sulfate for treatment of preeclampsia
 - prenatal vitamins
10. The nurse knows that a full-term newborn presents with ears that include what assessment characteristics?
- slightly curved pinna; soft; slow recoil
 - well-curved pinna; soft; ready recoil
 - thick cartilage, ear stiff
 - pinna flat, stay folded
11. The nurse is assessing a newborn girl born at 40 weeks of gestation based on the parent’s LMP. What assessment finding of the genitalia confirms this gestational age?
- labia majora covering clitoris and labia minora
 - clitoris prominent, labia minora enlarged
 - small labia minora, clitoris enlarged
 - labia majora enlarged, labia minora small
12. What are the characteristics of a 40-week preterm newborn male’s genitalia?
- scrotum empty, faint rugae
 - testes in upper canal, rare rugae
 - testes down, appropriate rugae
 - testes pendulous, deep rugae
13. When assessing the newborn for the presence of lanugo, where should the nurse look for it?
- on the newborn’s face
 - on the newborn’s extremities
 - on the newborn’s back near their buttocks
 - on the newborn’s back between the scapulae
14. The nurse is assigned to the postpartum room of a 12-hour-old neonate, and the EHR has a task reminder prompting the nurse to complete a Brazelton assessment on the newborn. Why is this not appropriate?
- This newborn has been born to a person who is placing the infant up for adoption.
 - This newborn has been born to a person who birthed by cesarean section.
 - This newborn is only 12 hours old.
 - This newborn is experiencing pathologic jaundice.
15. The nurse is assigned to the room of a 15-year-old person who gave birth to a newborn 72 hours ago. Why is this newborn a perfect candidate for the Brazelton assessment?
- This parent-newborn couplet is at risk for delayed attachment.
 - The newborn is likely going home soon.
 - The EHR is prompting her to do so.
 - The infant is likely withdrawing from a substance.
16. What categories are in the Brazelton assessment? Select all that apply.
- interactive process
 - organizational process
 - behavioral process
 - motoric process

- 17.** The nurse knows that during the interactive process of the Brazelton assessment, the newborn will receive an exceptionally good rating by reacting to what? Select all that apply.
- a. turns their head toward a familiar voice
 - b. stays awake
 - c. focuses on an object
 - d. cries inconsolably
- 18.** The nurse knows that during the motoric process, the newborn will be rated poorly if they do what?
- a. They have good reflexes.
 - b. They have hyper- or hypotonic movements.
 - c. They have good head control.
 - d. They have moderate activity levels.
- 19.** The nurse knows that during the organizational process, the newborn will be rated as exceptionally good if they do what? Select all that apply.
- a. They will remain alert.
 - b. They will be highly irritable and demonstrate mood swings.
 - c. They will demonstrate self-soothing and quieting techniques.
 - d. The newborn will shut down body responses to stimuli when drowsy.
- 20.** The nurse knows that newborns that are high-risk for delayed attachment with their parents/caregivers are at risk for what? Select all that apply.
- a. poor breast-feeding initiation
 - b. not bonding with their parents
 - c. hard to wake to feed
 - d. not feeling happy
- 21.** When the nurse determines they have a high-risk newborn and birthing person in their care, what can they do to mitigate the situation?
- a. Document in the chart.
 - b. Reassure the parent that everything will be fine.
 - c. Refer the couplet to social work for early intervention.
 - d. Refer to a pediatric health-care provider for well-baby checkup.

Check Your Understanding Questions

- 1.** Why is it important that newborns with hypospadias and epispadias not be circumcised until they are seen by a pediatric urologist?
- 2.** A full neurologic assessment of a newborn includes evaluation of each newborn reflex. List the newborn reflexes and the expected finding for each.
- 3.** A newborn is feeding and acting fussy when the nurse walks into the room to complete a Ballard Assessment. What should the nurse know about timing the Ballard Assessment?
- 4.** Explain why it is important that the nurse not perform the Ballard Assessment on a newborn that is possibly withdrawing from substances.
- 5.** Summarize why the nurse must wear gloves the entire time they are completing an assessment on a newborn that has not yet had a bath post birth.
- 6.** Describe two reasons the nurse would want to perform a behavioral assessment on a newborn before discharge home.
- 7.** After completing a physical assessment and noting weight and measurements, the nurse completes a Ballard Assessment on a newborn.

SIGN	SCORE
Posture	3
Square Window	2
Arm Recoil	3
Popliteal Angle	3
Scarf Sign	3
Heel to Ear	2
TOTAL SCORE	

TABLE 23.4 Neuromuscular Maturity Scoring

SIGN	SCORE
Skin	2
Lanugo	2
Plantar Surface	3
Breast	2
Eye/Ear	2
Genitals (Male/Female)	2 female
TOTAL SCORE	

TABLE 23.5 Physical Maturity Score

Based on the indicated scores, what overall maturity score would this newborn receive?

Reflection Questions

1. As the nurse, how would you involve the new parents who are watching you complete the initial newborn assessment?
2. As a nurse, how would you explain to new parents of a newborn the blueness in their child's hands and feet, which was present at birth?
3. As a nurse, how would you respond to parents who ask why you are doing a gestational assessment on their infant?

Critical-Thinking Questions about Case Studies

1. Refer to [Newborn Care: Part 2](#).
A nurse has stimulated Marcus's Moro reflex. The parents are present and ask when the reflex will go away. What is the nurse's best response?
 - a. Moro, or startle, reflex is present at birth and usually disappears at around 2 months of age.
 - b. The Moro, or startle, reflex is abnormal at birth and is present in toddlers.

- c. The Moro, or startle, reflex is present at birth and remains present throughout life.
 - d. The Moro, or startle, reflex is abnormal at all times.
2. Refer to [Newborn Care: Part 2](#).
Marcus is assessed and found to have a weak or absent suck reflex. What could this be indicative of?
- a. an abnormal neurologic condition
 - b. a sleepy presentation
 - c. a fully fed newborn
 - d. an abnormal HEENT condition
3. Refer to [Newborn Care: Part 2](#).
Why is it important to perform a complete head-to-toe assessment on every newborn?

Competency-Based Assessments

1. While conducting a head-to-toe examination, you identify an abnormality in the newborn's musculoskeletal system. How would you integrate this finding into the overall care plan, considering potential impacts on vital signs and neurologic reactions?
2. As a maternity nurse, you are assigned to care for a newborn with a history of maternal substance misuse. During routine vital sign assessment, you notice some abnormalities. How would you approach this situation, considering both the vital signs and the potential neurologic reactions?
3. The health-care team needs to estimate the gestational age of a newborn using the Ballard estimation tool. Discuss the key physical and neurologic indicators you would assess and explain how these indicators contribute to determining gestational age.
4. Working in a pediatrician's office, you are asked to determine a newborn's social adequacy and capabilities using the Brazelton Neonatal Behavioral Assessment Scale. Explain the key components of this assessment tool and how they contribute to understanding the newborn's social well-being.

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CHAPTER 24

Care of the Typical Newborn



FIGURE 24.1 Nursing Care of the Newborn The nurse's care of the newborn is both patient- and family-centered: readying the newborn for discharge and preparing their parents and support persons to care for them at home. The postpartum or newborn nurse provides education and identifies any problems before the infant is discharged to home. (credit: "Newborn Baby Lee" by Joanne Lee/Flickr, CC BY 4.0)

CHAPTER OUTLINE

24.1 Basic Newborn Care

24.2 Care of Common Problems in the Newborn

24.3 Newborn Discharge Planning and Parent Education

INTRODUCTION The early days, weeks, and months of a baby's life are crucial for their growth and development and their overall well-being. Caregivers, parents, and health-care professionals require a comprehensive understanding of newborn care, encompassing various aspects such as hygiene, feeding, sleep patterns, soothing techniques, and general health assessments like newborn screening. Recognizing signs of illness, knowing when to call the provider, identifying variations from normal, and understanding the importance and timing of immunizations are also important for newborn care. By gaining knowledge in these critical areas, nurses can confidently navigate the challenges of newborn care, ensuring the well-being and healthy development of these vulnerable persons.

24.1 Basic Newborn Care

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Identify universal care items for the newborn
- Describe successful infant feeding along with the preparation and storage of both formula and breast milk
- Describe the expected voiding and stooling pattern of a newborn, including that of a breast-fed newborn and a formula-fed newborn
- Discuss circumcision care in the newborn and when to notify the physician if a problem occurs

A nurse's responsibility in any scenario is multifaceted. In caring for the birthing parent and newborn after birth,

basic newborn care is a priority. At this time, new families are experiencing a myriad of emotions. They are thrilled and excited, exhausted and exhilarated, anxious and confident all at the same time. What they want and need is gentle, reassuring guidance from their nurse, informing them that their feelings are perfectly normal and what they are doing is perfectly fine. The nurse can let the parents know that because their voices were audible to the fetus in utero, their baby learned to recognize them in the third trimester (Yale University, 2018). Therefore, after birth, newborns can recognize the parents' voices and those of siblings and other family members, depending on prenatal exposure. Information such as this helps to promote parental bonding and ease anxiety for new parents. Research also shows that as early as 1 week after birth, some newborns will turn their head toward a voice that they recognize to seek it out and will even recognize it in another room (Yale University, 2018). Therefore, parents should keep holding their baby close and talking softly to them.

Safety questions will arise regarding prevention of newborn injury and timing of immunizations. Umbilical cord care and care of the circumcised and/or uncircumcised penis will also present as points for communication and education with the family. Probably foremost in the minds of parents is the issue of feeding because this comes up in the delivery room almost immediately after giving birth. Both breast-feeding and bottle-feeding mothers need assistance and teaching. The topic of what is normal for bowel movements for breast-fed and bottle-fed infants is another related topic. There is much for the maternal-newborn nurse to understand and to be able to teach the new parent about the basic care of the newborn.

Protective Environment and Universal Well Newborn Care

Immediately after birth, the nurse is responsible for essential newborn care, beginning with thorough drying. The baby's breathing is assessed after birth, and an Apgar score is assigned, usually by the nurse or by the provider who oversees the delivery. As part of the Apgar score, breathing and heart rate are assessed and, if needed, resuscitation is begun. (For an explanation of Apgar scores, see [Chapter 22 Immediate Care of the Newborn](#).)

The primary goal of care immediately after birth is to assist the newborn in their transition to extrauterine life by establishing effective respirations. If the baby appears stable, skin-to-skin contact with the birthing parent is initiated, and breast-feeding or chest-feeding, when feasible and desired, is begun. The newborn is wet with amniotic fluid, blood, and body fluids, so temperature regulation is also a priority, and protection from heat loss is essential. The nurse dries the infant thoroughly, removing all wet linen, and covers the newborn with warm, dry linen while the baby remains skin-to-skin or in the parent's arms. Research (Mardini et al., 2020) shows that delaying the baby's first bath, in addition to preventing hypothermia while maintaining body heat, is one way to protect the infant from infection. At birth, babies often have a white substance called vernix on their skin, which is made up of skin cells from earlier in development ([Figure 24.2](#)). Vernix helps to fight against bacterial infections such as those caused by group B streptococcus and *Escherichia coli* (*E. coli*), which can lead to pneumonia and meningitis. Vernix also helps to stabilize the baby's blood sugar levels by preventing the production of stress hormones in response to bathing too early. Delaying the first bath also provides more time for parents and baby to bond without interruption, which in turn promotes and supports a better start to breast-feeding.



FIGURE 24.2 Vernix This newborn has vernix on the back and legs. (credit: “Vernix” by Upsilon Andromedae/flickr, CC BY 2.0)

Before bathing, infants are covered in amniotic and maternal bodily fluids, as noted previously. Medical staff could risk infection by any number of viruses and infections through exposure to these fluids. By following universal precautions, the medical staff protect themselves and ensure a healthy and protective environment for the baby. Universal precautions will continue to be used for both the birthing parent and baby, even after the baby’s first bath.

Newborn screening begins at 24 to 48 hours after birth, while they are still hospitalized. All babies in the United States get newborn screening after birth, with approximately 4 million babies being screened each year (U.S. Department of Health and Human Services, 2021b). Several drops of blood are obtained from a heel stick, and the blood is sent to a laboratory, where it is analyzed for biochemical and genetic markers indicative of hidden congenital disorders. If markers are found, follow-up programs exist so that the baby can receive immediate medical attention and services to minimize the effects of the underlying disorder, which may be entirely asymptomatic at this point.

Newborn screening consists of three essential components:

1. **Blood test:** The primary element of newborn screening involves a blood test to detect uncommon yet severe health issues. These conditions, such as PKU (phenylketonuria), are rare and are mostly treatable. The nurse or other health-care provider will prick the baby’s heel to obtain a small blood sample, which is then collected on specialized paper and dispatched to a laboratory for analysis. Typically, the results are available by the time the baby reaches 5 to 7 days of age. If parents are curious about the need for newborn screening, the nurse can provide the example of PKU, which is treatable but, if not diagnosed early, leads to severe cognitive impairment.
2. **Hearing screening:** This examination aims to evaluate the baby’s hearing capabilities and to identify potential hearing loss. Specialized computer equipment assesses the baby’s response to auditory stimuli. If the initial results show no response, more in-depth hearing evaluations are done later in coordination with the primary care provider.
3. **Heart screening:** This screening is intended to identify specific heart conditions referred to as critical congenital heart defects (also known as critical CHDs or CCHDs). It employs pulse oximetry, which measures the oxygen levels in the baby’s blood using a pulse oximeter machine and sensors placed on the baby’s skin.



LINK TO LEARNING

To learn more about [Critical Congenital Heart Defects Screening Methods \(https://openstax.org/r/77heartdfctscrn\)](https://openstax.org/r/77heartdfctscrn) available, see the algorithm and explanations of results at the Centers for Disease Control and Prevention (CDC) website.

All newborns in the United States get newborn screening, but the specific requirements differ from state to state. Some states require that babies have newborn screening for a second time at about 1 to 2 weeks after their first screening.



LINK TO LEARNING

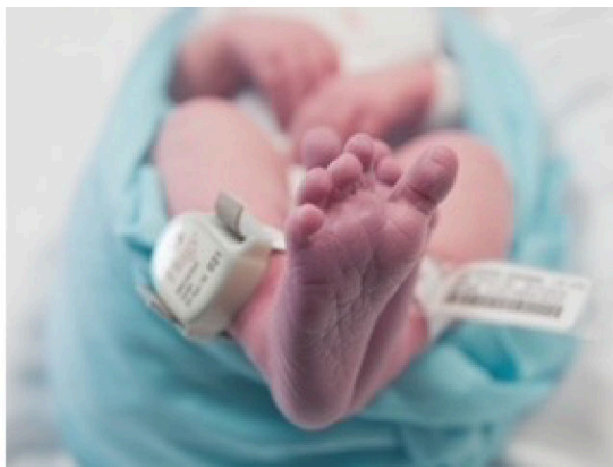
The [National Newborn Screening and Genetics Resource Center \(NNSGRC\) \(https://openstax.org/r/77NewbornscrnUS\)](https://openstax.org/r/77NewbornscrnUS) lists conditions screened in newborns by U.S. states and territories.

Preventing Infant Abduction

Safety is an essential component of nursing instructions to new parents and is always a primary concern. The nurse is responsible for identifying the infant, even in emergent situations, at the time of delivery (even in the operating room, or OR), before the baby is removed from the room or taken to the nursery. This will occur even if the baby is transported to the neonatal intensive care unit (NICU). Identifying the newborn consists of placing two identification (ID) bands on the baby, usually one on each ankle, and one on the birthing parent's wrist at the time of birth. Exact placement of ID bands is dictated by hospital policy. The ID bands contain the following information: sex, date and time of birth, parent's last name, and doctor or midwife ([Figure 24.3](#)). An electronic security device with an imprinted number is placed on the infant, usually on the ankle. This device has the same identifying numbers as the other ID bands on the infant and parent, and it will sound an alarm at any of the unit exits for additional security. The device will be removed by the nurse at the time of discharge. Other methods for identifying the infant include footprints, usually taken at the time of delivery, along with the birthing parent's fingerprint.



(a)



(b)

FIGURE 24.3 Identification Band Immediately after birth, (a) an identification band is placed on both the newborn and birthing parent as a safety measure. (b) An anti-theft device may also be placed on the infant's ankle. (credit a: "Newborn baby's foot with identification tag" by "rawpixel"/freerangestock.com, CC0; credit b: reproduced with permission from Regina Prusinski)

Hospitals around the world are prepared to protect against infant abductions by using security systems. This requires that special tamper-detecting bands are placed on the infant, usually on an ankle, but sometimes on the cord clamp, depending on the manufacturer. These bands have a number, which matches a band placed on the parents of the infant. All hospital staff are instructed to check the ID bands for matching numbers prior to leaving the baby with the parents. All parents are directed not to leave the baby with anyone who does not have a hospital picture ID. The security ID band will sound an alarm when the infant is brought within a certain distance of any of the unit exits. When this happens, all exits lock immediately; security cameras activate on the unit, in stairwells, and at all exits. In addition, an immediate search to account for all newborns on the unit is undertaken by nursing staff and security. When parents are discharged to home with their baby, the ID bands are removed by the nurse with a special tool so that alarms do not sound when babies leave the unit.

Common hospital safety instructions to parents include the following:

- Never release your baby to anyone who does not have a hospital picture ID badge.

- If you see anyone acting suspiciously on the unit, report them to the nursing staff or call hospital security with the phone in your room.
- Never leave your baby unattended in your room. You can take your baby's crib into the bathroom with you or in the hallway with you.
- If you are going to take a nap, ask the nurses to take your baby to the nursery if a family member is not in the room with you.
- When the baby is in the room with you, position the crib on the side of your bed furthest and opposite from the door.
- Do not sleep with the baby in the bed with you. Do not let your partner sleep with the baby in the bed with them.
- Do not leave the infant alone on the bed or propped up on a pillow or with pillows.
- Do not prop up the baby with a bottle of formula for feeding.
- Do not leave your baby unattended in the arms of a child or sibling.
- In the hospital and during your early weeks at home, wash your hands before handling your newborn. Your newborn is particularly susceptible to infection.

Immunizations

An **immunization** is the process by which someone becomes protected against a disease through injections into the skin, nasal spray, or by mouth. The term can be used interchangeably with *vaccination* or *inoculation*. The Centers for Disease Control and Prevention (CDC, 2023b) and the American Academy of Pediatrics (AAP; 2023c) work together each year to recommend the same carefully planned childhood vaccine schedule to protect infants and children from vaccine-preventable diseases. Newborns receive their first vaccine shortly after birth, often while still in the hospital. They will be given several vaccines during their first months. Following the recommended vaccine schedule in the first months and years of life will keep them on track for life-long immunity to childhood diseases. See [Figure 24.4](#) for the current vaccine schedule from birth to 15 months of life.

Birth to 15 months

Vaccine and other immunizing agents	Birth	1 mo	2 mos	4 mos	6 mos	9 mos	12 mos	15 mos
Respiratory syncytial virus ⓘ (RSV-mAb [Nirsevimab])	1 dose depending on maternal RSV vaccination status, See notes					1 dose (8 through 19 months), See notes		
Hepatitis B ⓘ (HepB)	1 st dose	←2 nd dose→			←3 rd dose→			
Rotavirus (RV) ⓘ RV1 (2-dose series); RV5 (3-dose series)			1 st dose	2 nd dose	See notes			
Diphtheria, tetanus, & acellular pertussis ⓘ (DTaP: <7 yrs)			1 st dose	2 nd dose	3 rd dose			←4 th dose→
Haemophilus influenzae type b ⓘ (Hib)			1 st dose	2 nd dose	See notes		←3 rd or 4 th dose, See notes →	
Pneumococcal conjugate ⓘ (PCV15, PCV20)			1 st dose	2 nd dose	3 rd dose		←4 th dose→	
Inactivated poliovirus ⓘ (IPV: <18 yrs)			1 st dose	2 nd dose	←3 rd dose→			
COVID-19 ⓘ (1vCOV-mRNA, 1vCOV-aPS)						1 or more doses of updated (2023–2024 Formula) vaccine (See notes)		
Influenza (IIV4) ⓘ						Annual vaccination 1 or 2 doses		
or Influenza (LAIV4) ⓘ								
Measles, mumps, rubella ⓘ (MMR)						See notes	←1 st dose→	
Varicella ⓘ (VAR)							←1 st dose→	
Hepatitis A ⓘ (HepA)						(See notes)	←2-dose series, See notes →	
Tetanus, diphtheria, & acellular pertussis ⓘ (Tdap: ≥7 yrs)								
Human papillomavirus ⓘ (HPV)								
Meningococcal ⓘ (MenACWY-CRM ≥2 mos, MenACWY-TT ≥2years)		See notes						
Meningococcal B ⓘ (MenB-4C, MenB-FHbp)								
Respiratory syncytial virus vaccine ⓘ (RSV [Abrysvo])								
Dengue ⓘ (DEN4CYD: 9-16 yrs)								
Mpox ⓘ								

FIGURE 24.4 Recommended Immunizations The CDC and American Academy of Pediatrics recommend numerous vaccines between birth and 15 months of age for establishing lifelong immunity. These recommendations must be read with the notes published online with the schedule. For those who fall behind or start late, catchup vaccinations should occur at the earliest opportunity as indicated by the green bars. To determine minimum intervals between doses, see the catchup schedule. (credit: “Birth to 15 Months” by National Center for Immunization and Respiratory Diseases/cdc.gov, Public Domain)

The hepatitis B vaccine is the first vaccine the baby will receive, most likely within the first 24 hours of life. The vaccination will be held and provided later if the newborn weighs less than 2 kg (4.4 lb). They will receive a second dose of the hepatitis B vaccine during their 2-month well-baby checkup and a third dose at 4 or 6 months to

complete the three-dose vaccination series. Hepatitis B infection can cause slow, persistent liver damage in a child. The virus is found in the blood and body fluids and can last on a surface for up to a month. This vaccine is recommended for all babies to protect against infection, which can lead to complications such as chronic liver disease, liver cancer, and even death (CDC, 2023b).



LINK TO LEARNING

The [Vaccine Information Sheet for the hepatitis B vaccine \(https://downloads.aap.org/AAP/PDF/immunization_refusaltovaccinate.pdf\)](https://downloads.aap.org/AAP/PDF/immunization_refusaltovaccinate.pdf) should be given to new parents to read before their baby receives the vaccine.

Nurses should share important facts with parents regarding vaccinations and prevention of diseases. These medications go through rigorous safety testing before they are introduced to the public, and they are constantly being monitored for side effects after they are introduced. Vaccines may cause mild side effects that will not last long. After the infant receives a vaccine, the site may be sore for a day or two, or the infant may be irritable, but vaccination is one of the most important things parents can do to protect their children against serious and preventable illness.

Parents consider their health-care provider and staff, particularly nurses, to be the most trusted source of information when it comes to the health of their newborns and vaccine information (U.S. Department of Health and Human Services, 2021c). When discussing vaccines with parents, it is important to assume that they plan to vaccinate their newborns. Discuss the vaccine schedule and which vaccines the baby is due to receive as if you presume the parents are ready to accept the recommended vaccines for their child during that visit. For example, rather than saying “Have you decided what you want to do about your baby’s shots today?” say “Your child’s DTaP, Hib, and Hepatitis B vaccinations are scheduled today.” Research shows that more parents accept vaccines for their children, especially when offered the first time, when care providers take a presumptive approach in discussions (U.S. Department of Health and Human Services, 2021c).



LINK TO LEARNING

The [CDC’s recommended vaccine schedule for children and adolescents ages 18 years and younger \(https://openstax.org/r/77vaccinesched\)](https://openstax.org/r/77vaccinesched) is updated often and should be referred to prior to any vaccination plan.

If parents express vaccine concerns, then providers should share their *strong* recommendation. Because the opinion of doctors and nurses is consistently valued highly, responses such as “This office strongly recommends that your child get these vaccines today” or “I strongly believe in following this vaccine recommendation and have vaccinated my own children with these vaccines at the same age” can be persuasive. You can also say, “Vaccines are very important to protect children from serious diseases.” When parents have vaccine-related concerns, the nurse should show their willingness to listen. This will play a major role in building a foundation of trust in you and your strong recommendations. Answer all their questions to the best of your ability.

Parents have the right to refuse vaccinations, and it is not appropriate for the nurse to argue with them. Try to end the conversation at that visit on a positive note. Continue the conversation about vaccines during the next visit and restate your strong recommendation. Discuss with the parents some clinical examples of vaccine-preventable diseases, including early symptoms of such diseases. Remind parents that if the child remains unvaccinated, they will need to call the office, clinic, or emergency department before visiting so that arrangements can be made to prevent contact with other patients who may be too young to be vaccinated or who may have weakened immune systems. Some providers have parents sign “AAP’s Refusal to Vaccinate” form (see the following Link to Learning) each time a vaccine is refused, to have a record of the refusal in the child’s medical record. Because a parent has refused a vaccine once does not mean that they will refuse every vaccine. Continue the conversation with vaccine-hesitant parents. Encourage them to read information that you provide them and continue to remind them about the importance of keeping their child up to date on vaccines during future visits.



LINK TO LEARNING

Many pediatric providers have parents sign the AAP's form [Documenting Parental Refusal to Have Their Children Vaccinated](https://openstax.org/r/77vaccinerefuse) (<https://openstax.org/r/77vaccinerefuse>) for each vaccination refused.

Umbilical Cord Care

During pregnancy, the umbilical cord supplies the developing fetus with nutrients and oxygen. After birth, the umbilical cord is no longer needed, so it is clamped and cut, leaving a short stump and a clamp. The clamp is removed when the cord stump dries out and before the baby leaves the hospital. The umbilical cord stump will eventually dry up and fall off, usually within 1 to 3 weeks after birth. In the meantime, parents need to be taught how to care for the umbilical cord stump at home. Keeping the cord stump and surrounding skin clean and dry, which prevents infection and helps the stump to fall off and the navel to heal more quickly, is called **cord care**.



CLINICAL SAFETY AND PROCEDURES (QSEN)

QSEN Competency: Patient-Centered Care: Parental Instructions for Umbilical Cord Care

Definition: Recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for the patient's preferences, values, and needs.

Knowledge: Describe strategies to empower patients or families in all aspects of the health-care process.

Skill: Engage patients or designated surrogates in active partnerships that promote health, safety and well-being, and self-care management.

Do *not* pull the stump off, even if it appears to be hanging on. Let the cord fall off naturally.

- Sponge bathe the baby. No tub baths until the cord has fallen off on its own.
- Keep the stump dry. Expose to air to help the cord dry at the base and separate.
- Fold down the front of the baby's diaper to avoid covering the stump. If the stump gets soiled between diaper changes, wash with gauze and water only and air dry.
- Watch for signs of a local infection at the stump site:
 - foul-smelling, yellow drainage from the stump
 - redness, swelling, or tenderness of the skin around the stump
 - oozing pus
 - development of a pink, moist bump in the surrounding area
- Be aware of more serious signs of infection:
 - poor feeding
 - fever of 100.4° F (38° C) or higher
 - lethargy
 - floppy, poor muscle tone
- When healing, the cord may scab at the stump, and it may bleed a little when it falls off. Both are normal. Any continuous oozing of blood is not normal, and the baby's health-care provider should be notified.
- Sometimes instead of completely drying, the cord forms a pink scar tissue called a granuloma, or the granuloma drains a light-yellowish fluid. This will usually go away on its own in about a week. If it does not, the baby's health-care provider should be notified.
- If the stump has NOT fallen off in 3 weeks, call the baby's health-care provider. This may be an indication of a problem such as an infection or an immune system disorder.

(Pruthi, 2023)

Knowledge: Value active partnerships with patients or designated surrogates in planning, implementation, and evaluation of care.

Umbilical Cord Problems

The umbilical cord should dry and fall off between 10 days and 2 weeks after birth. Parents may notice a few drops of serous drainage or blood on the diaper around the time that the umbilical stump falls off. This is normal. If at any time the umbilical cord or stump is actively bleeding, parents should be instructed to call their health-care provider immediately, as it will require medical treatment. Cord infections are uncommon, but if caregivers notice any of the following, they should notify their health-care provider:

- foul-smelling yellowish discharge from the cord or stump
- red skin around the base of the stump
- crying when the cord or the skin around it is touched

Feeding the Newborn

The newborn period is a time of great nutritional need, greater than any other time in a person's life. The infant will be entering a time of exponential growth and maturation in the upcoming year and will need the best nutritional composition and health-promoting feedings possible to support and sustain them. Breast milk, or human milk, is the ideal food for human infants (American Academy of Pediatrics [AAP], 2021c). For those birthing parents who cannot or do not wish to breast-feed their newborns, infant formula is an acceptable and nutritious alternative to breast milk (AAP, 2021c). Most commercially prepared infant formulas are based on cow's milk and have been modified to closely resemble the nutritional composition of human milk. Both provide 20 kcal/ounce (30 mL) but vary in other metrics of nutritional content.

Formula-Feeding

Parents and the infant's health-care provider will need to pay attention to the baby's pattern of feedings to make sure they are getting enough to eat and are growing properly. Regular checkups and growth monitoring are the best way to do this. Formula provides parents with an option to supplement maternal breast milk, as an additional feeding method for the newborn if they desire. It allows others the opportunity to feed the newborn and provides the nursing parent with respite from breast-feeding. Formula can be prepared ahead of time and can remain in a refrigerator for up to 48 hours. If an infant is fed formula exclusively, there is no need for maternal breast pumping or emptying if breast-feeding is missed. When formula-feeding, bottles, nipples, and clean water will be needed, as will a place to store the equipment. If the caregiver is traveling, they will need to make bottles in advance. Formula can be fed at room temperature, but it depends on what the individual infant is used to. Pacifiers may be introduced immediately after the baby is born, which will provide nonnutritive sucking, decrease the risk of sudden infant death syndrome (SIDS), and provide comfort to the crying baby.

Formula Characteristics

Infant formula is easily accessible for purchase in the United States in pharmacies, grocery stores, warehouse clubs, and via the Internet. One can purchase ready-to-use formula in bottles or in cans, and concentrated formula is also available in liquid or powdered form. Concentrated liquid formula requires water to be added to it before it can be fed to the baby. Powdered formula, also referred to as dry formula, must also be mixed with water before feeding it to the baby. The scoop that comes with the formula must be used to measure the right amount of powder. Then, the powder must be mixed with the correct amount of water.

No brand of formula is best for all babies, and not all babies have the same nutritional needs. The U.S. Food and Drug Administration (FDA) regulates commercial infant formulas to make sure formulas meet minimum nutritional and safety requirements. The CDC and the AAP strongly recommend using only infant formulas purchased in the United States and those that are iron-fortified (CDC, 2022b; AAP, 2021c). Enfamil, Similac, and Gerber's Good Start are three common formula brand names found in the United States, each offering many different varieties to meet the individual nutritional needs of normal newborns as well as premature, special, or prescription formulas.

Parents can work with their infant's health-care provider to determine if these or other formulas are best for their baby. When they find a formula that their baby tolerates well, it is best to use that brand only, without switching between brands. Parents should notify their baby's health-care provider if the baby develops gas, a rash, diarrhea, or vomiting. These may be signs that the formula is not right for their baby and that they may have to change to another. This should be done with the guidance of the health-care provider. Their baby may have developed an allergy to one of the ingredients of the formula. Neither homemade infant formulas nor formulas from outside the

United States are recommended by the CDC or the AAP because these formulas are not regulated by the FDA, and their ingredients may not be trustworthy. These formulas also do not usually contain iron. Both homemade and foreign formulas have an increased risk of contamination, and thus are more likely to make babies ill with infection.

There are three kinds of infant formula (AAP, 2022b; March of Dimes, 2019):

1. *Ready-to-use liquid formula.* This formula is ready for infant consumption and can be poured directly into the baby's bottle. This is the "no-mix, no-measuring, no-fuss" method, but it is also the costliest.
2. *Concentrated liquid formula.* This formula requires the addition of water, according to specific directions on the container before it can be fed to the baby. This is the "just add water and shake" option for formula. All brands of concentrate call for equal amounts of water and concentrate to reduce error in preparation (AAP, 2022b). To make 4 ounces of prepared formula, you will need to mix *2 fluid ounces of concentrate with 2 fluid ounces of water*. Concentrated formula is not as costly as ready-to-feed formula but is more costly than powdered formula. Once mixed, this formula can be refrigerated for up to 48 hours.
3. *Powdered formula* (may also be referred to as dry formula). Most powdered formulas need to be used within 1 month of opening the container (check label). Once a container has been opened, write the date on the lid as a reminder. Never use formula after the "use by" date on the container.

Once mixed, formula needs to be used within 1 hour from the start of feeding and within 2 hours of preparation (AAP, 2022b; March of Dimes, 2019). If it is not going to be used within 2 hours, immediately store it in the refrigerator for up to 48 hours (AAP, 2022b). Any formula left in the bottle after a feeding should be discarded. The combination of formula and infant's saliva can cause bacteria to grow; therefore, "leftovers" should not be refrigerated or saved for another feeding.

Safe Preparation of Formula in the Hospital

In the United States, most hospitals use ready-to-feed formula when feeding infants. This formula requires no preparation, no unique storage, and is, as its name implies, "ready-to-feed." Infant formula is frequently supplied to hospitals and birthing centers free of charge by formula companies. This is a form of advertisement and promotion of their products to new parents. Care providers make the final decision about what formula an infant will receive while in the hospital, regardless of what formula has been donated or purchased.

When an infant requires special formula—for example, lactose-free, hypoallergenic, or high-iron—the nurse may need to mix it from a powdered formula if it is not available in ready-to-feed bottles. If that is the case, hospitals strictly follow the protocol for mixing powdered formula, using sterilized (disposable) bottles and nipples as well as bottles of sterilized water. Bottles are filled with the correct amount of water before adding the powdered formula. An incorrect amount of water mixed with formula can be harmful to the infant. Formula mixed from powder must be disposed of within 1 hour of the start of the feeding. It can be stored in the refrigerator for only 24 hours after being mixed; therefore, bottles are marked with the name, date, and time before being refrigerated. Families that do not have access to clean running water or electricity must have alternative ways to safely mix and store formula.



CLINICAL SAFETY AND PROCEDURES (QSEN)

Competency: Safety: Preparing Powdered Infant Formula

Definition: The preparation minimizes risk of harm to patients and providers through both system effectiveness and individual performance.

Knowledge: Examine human factors and other basic safety design principles as well as commonly used unsafe practices (such as workarounds and dangerous abbreviations).

Skill: Use appropriate strategies to reduce reliance on memory (such as forcing functions, checklists).

Step 1	Make sure the container is not expired and is in good condition (no dents, puffy ends, or rust spots). Ensure that the container is labeled for infants, not toddlers. Toddler formulas are not safe for infants until they are 1 year of age. Store unopened formula containers in a cool, dry, indoor location—not in vehicles, garages, or outdoors.
Step 2	Clean the countertops and wash hands with soap and warm water before preparing bottles. Use a clean bottle and nipple.
Step 3	Use water from a safe source to mix with the formula. Tap water is usually safe but contact the local health department if unsure.
Step 4	Use the exact amount of water and formula listed on the instructions of the infant formula container.* <i>Always</i> measure the water first and then add the infant formula powder. <i>Never</i> dilute formula by adding extra water. This can make the baby sick. *NOTE: Most powdered formula is mixed according to the same recipe: 1 scoop of formula mixed with 2 fluid ounces of water to make 2 ounces of formula (AAP, 2022b) unless otherwise specified by the provider.
Step 5	<i>Shake</i> infant formula in the bottle to mix. Do not stir.
Step 6	Infant formula does <i>not</i> need to be heated before feeding. If you decide to warm the formula, place the bottle under running warm water or into a bowl of warm water for a few minutes. Avoid getting water into the bottle or nipple. This could contaminate the prepared formula. Test the temperature of the formula before feeding it to the baby by putting a few drops on the inside of your wrist. It should feel warm, <i>not</i> hot. Never warm infant formula in a microwave! Microwaving creates hot spots, which can burn a baby's mouth!
Step 7	After feeding, be sure to thoroughly clean the bottle and nipple before the next use.

(AAP, 2022b)

Attitude: Value the contributions of standardization/reliability to safety.

Patient Education for Parents Who Are Formula-Feeding

Teach parents to watch for signs that their baby is ready to eat and, whenever possible, to begin their feeding *before* the baby becomes agitated or begins to cry. Instruct parents to let the baby take breaks to catch their breath, drinking when the baby seems to want to. The baby does not need to suck continuously.

Demonstrate how to hold the baby close when feeding them a bottle. Encourage parents to make eye contact with and talk softly to the infant. This contact is important to bonding and the baby's overall socialization. Explain to parents the importance of *always* holding the bottle for the baby while feeding. Propping the bottle in the baby's mouth can increase the baby's risk of choking, ear infections, and later tooth decay. Teach parents not to put their baby to bed with a bottle. Infant formula can pool in the baby's mouth and cause choking. Later, it can pool around the baby's teeth and cause tooth decay. Instruct parents not to force the baby to finish their bottle. Let the baby be the judge of when the feeding is over. See [Table 24.1](#) for signs that an infant is full. Teach these signs to the parents so that they know to stop the feeding, even if the bottle is not empty.

LINK TO LEARNING

If an infant is younger than 2 months old, was born prematurely, or has a weakened immune system, caregivers may

want to take extra precautions when preparing infant formula. The CDC provides [guidance on how to keep infants safe from *Cronobacter sakazakii*](https://openstax.org/r/77Cronobacter) (<https://openstax.org/r/77Cronobacter>) which may be found in powdered infant formula.

Cues	
Hunger	Rooting: when baby turns head toward anything that touches the cheek or mouth Sucking movements or sounds Putting hand to mouth Crying, a late feeding cue; best to feed before baby starts crying, particularly if breast-feeding
Fullness	Starts and stops feeding Spits out the bottle or breast Slows down or falls asleep Is difficult to wake Gets easily distracted

TABLE 24.1 Feeding Cues in the Infant

Newborns eat approximately 2 to 3 ounces of formula every 3 to 4 hours. If the infant sleeps longer than 4 to 5 hours at a time, they need to be awakened for a feeding. By the end of the second month, they will eat at least 4 ounces every 4 hours. By the time they are 6 months of age, they will be eating approximately 6 to 8 ounces 4 or 5 times a day (March of Dimes, 2019).

In the baby's first few days of life, many parents are concerned that their infant is consuming too little during feedings. Breast-feeding parents often feel they need to supplement with formula at this stage. However, the natural content of **colostrum**, the first breast milk produced in breast-feeding, paired with the anatomic size of a newborn's stomach is such that only a very small amount of colostrum is needed to satisfy the infant's nutritional needs (Figure 24.5).

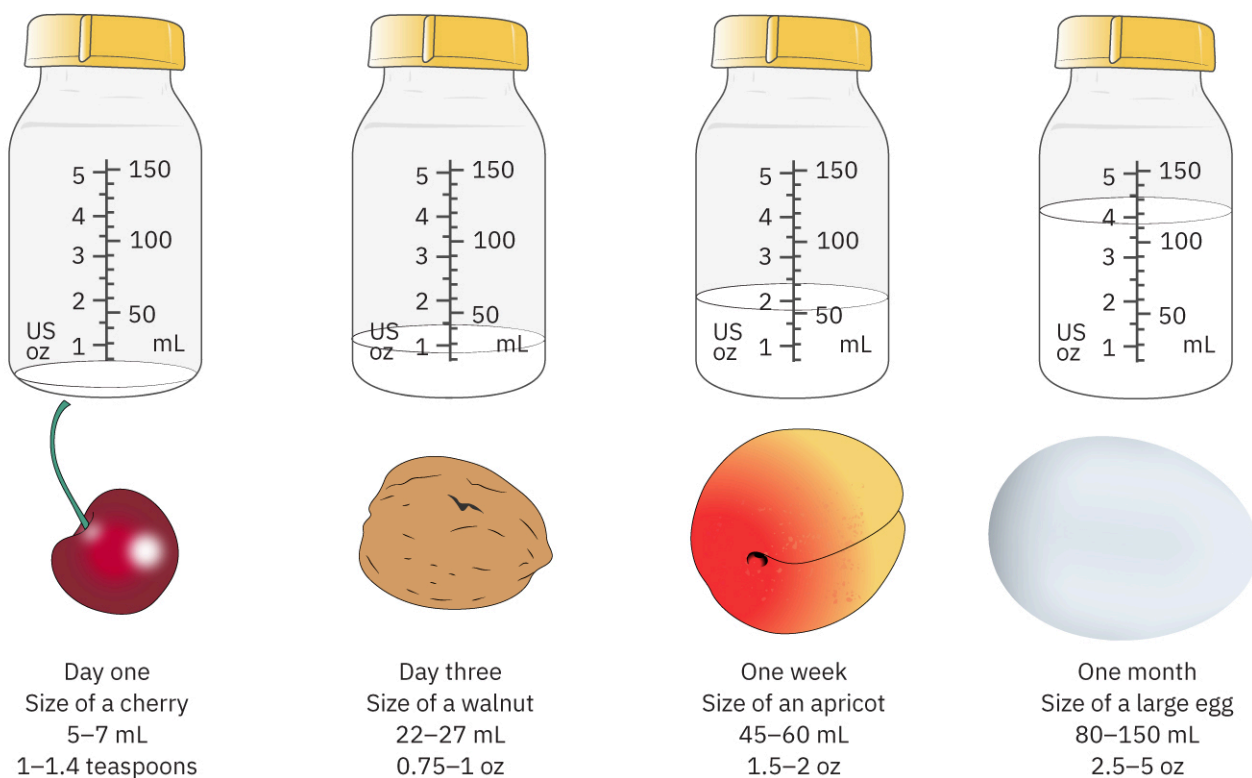


FIGURE 24.5 Capacity of a Newborn's Stomach A newborn's stomach capacity on the first day after birth is only the approximate size of a cherry, to accommodate colostrum. It grows to be approximately the size of an egg by 1 month. (attribution: Copyright Rice University,

Breast-Feeding

The AAP (2021c) and CDC (2023a) recommend exclusive breast-feeding for the first 6 months of an infant's life. For the benefits of breast-feeding, see [Table 24.2](#). Updated AAP breast-feeding guidelines emphasize an urgent need for nurses and other health-care workers to provide a patient-centered approach to broaden awareness of the benefits of breast-feeding and to promote equitable care (Meek et al., 2022). Knowledge imparted by the nurse in the immediate newborn period has a powerful influence on the breast-feeding parent and infant.

Successful lactation practices developed at this time can help prevent infant readmissions for dehydration or hyperbilirubinemia and can promote overall infant health. They can also serve as an important promotion of self-efficacy for the nursing parent, thereby improving breast-feeding success and duration. The establishment of frequent and efficient infant feedings (8 to 12 feedings in 24 hours) of unlimited length, where the infant is positioned properly and latched on, will promote an adequate supply of breast milk and prevent many common breast-feeding problems (U.S. Department of Health and Human Services, 2022b). Beyond the initial 6 months, the AAP recommends that breast-feeding continue for as long as desired by parent and infant and be supplemented with nutritious complementary foods as needed (AAP, 2022b; Scott & Kirkland, 2023). The most significant change in the revised guideline is the length of breast-feeding time recommended by the AAP, which has increased from 1 year to 2 years and beyond on the condition that it remains desired by both parent and infant.

Benefits	
Infant	- Breast milk has the right amount of fat, sugar, water, protein, and minerals needed for a baby's growth and development. As the baby grows, the breast milk will change to adapt to the baby's changing nutritional needs. - Breast milk is easier to digest than formula. - Breast milk contains antibodies that protect infants from certain illnesses, such as ear infections, diarrhea, respiratory illnesses and allergies, asthma, atopic dermatitis, childhood and adult obesity, diabetes mellitus, childhood leukemia, SIDS, and hypertension. The longer the baby breast-feeds, the greater the health benefits. - Breast milk can help reduce the risk of many of the short-term and long-term health problems that can affect preterm babies.
Nursing parent	- Breast-feeding reduces the nursing parent's risk of breast and ovarian cancer. - Breast-feeding reduces the nursing parent's risk of type 2 diabetes. - Breast-feeding reduces the nursing parent's risk of high blood pressure. - Breast-feeding boosts production of oxytocin, which helps breast milk flow and can calm the nursing parent. - Breast-feeding may help nursing parents lose weight and return to prepregnant weight more quickly. - Breast-feeding is cost effective; formula-feeding is estimated to cost over \$1,500 per year versus \$0 for breast-feeding. - Breast-feeding may help nursing parents be more productive at work. Research shows that parents who breast-feed may miss less work to care for sick infants than those who feed their infants formula. - Breast-feeding results in lower medical costs and copays. - Breast-feeding is better for the environment, using no bottles, cans, or plastic waste. - Breast milk comes prepackaged and prewarmed

TABLE 24.2 Benefits of Breast-Feeding (Meek et al., 2022; Scott & Kirkland, 2023; U.S. Department of Health and Human Services, 2021a)

Breast Milk Characteristics

Breast milk is complex and specific. As the infant grows, the consistency and nutritional content of the milk change to meet the ever-changing needs of the baby. Breast-feeding is the best nutritional choice to feed a newborn, but

not all parents choose to or can breast-feed their infants for a variety of reasons. In the United States, prepared formulas are developed to meet the nutritional needs of infants and to be as close to breast milk as possible. When breast-feeding is not possible or not chosen as a feeding choice, nurses and physicians should be supportive of a family's choice to formula-feed their infant.



CULTURAL CONTEXT

Breast-Feeding Practices

Breast-feeding practices differ from one culture to another around the world. The World Health Organization (WHO) breast-feeding statistics show that 41 percent of babies below 6 months of age experience exclusive breast-feeding (EBF). One major difference is the length of time that nursing parents breast-feed their infants. Culture often has an influence on this practice ([Table 24.3](#)).

Country	Length of Breast-Feeding	Notes
Turkey	12–24 months	Only 1% of babies are NOT breast-fed. Paid parental leave of 46–56 weeks encourages high breast-feeding rates.
France	3–6 months	41% of mothers find it awkward to breast-feed in public.
United States	6–12 months	The United States has many support groups available to promote breast-feeding for new mothers, but most hospitals provide free formula to parents at discharge.
China	6–12 months	Research demonstrates that exclusive breast-feeding determinants include urban residence, mode and place of delivery, and where early initiation of breast-feeding took place, more so than the mother's wishes alone.
Brazil	6–12 months	Brazil has the most milk banks globally, numbering over 200. The government bans advertising of infant formula.
Hungary	6–12 months	7% of mothers find it awkward to breast-feed in public.
Mexico	6–12 months	13% of mothers find it awkward to breast-feed in public.
Canada	6–12 months	91% initiate breast-feeding after birth, but 40%–50% stop after 6 months.
India	Varies	There is a widespread belief that colostrum is impure and dirty, and it is thus discarded. Infants are given formula the first few days of life. Some give infants hot water, tea, goat/cow milk, or honey, etc. Unpasteurized honey is unsafe for newborns.
Guatemala	8–12 months(exclusive breast-feeding may be due to financial constraints)	Many believe colostrum is not clean and discard it, giving babies coffee, soda, and sugar water in the first days of life. Some breast-feed until solids for financial reasons.

TABLE 24.3 Breast-Feeding Norms around the World (Expatica, 2023; Fey, 2022)

Country	Length of Breast-Feeding	Notes
Philippines	A high percentage will practice mixed feeding (breast and formula).	The government encourages breast-feeding for up to 6 months. It is illegal to advertise infant formula.
Muslim countries	Approximately 2 years	Parents often see breast-feeding as a religious duty. The Qu'ran states that babies should be breast-fed by their mothers or a wet nurse for approximately 2 years.

TABLE 24.3 Breast-Feeding Norms around the World (Expatica, 2023; Fey, 2022)

It is important to let nursing parents know that longer feedings do not usually lead to sore nipples or breast-feeding problems if the baby is latched-on properly. If nursing parents feel feedings are lasting too long or if nipples are becoming sore, encourage evaluation by a lactation consultant.

Donor Breast Milk

With breast-feeding recommended exclusively for the first 6 months of life and with the possibility that it may remain part of the nutritious diet for the first 2 years of age and beyond, it is important that breast milk be available as a first alternative feeding choice for those infants who cannot or will not be breast-fed. Breast milk provides a wide range of benefits for the infant, as mentioned in [Table 24.2](#), that simply cannot be replicated by any other source of nutrition. When the nursing parent has an insufficient volume of breast milk, pasteurized breast milk is a viable option as an alternative feeding. Human milk banks exist throughout the United States and around the world. It is important to note that human milk is species specific and considered superior to all other supplements or alternatives.

Although cow-, goat-, and soy-based formulas have been made that approach the fat, protein, and carbohydrate composition of breast milk, they do not replicate the complexity or purpose of the bioactive factors found in breast milk (Canadian Paediatric Society, 2020; Quigley et al., 2019). Breast milk helps ensure optimal growth, immune function, and neurodevelopment at minimal financial costs to families. Benefits are seen in both the short and long term, with positive effects seen in both maternal and child health.

Preterm and ill infants may not be able to nurse directly at the breast from birth, but with appropriate and continued support, they can begin to breast-feed when they become developmentally ready or stable enough. When breast-feeding itself is not possible, the first choice is to feed expressed milk from the infant's own birthing parent. When that parent's milk is not recommended, is unavailable, or is limited in volume, pasteurized donor human milk (PDHM) from a regulated milk bank is recommended for supplementary, bridging, or replacement feedings (Quigley et al., 2019). Most hospitals are connected to milk banks in the area in the event that pasteurized donor human milk is requested for premature or ill infants or for mothers who are unable to breast-feed due to illness. Milk from lactating persons who pump or express breast milk and donate it to a regulated breast milk bank following their policies and procedures is called **donor breast milk**.

To donate to a breast milk bank, donors are first screened extensively. Guidelines vary by center, but in general, donations are accepted only from donors who are seronegative for hepatitis B and C, human immunodeficiency virus (HIV), human T-cell leukemia virus (HTLV), SARS (COVID-19), and syphilis; do not take medications (with some exceptions); and do not consume alcohol, tobacco, or cannabis or use illicit drugs (Canadian Paediatric Society, 2020). If a donor experiences illness or uses medication, they are temporarily excluded from donation. The centers educate all accepted donors to ensure they follow safe breast milk handling techniques and storage.

LINK TO LEARNING

“Breast is Best” is a global mantra started in 1991 by the World Health Organization (WHO) and the United Nations

Children's Fund (UNICEF) after breast-feeding rates decreased in the 1980s, to help increase breast-feeding rates worldwide. "[Fed is Best](https://openstax.org/r/77FedIsBest)" (<https://openstax.org/r/77FedIsBest>) is the *new* mantra, launched in 2016. It is not meant to diminish the message that breast-feeding is still considered the best feeding choice but is meant to ensure that babies do not experience any complications due to a facility's protocols, and that parents do not feel shame for choosing other feeding options.

Successful Breast-Feeding Patterns of the Newborn

To ascertain successful breast-feeding, the nurse needs to assess the breast-feeding process. There are five common maternal-infant positions for breast-feeding (Murray, 2021); however, others may be used effectively based on the needs and preference of the person. The nurse's assessment of the infant at the breast focuses on the infant's latch, coordinated suck, and swallow during breast-feeding. The nurse first checks the placement of the infant's lips, gums, and tongue.

Then, the nurse listens for the infant's swallowing pattern. After several sucks in a row, a soft "k" sound should be heard. This is easier to hear once the parent's milk is in and has let down, with copious milk secretion. Therefore, this may not be observed in the first 24 hours of life or prior to discharge of parent and infant.

Finally, the nurse should observe the nipple shape immediately after the infant is removed from the breast. The nipple should be round. If a nipple is extended, with a shape resembling that of lipstick, that suggests a shallow latch and will lead to sore or damaged nipples.

The general guidelines for latching on involve correct placement of the infant's mouth to ensure good stimulation for milk supply, promote good milk transfer to the infant, and decrease and/or prevent maternal nipple soreness. The steps of the procedure are as follows:

1. Have the nursing parent stroke the center of the infant's top lip with the nipple to elicit a rooting reflex and wait for the infant to open mouth wide.
2. With the infant's mouth wide open, the parent should pull the infant in close (using pressure on the infant's upper back and neck). Note that the breast should not be brought to the baby, but rather the baby should be brought to the breast.
3. The nipple should be deep in the infant's mouth; more of the areola should be covered by the lower lip than by the top lip; both lips are flanged; chin is positioned deep into the breast, with infant's head tipped back slightly to clear the nose.
4. The nursing parent can remove the infant from the breast by breaking the suction; insert a clean finger into the corner of the infant's mouth, between the infant's gums.

The expected outcomes are as follows:

- Infant's mouth is open wide, lips are not tucked or curled.
- Infant's tongue is positioned under the breast.
- Infant does not slip off the breast.
- Infant demonstrates rhythmic sucking and swallowing.
- The nursing parent has few or no complaints of sore nipples. Infant is satiated after feedings.

To assist with and teach breast-feeding techniques, the nurse ensures that both the nursing parent and the infant are positioned comfortably. The parent should be made as comfortable as possible before the feeding begins. If they have recently delivered, particularly if they have had an operative delivery, provide pain medication as needed. Pain or an awkward position can interfere with the letdown reflex and cause the parent to tire easily. Be sure to provide privacy and prevent unnecessary interruptions. It is best to begin the feeding process when the infant shows feeding cues and before they are crying (which is a late cue to hunger). A crying infant is often difficult to settle, particularly because nursing parents often become anxious and unsettled themselves. The five commonly used maternal-infant breast-feeding positions (Murray, 2021) are described in detail here and shown in [Figure 24.6](#). It is important to note that that these five positions are in no way inclusive, and many other positions can be utilized for breast-feeding as long as they are comfortable for both parent and infant and are conducive to the infant's successful latch, suck, and swallow at the breast.

- Football-hold position: This may also be called the "clutch position." This position is frequently recommended

to nursing parents after cesarean birth or to those with a premature infant because it offers good control of the infant with little or no abdominal pressure for the parent. The infant is placed on a pillow at the parent's side. The parent supports the infant's upper back with their arm and supports the infant's neck in their hand. The infant's head is level with the breast. It is important that the infant's body is turned toward the parent in a belly-to-body position, rather than looking upward, and that the infant's head and body are in alignment (facing the same direction) facing the parent. If the head is facing the breast but the body is facing upward, it is difficult if not impossible to swallow, and feeding will not happen. Have the parent use their opposite hand to support the breast, fingers off the areola, with the index finger under the breast. The palm should remain facing the rib cage, and the nipple should gently tip down toward the infant's mouth. Steps for successful latch-on can continue at this point forward.

- Cradle-hold position: For the cradle-hold position the parent positions the infant's body across the front of their own, with the infant's head at or near the antecubital space and level with their nipple. The parent's arm is supporting the infant's body, with the baby lying belly-to-belly with the parent and the infant's bottom shoulder tucked in slightly closer to the parent's stomach than the top shoulder. The parent grasps the infant's bottom and tucks the infant's lower arm next to the parent's stomach. The parent's other hand is free to support the breast in a "C" hold, fingers behind the areola, index finger under the breast. The parent lifts from under the breast until the nipple is directly in front of the infant's mouth; the parent should continue to support the breast during the early weeks of breast-feeding.
- Cross-cradle hold position: This position is similar to the cradle-hold position in that the infant is placed across the nursing parent's stomach as in the cradle hold but is held with the parent's opposite hand placed at the infant's upper back, supporting the back of the infant's neck. Once again, the infant is belly-to-belly with the parent and is held close by tucking the parent's forearm around the infant's bottom and pulling the infant close. The other hand supports the breast with the thumb coming up from the bottom of the breast. The nipple should be gently tipped toward the infant's mouth. At this point, the parent follows the tips for successful latch-on. The cross-cradle hold offers the parent more control over the infant's position than the cradle-hold.
- Prone position: In this position, the nursing parent is semi-reclined with head, neck, and body supported by the bed or the chair. The infant is placed on the parent's body in a way that allows the front of the infant's body to be in full contact with the parent's body. The infant's head is at the nipple, and the infant is allowed to self-attach to the breast. The parent (or an assistant, as needed) supports the infant on the body to maintain the ideal position and for safety. The infant's chin position is allowed to gently extend to allow proper mouth and chin placement with latch-on.
- Side-lying position: Nursing parents need to be well supported in this position. Infants are placed on their side, facing the parent (belly-to-belly) with their head and body in alignment. Parent and baby may require a pillow or blankets behind their backs to maintain this position during learning. Have the parent support the breast with the opposite hand (the top one), while the other hand (the bottom one) either supports the parent's head or cradles the baby, depending on the parent's preference. With the breast supported, the parent pursues a successful latch-on. For safety, it is important that the parent does not fall asleep in this position while feeding the baby. This position is often preferred for parents who have had an operative delivery.

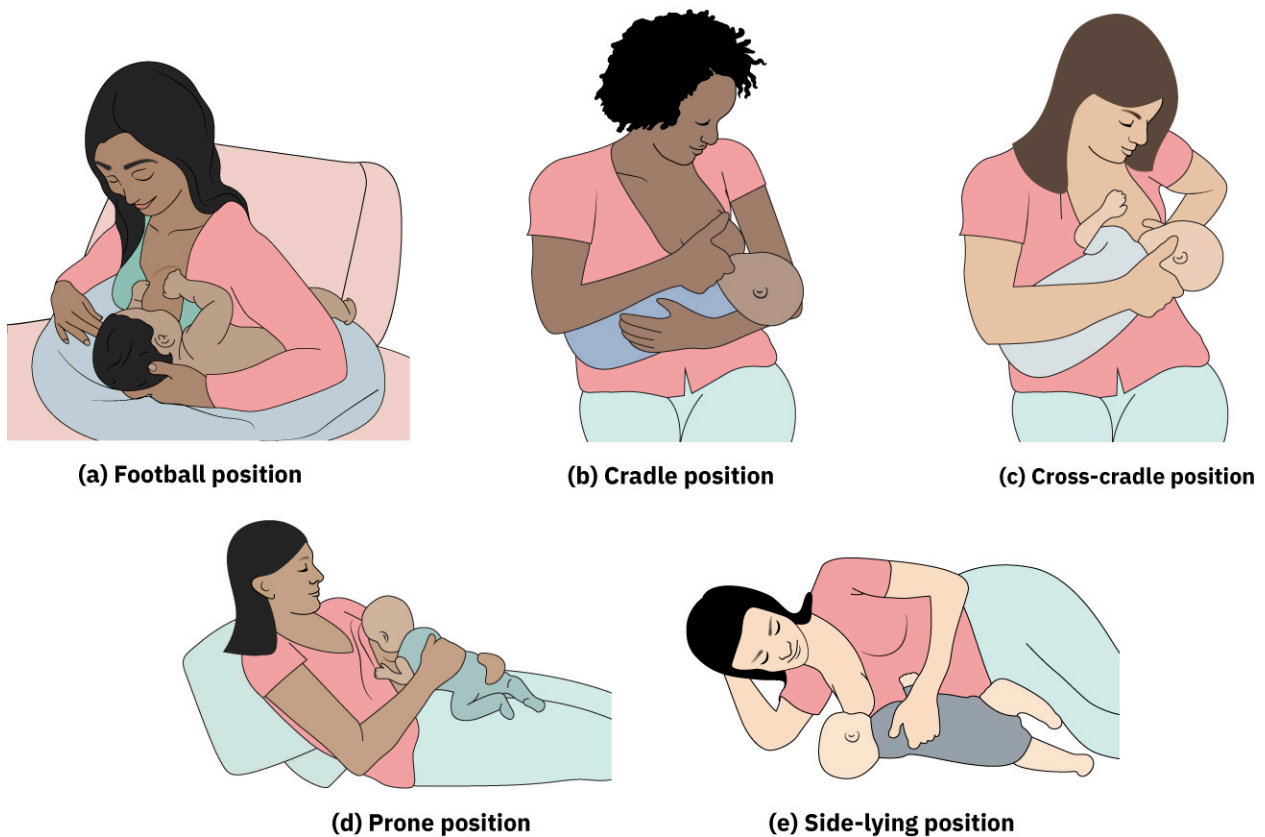


FIGURE 24.6 Breast-Feeding Positions The (a) football, (b) cradle, (c) cross-cradle, (d) prone, and (e) side-lying positions are considered the five basic breast-feeding positions, although many more exist. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

To make the nursing parent more comfortable, pillows can be used behind the back, over the abdominal incision (if present), and to support the arms. It is important that the parent's shoulders be relaxed, and they should not be in a hunched position. Pillows or blankets can be used to elevate the infant to the level of the nipple to prevent pulling and tension on the nipple, which will cause sore, cracked, and broken-down nipples.

Healthy infants are generally alert and active at the breast, particularly at the beginning of a feeding. If the baby is sleepy and has already gone 2 to 3 hours since the last nursing session, the nursing parent should be encouraged to frequently massage their breasts in a downward motion while feeding and arouse their baby to ensure adequate breast emptying. Providers should inquire about pain or discomfort during breast-feeding as well as observe a feeding when possible. This helps screen for ineffective latch, nipple trauma, and/or poor milk transfer. If there are any concerns regarding the infant's status, the health-care provider should conduct a complete feeding evaluation and complete a comprehensive feeding plan, while also scheduling frequent follow-up visits until the issues have been resolved. Additionally, the provider should also gauge the parent's overall well-being and the parent-infant bonding. Poor maternal-infant bonding may be an indication of perinatal mood or anxiety disorders (O'Dea et al., 2023).

Breast-feeding is most successful when infants are not subject to scheduled feedings but are allowed to nurse as frequently and for as long as they show feeding cues (see [Table 24.3](#)). Frequent feedings are required to establish and maintain milk supply. The AAP (Scott & Kirkland, 2023) states that a benchmark for breast-feeding is that infants should nurse between 8 and 12 times in a 24-hour period. But it is important to note that these feedings may not be evenly spaced, and the duration of each feeding may be different. Frequent feedings are particularly important in the first days of life when lactation is being established and the infant's stomach capacity is small. The nurse should explain to parents that the hormone prolactin is being released in increased amounts while the infant is suckling, and this is responsible for milk production. This will help them understand the relationship between frequent feedings and milk supply. Long stretches of time between feedings increase the likelihood of breast engorgement.

Research demonstrates that early skin-to-skin contact between the nursing parent and the newborn may improve lactation confidence and help facilitate exclusive breast-feeding (Kellams, 2022; Scott & Kirkland, 2023). When milk supply diminishes for reasons of decreased stimulation, infant inability to nurse, maternal illness, or any other cause, breast milk volume can be supported and increased by the following:

- Have the nursing parent offer both breasts at each feeding, while increasing the frequency of feedings (or pumping) to more than 8 times per 24 hours.
- Instruct the nursing parent to allow the infant to feed on one breast until audible swallowing has decreased in frequency, and then switch to the other breast.
- Have the lactating parent apply warm compresses to the breast prior to feeding to assist in letdown. Instruct the parent to massage the breasts in a downward motion, toward the nipple, immediately before and during the feeding or pumping.
- Suggest to the nursing parent to consider breast-feeding for infant comfort or skin-to-skin contact between feedings.
- If the lactating parent is supplementing with breast milk or to increase supply, encourage pumping *after* feeding at the breast to stimulate supply, especially during the waking hours. Encourage maternal rest and sleep at night.
- Maternal intake of adequate fluids as well as continued consumption of a well-balanced nutritional diet is essential to produce healthy breast milk. As a basic guideline, encourage nursing parents to drink at least 8 ounces of water or fluids each time they breast-feed or pump (Ndikom et al., 2014).

For specific information on fluid amounts and dietary recommendations, parents should be directed to their health-care provider.

When an infant spaces several feedings closely together, with little time between the end of one feeding and the beginning of another, it is called a **cluster feeding**. These are often followed by a longer spacing between feedings. Infants may demonstrate cluster feedings on the second or third night home from the hospital after birth or in later weeks when experiencing a growth spurt (Kim et al, 2023). Cluster feeding is a way for the infant to increase the milk supply at each feeding. An infant's need to nurse more frequently may lead a nursing parent to question whether they have an adequate milk supply for the baby when in fact they probably do and this behavior is normal. Nurses should give parents anticipatory guidance through this often difficult time, particularly when cluster feedings are at night, and encourage daytime resting whenever possible.

Because breast milk cannot be measured as it is consumed directly from the breast, parents must be given other tools to determine if their infant is getting enough to eat. Obviously, the number of feedings, frequency, and length of time on each breast are a measure, along with hearing auditory suck and swallow during feedings. But that still leaves a question regarding the volume consumed. The most accurate short-term sign of intake is the infant's output (i.e., voids and stools). The nurse should note the time of the first void and stool on the infant's chart because absence of either or both in the first days may indicate an anomaly. Another sure sign of successful breast-feeding is infant weight and hydration status. Weight gain below the 75th percentile on the newborn weight and height graph, failure to regain birth weight by day 14 of life, and/or gaining less than 0.5 ounce daily are all indicators that the provider should investigate the root cause(s), refer the nursing parent and baby to a lactation specialist, and potentially advise supplementation, depending upon individualized assessment and findings, according to the Academy of Breastfeeding Medicine (ABM) guidelines (Scott & Kirkland, 2023). The ABM encourages continued infant cueing and expressed breast milk as the first choice for supplementation, given after nursing and in limited volume. Donor human milk is the second choice, followed by formula when donor milk is not available (Scott & Kirkland, 2023). The ABM suggests specific volumes for supplementation based on the infant's age. Supplementing with glucose water is not appropriate because it can cause hyponatremia.

Safe Handling, Storage, and Preparation of Expressed Breast Milk

Breast milk can be stored in several different ways for different lengths of time. It is important that specific preparation guidelines and storage protocols be followed to maintain the integrity and safety of the milk. The nurse teaches the nursing parent that before expressing or pumping breast milk, the parent must wash their hands well with soap and water. If soap and water are not available, they may use an alcohol-based hand sanitizer that contains at least 60 percent alcohol.

If pumping is required in the first 24 to 48 hours of life, a hospital-grade electric pump is most appropriate for establishing milk supply. Manual pumps, battery-operated or small electric pumps, or hand expression of milk should not be relied upon for establishing milk supply in the early days of breast-feeding. Many families are discharged with instructions on how to rent or borrow a pump from the birthing hospital or pharmacy. Nursing parents should inspect the pump kit and tubing to ascertain that it is clean, and they should immediately replace any tubing that is moldy. If using a shared pump, the parent should clean pump dials with a disinfecting wipe and clean the countertop.

To store breast milk after expressing, the nursing parent should use breast milk storage bags or clean food-grade containers with tight-fitting lids and avoid plastics containing bisphenol A (BPA) (recycle symbol #7).

Freshly expressed or pumped milk can be stored

- at room temperature (77° F/25° C or colder) for up to 4 hours,
- in the refrigerator for up to 4 days, and
- in the freezer. Up to 12 months is acceptable, but about 6 months is best. For specific storage temperatures, see [Table 24.4](#). Although freezing keeps food safe almost indefinitely, recommended storage times are important to follow for best quality.

(CDC, 2023a)

Storage Locations and Temperatures			
Type of Breast Milk	Countertop, 77° F (25° C) or colder	Refrigerator, 40° F (4° C)	Freezer, 0° F (–18° C) or colder
Freshly expressed or pumped	Up to 4 hours	Up to 4 days	Within 6 months is best. Up to 12 months is acceptable.
Thawed, previously frozen	1–2 hours	Up to 1 day (24 hours)	NEVER refreeze human milk after it has been thawed.
Leftover from a feeding (baby did not finish the bottle)	Use within 2 hours after the baby is finished feeding.		

TABLE 24.4 Human Milk Storage Guidelines (CDC, 2022a)

Tips for safe breast milk storage include the following:

- Prior to storing, clearly label breast milk with the date it was expressed.
- Breast milk should *not* be stored on the door of the refrigerator or freezer, to avoid exposure to temperature changes from opening and closing the door.
- If breast milk will not be used within 4 days of expression, it should be frozen immediately to protect the quality of the milk.
- Store breast milk in small amounts to avoid wastage of milk not used at a feeding. Amounts of 2 to 4 ounces or the amount usually taken at a feeding is appropriate.
- Breast milk expands when frozen, so approximately 1 inch of space should be left at the top of the container to accommodate this.
- If breast milk is given to a childcare provider, it should be labeled clearly with the child’s name, and the provider should be given specific instructions about preparation and storage of breast milk.
- Breast milk can be stored in an insulated cooler with frozen ice packs for up to 24 hours when families are traveling. When they reach their destination, they should use the milk right away, store it in the refrigerator, or freeze it.



LINK TO LEARNING

The CDC provides more information on the [safe storage and preparation of breast \(https://openstax.org/r/77brstmilksfty\)](https://openstax.org/r/77brstmilksfty) milk. It includes tips for travel and home use of breast milk. After storage of breast milk, mixing will be required because of the fat, which may have separated. Remember, breast milk is not naturally homogenized. If the baby does not finish the bottle at a feeding, the leftover milk can be used to feed the baby within 2 hours after completion of the initial feeding. After the 2-hour period, the leftover breast milk should be discarded.

Bottle-Feeding the Breast-Fed Infant

Even when a baby is breast-fed, sometimes it is necessary to introduce a bottle as a feeding alternative, whether to feed expressed or pumped breast milk or formula. Depending on how long the breast-fed infant has been exclusively nursing, the type of bottle nipple used and what is in the bottle will impact how quickly and how easily the baby will transition to the bottle from the breast. In addition, infants vary in how easily they transition to the bottle. Some babies transition with more ease than others. All babies will eventually make that transition if the caregiver is persistent enough, but not all babies have to. Infants can successfully transition from the breast to the cup, regardless of age, if the caregiver is patient and persistent.

Positioning for Bottle-Feeding

When introducing the bottle to a breast-fed infant for the first time, it is best to have the baby in an upright position, keeping them comfortable and close, while giving them more control during the feeding. Similar to eliciting a latch-on, touch the baby's bottom lip with the bottle nipple. This will encourage the infant to open their mouth wide. Place the nipple inside the mouth slowly and gently. Be sure not to force the mouth open, instead allowing the infant to open the mouth on their own. Try offering only $\frac{1}{2}$ to 1 ounce of the bottle to the infant. This will allow them to learn to drink from the bottle without feeling too full. Increase the amount of the feeding only if the baby seems hungry and is giving cues for more. Introduce the bottle by giving it once a day between breast-feedings when the baby is neither full nor hungry. This may help them to accept the bottle (as a new feeding method) with less stress. About halfway through the bottle-feeding, switch the baby's position by moving them from one arm to the other. This helps prevent the baby from developing a favorite side when feeding and allows for good eye contact with them as well, helping the parent to better read their cues. Let the baby take breaks if they want to, just as they do when breast-feeding. Never force them to finish the bottle (Kotowski et al., 2020).

If the baby refuses the bottle, several suggestions might help. It is best to offer the bottle when the baby is happy and calm, rather than when they are upset. Remember that crying is a late feeding cue for hunger. Try comforting the baby by holding them, singing to them, or playing with their favorite toy. Breast-feed the baby after they calm down and try the bottle again later in the day. Babies may refuse to feed when they do not feel well, so check the baby for signs of illness. Another suggestion is to hide the bottle with a blanket or washcloth during the feeding.

Frequency, Timing, and Quantity of Feedings

When breast-feeding an infant, it takes approximately 2 to 3 weeks to develop a good breast-feeding routine. Breast-feeding a baby on demand is full-time and exhausting work. The nursing parent's body needs adequate energy to produce enough milk. They must eat well, get adequate rest and sleep, and drink sufficient fluids. Drinking at least 8 ounces of fluid each time they nurse helps address fluid needs. Nursing parents can expect that their breasts will become swollen, engorged, and painful 2 to 3 days after giving birth (Zakarija-Grkovic & Stewart, 2020). Their baby will need to be nursed often to relieve the discomfort and ease the engorgement. If a feeding is missed, nursing parents should pump their breasts or express them. This can also be done if a feeding does not relieve the pain of engorgement. During the first month, breast-fed infants will nurse every $1\frac{1}{2}$ to $2\frac{1}{2}$ hours during the day and night. Breast milk is digested more easily than formula, and thus breast-fed infants will need to eat more frequently than their formula-fed counterparts.



LINK TO LEARNING

The American Academy of Pediatrics parenting website, [healthychildren.org](https://www.healthychildren.org), provides a list of [bottle-feeding tips](#)

(<https://openstax.org/r/77bottlefeedtip>) for concerns about overfeeding or underfeeding a baby.

During growth spurts, babies increase the frequency with which they want to nurse. This frequent nursing works to increase the milk supply and allow for normal growth and development of the infant. The baby will breast-feed every 30 to 60 minutes and stay at the breast for longer periods. The frequent nursing for growth spurts is temporary, lasting only a few days, until the milk supply increases to provide enough milk at each feeding to meet the needs of the baby. At that time, the baby will eat less often and for shorter periods. Growth spurts usually occur at around 2 weeks, and then at 2, 4, and 6 months of age (Jacobson, 2022). To increase the milk supply, nursing parents need encouragement not to supplement with formula-feedings when their infant wants to feed frequently. Parents often feel that they are not making enough milk for their infant but need to know that this is normal and that their body will respond to their baby and make enough milk. Their baby is getting enough to eat if they: (Jacobson, 2022)

- nurse every 2 to 3 hours
- have 6 to 8 wet diapers each day
- gain weight (about 1 pound, or 450 grams, each month)
- make swallowing noises while nursing
- are satiated when feeding is over

Formula-fed infants also start out eating 8 to 12 times every 24 hours. As newborns, they might take in only $\frac{1}{2}$ to 2 ounces per feeding for the first day or two of life, depending on their birth weight, but usually average 1 to 2 ounces at each feeding. This amount increases to 2 to 3 ounces by 2 weeks of age. By the end of 1 month, the baby will be up to at least 3 to 4 ounces (120 mL) per feeding, with a fairly predictable schedule of feedings about every 3 to 4 hours (AAP, 2022b). At about 2 months of age, babies usually take 4 to 5 ounces per feeding every 3 to 4 hours. At 4 months, babies usually take 4 to 6 ounces per feeding. By 6 months, babies will consume 6 to 8 ounces at each of 4 or 5 feedings in 24 hours (AAP, 2022b).

Babies generally take in about $2\frac{1}{2}$ ounces (75 mL) of infant formula a day for every pound (453 g) of body weight (AAP, 2022b). All babies are different, but most will drink more and go longer between feedings as they grow and their stomachs can hold more milk. Also, babies suck not only for hunger but also for comfort. At 6 months, babies may be taking up to 8 ounces every 4 to 5 hours. As a general rule, infants will increase the amount of formula they drink by an average of 1 ounce each month before leveling off at 7 to 8 ounces per feeding (Jain & Bunik, 2022). Solid foods are usually introduced at about 6 months (Jain & Bunik, 2022).



LINK TO LEARNING

The AAP also addresses parents' concerns about [pacifier use \(https://openstax.org/r/77pacifieruse\)](https://openstax.org/r/77pacifieruse) by providing guidelines for pacifier choice and use.

In general, babies do a good job of self-regulating how much they eat. Infants who are bottle-fed may be more likely to be overfed because drinking from a bottle takes less effort than being breast-fed. Overfed babies can experience stomach pains, gas, spit up, or vomit and be at higher risk for obesity as adults. Offering less is a better choice because you can always offer more if the infant remains hungry. For babies who like to suck for comfort rather than nutrition, pacifiers are a good substitute when used after feedings. While research on the timing of pacifier introduction to the breast-fed infant (Orovou et al., 2022) is highly variable, most of the literature agrees that avoiding a pacifier in the early days (first 1 to 3 weeks) while breast-feeding is being established is valuable.

Spitting up of stomach contents in infants, or reflux, that occurs when the lower esophageal sphincter muscle lets the stomach contents back into the esophagus because it is not fully developed is called **physiologic regurgitation** (AAP, 2022c). Spit up consists of milk flowing from the mouth during or after a feeding when the stomach is full and can be caused by overfeeding, air swallowed during feeding (therefore it may occur when burping), crying, or coughing. It is common for infants and children under 2 years of age to experience **gastroesophageal reflux (GER)**, which is the spitting up of liquid or food, when the stomach contents move back up from a baby's stomach into the esophagus. Many infants who experience reflux have a normal physical exam and adequate weight gain, and present as healthy, happy newborns. This condition usually resolves itself by 12 months of age and does not require medical

management (AAP, 2022c).



LINK TO LEARNING

For concerns about infant reflux, read [Gastroesophageal Reflux in Infants and Children](https://openstax.org/r/77infantreflux) (<https://openstax.org/r/77infantreflux>) from the American Academy of Family Physicians (AAP).

How to Burp a Baby

Burping is necessary because babies take in air when they are feeding. They may take in more air with the bottle, but many babies take in air at the breast also. When a baby swallows air during a feeding, that air gets trapped in the stomach. The trapped air can become uncomfortable “gas pockets,” causing the baby to cry or fuss. Burping the baby helps to remove that trapped air and prevent the “gas” from becoming a problem.

Before burping the baby, place a burp cloth, bib, towel, or cloth diaper under the baby’s chin in case the baby spits up during the process. This protects the caregiver’s and the baby’s clothing. There are three commonly used burping positions that nurses can teach new parents ([Figure 24.7](#)):

- Over the caregiver’s shoulder: Hold the baby upright with their head over the caregiver’s shoulder.
- Sitting on the caregiver’s lap: Set the baby on the caregiver’s lap, facing away. Lean them forward and support their head (under the jaw) with the thumb and forefinger, while supporting their neck and chest with the hand and forearm.
- Lying on the caregiver’s lap: Place the baby on their belly, face down, across the caregiver’s lap, and support their head with the caregiver’s lap, arm, or hand.

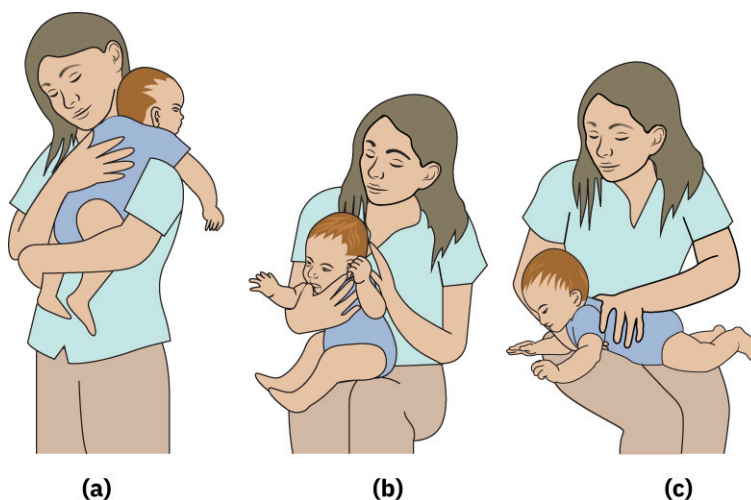


FIGURE 24.7 Burping Positions The three most common positions for effective burping of an infant are (a) over the caregiver’s shoulder, (b) sitting on the caregiver’s lap, and (c) lying on the caregiver’s lap. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)

When the baby is in one of the preceding positions, gently rub or pat them on their back to help elicit a burp. There is no need to pound harder on their back; this could cause injury and will not make them burp better or faster. If the baby does not burp after a few minutes of trying, change their position and try again. If you cannot elicit a burp and the baby does not appear to be in any discomfort, you do not need to worry about a burp. Babies do not need to burp every time you try.

How often should a baby be burped? That depends on the baby and the circumstances. If a nursing parent is breast-feeding and has a strong letdown reflex or an overabundant breast milk supply, the fast flow of breast milk can cause the baby to swallow more air; thus, that baby would need to be burped more often. Usually, it is enough to burp a breast-fed baby between breasts and at the end of the feeding. For bottle-fed infants, it depends on whether they are vigorous feeders and whether they gulp their feedings. Initially, they may need to be burped after every $\frac{1}{2}$ ounce, then gradually increase to halfway through the feeding, and then as the infant sucks more continuously and efficiently, burp them when the feeding is finished. At any time during the feeding, if a breast-fed or bottle-fed infant

begins to squirm or move around when they were previously still, they probably have gas and need to be burped (Deepti et al., 2024). If the newborn falls asleep at the breast or with the bottle, that is a good time to burp them. Burping may help to wake them up and keep them feeding a little longer. If the baby is feeding and actively sucking, you do *not* have to interrupt the feeding (breast or bottle) to burp them. Wait until they stop the feeding on their own and then burp them. Burping will help to get rid of the air that the baby naturally swallows as part of their feeding. The frequency of burping will ultimately be determined by the infant's individual needs.

Voiding and Stooling Patterns in Newborns

When a newborn voids and stools and how often voiding and stooling occur after birth is an important assessment for the nurse to note in the newborn's chart. Potential health concerns are raised when voiding or stooling does not occur. Educating the parents on the expected voiding and stooling patterns and what to do if these expected norms are not met is a part of the nursing role in educating the newborn's caregivers.

Expected Stooling Patterns in the Newborn

The newborn's initial stool is the same for both breast-fed and bottle-fed infants and is present for the first few days after birth. It is called meconium and is a thick black or dark green, tar-like substance that filled the fetus's intestines before birth (Figure 24.8). Meconium is passed within the first 24 to 48 hours of life; a delay in passing it may indicate an underlying health condition (Skelly et al., 2023). Babies have an immature digestive system, which accounts for the varying color and consistency of their stools. After the first day or two, the meconium starts to change in consistency, particularly after the baby starts to eat. After the meconium has passed, newborn stool changes to **transitional stool**, which is more yellowish-green. Then, stool becomes more consistently a "breast-fed stool" or "formula-fed" stool in appearance.



FIGURE 24.8 Meconium Meconium is the newborn's first stool, and it is thick and dark. (credit: "Meconium Stool" by Sarah Evans/Flickr, CC BY 4.0)

Regardless of feeding method, hard or very dry infant stools may be a sign that the infant is not getting enough fluids or that they are losing too much fluid due to illness, dehydration, fever, or heat (AAP, 2021b).

Stooling Pattern of Formula-Fed Infants

After meconium has passed, formula-fed infants have stools that are usually browner and firmer than those of

breast-fed infants. Bowel movements in formula-fed infants are on the brown color spectrum, meaning that yellow-brown, tan-brown, and green-brown are all normal colors for stools. Consistency is like that of peanut butter. Although the odor is stronger than that of breast-fed infant stool, it remains mild until the infant begins solid foods.

Stooling Pattern of Breast-Fed Infants

The bowel movements of breast-fed babies are different from those of formula fed babies after meconium has passed. The stool is brownish-yellow, mustardy, or yellowish-green and often appears seedy ([Figure 24.9](#)). It is soft and occasionally runny. Being runny is not a problem as long as the baby is feeding well and does not have other issues, such as blood in the stool. Breast-fed babies may sometimes appear to have mucus in their stool. This is not a cause for concern. It is not normal for their stool to be very hard or similar to the consistency of adult stool. This would indicate constipation. Breast-fed babies rarely suffer from constipation, since breast milk contains a natural laxative-like component. Conversely, very watery stool might be a sign of diarrhea, for which a concern would be dehydration and illness. During the first 6 weeks of a baby's life, frequent bowel movements are an indication that the baby is getting enough food. Most babies have two to five bowel movements per day and may stool after every feeding (AAP, 2021b). A baby who has significantly fewer bowel movements than this or does not stool on most days may not be getting enough breast milk. This may be an indicator that more frequent feedings are necessary or that an evaluation with a lactation consultant is indicated to increase breast milk supply. Other breast-fed infants, by 3 to 6 weeks of age, may have a stooling pattern of only one bowel movement a week and still be considered normal (AAP, 2021b). Breast milk leaves very little solid waste to be eliminated from the digestive system, but when these babies do have a bowel movement they go in very large quantities. As long as their infrequent stools are soft and the infant is otherwise healthy, it is not considered a problem. Caregivers need to be cognizant of any changes in their infant's stooling patterns, as indicators of concerning issues.

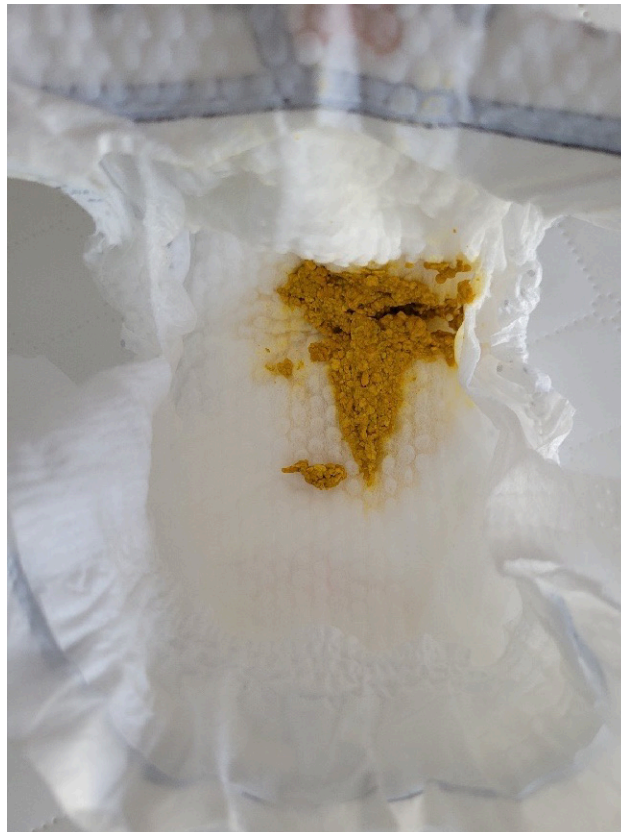


FIGURE 24.9 Stool of a Newborn The stool of a breast-fed newborn is usually light in color and seedy. (credit “Newborn Stool” by Sarah Evans/Flickr, CC By 4.0)

Breast milk stool has a very mild odor. The stool of babies who are both breast-fed and bottle-fed has a stronger odor, as does the stool of those who have had solid foods introduced. These stools have more form to them and are a darker color than breast-fed stools.

Expected Voiding Patterns in the Newborn

Regardless of feeding method, in the first 4 days of life, a newborn is expected to have at least one void per day of age plus at least one stool per 24 hours; on day 5, the newborn should have at least six to eight voids and one yellow seedy stool daily (Scott & Kirkland, 2023). Newborns often void at the time of birth, and this can easily go unnoticed because of the small amount and because of the very pale color. The nurse should note the time of first voiding on the infant's chart because absence of voiding in the first 2 days may indicate an anomaly. Usually, the first void occurs sometime during the first 12 to 24 hours of life. Disposable diapers are very absorbent, and the pale color of the infant's urine may cause very little, if any, color change on the diaper itself. The nurse may need to put gloves on and examine the inner layer of the diaper for clumping or dampness. Cotton balls or tissues may be placed in the diaper to better visualize small amounts of urine. Newborn's urine may contain uric acid crystals that cause a reddish or pink stain on the diaper, known as a brick staining, which might be frightening to parents who may mistake it for bleeding. It does not continue past the first few days as the kidneys mature. It is the nurse's role to notify the primary care provider if the infant does not meet the voiding expectations in the first days of life. If the infant is breast-fed, an additional lactation consultation is indicated to assess latch, suck, and swallow with the ultimate goal of increasing breast milk production and ingestion. Infants who are content, have good skin turgor, produce an adequate number of wet diapers, and have normal weight gain are considered to be consuming an adequate amount of either breast milk or formula (Scott & Kirkland, 2023).

Circumcision of the Male Newborn

Male **circumcision** is the surgical removal of the foreskin, the layer of skin that covers the glans (head) of the penis. In the newborn, circumcision is typically done in the hospital on the first or second day of life, before the birthing parent and baby are discharged. Circumcision is performed only if the parents request it and if the baby is healthy. It can be postponed if necessary. For religious or cultural reasons, some babies may be circumcised later in a nonhospital setting. Overall, approximately 25 percent to 33 percent of the world's male population is circumcised (Abdulwahab-Ahmed & Mungadi, 2013). Religious circumcision is practiced by those of the Jewish religion, while Muslims, Black Africans, Indigenous Australians, and other ethnic groups in different parts of the world practice religious and cultural circumcision (Gerharz & Haarmann, 2000). The United States is an outlier among other Western societies in its common circumcision of males who are not Jewish or Muslim (Abdulwahab-Ahmed & Mungadi, 2013).

The three techniques used for infant circumcision are the Plastibell technique, the Mogen clamp, and the Gomco clamp.

- **Plastibell:** A plastic bell-shaped tool is used for the procedure. The penis will have a plastic ring around it that will remain after surgery. The ring will fall off on its own in 5 to 7 days. There are no stitches with this procedure. Swelling may be present but will subside by approximately day 4. Change diapers often, rinsing the genitals and buttocks with water (do not use commercial diaper wipes). Give sponge baths until the umbilical cord has fallen off. If it is off, baths can be given daily beginning the day after circumcision until the ring comes off. Follow circumcision care instructions. There are no restrictions. The advantage to this method is reduced bleeding.
- **Mogen clamp:** With use of this clamp, the foreskin is crushed along a line that is 1 mm wide, and the foreskin is then removed distal to the clamp. When the clamp is removed, the glans is then liberated by opening the crush line. The procedure usually takes only 3 to 4 minutes and is virtually bloodless. The Mogen clamp has been associated with shorter procedure time and less pain when compared with the Gomco clamp (Taddio, 2001). This procedure was initially designed by Rabbi Harry Bronstein in 1954 and is one of the most commonly used techniques for ceremonial circumcisions outside hospital settings (Stanford Medicine, n.d.-b).
- **Gomco clamp:** This is one of the most commonly used devices for newborn circumcision (Stanford Medicine, 2023a). It has all the advantages of a steel bell, which protects the glans penis during the procedure, and the absence of a foreign body remaining on the penis after the circumcision (as it does with the Plastibell). It has been in continuous use for more than 70 years and gets its name from the company that originally manufactured it, the Goldstein Manufacturing Company (Stanford Medicine, 2023a).

Nurses are often involved in the consent procedure for infant circumcision. Before obtaining any consent, the nurse must have a thorough understanding of the indications, contraindications, complications, and the need for emergent intervention. When obtaining parental consent for circumcision, the nurse is responsible for explaining these

elements to the parents, listening to their questions and/or concerns, and addressing them. The nurse then witnesses parental signature on the consent. If the parent does not wish to sign the consent, the nurse then notifies the physician prior to the procedure and any procedural preparation for the patient.

Circumcision is a quick procedure, and various surgical techniques can be used, but the basic steps are the same (Stanford Medicine, n.d.-a):

- Local anesthetic is applied.
 - A topical cream (put on the penis) may be used. It takes about 20 to 40 minutes to take full effect.
 - An injectable anesthetic requires less time to take effect and may provide a slightly longer period of anesthesia.
 - Sometimes acetaminophen (Tylenol) is also given with the anesthetic to help lessen pain during surgery and for several hours later. Acetaminophen is an **analgesic**, which is a drug or medication that reduces pain or discomfort.
 - A bottle nipple filled with a sugar water substance (also called a “sweetie” or “sweet ease”) may also be given during the procedure to soothe the infant and lessen stress. A pacifier alone can also lessen stress and pain.
- The baby is placed on a special table for the procedure.
- The penis and foreskin are cleaned.
- A special clamp is attached to the penis, and the foreskin is cut and removed.
- After the procedure, special care is taken to protect the wound from rubbing against the diaper.

Circumcision may be done by the maternal health-care provider or by the newborn care provider. In some cases, when it is done in a nonmedical setting for religious or cultural reasons, circumcision may be performed by another person trained in how to do the procedure, how to relieve pain, and how to prevent infection in the baby. No single treatment has been demonstrated to offer complete pain relief for every newborn undergoing circumcision. Therefore, a combination of therapies is likely the most effective choice for pain management.



PHARMACOLOGY CONNECTIONS

Medications Used in Male Circumcision

Lidocaine (Topical)

- The application of a 1-g dose of lidocaine-prilocaine cream to the penis, about 60 to 80 minutes before circumcision, has been determined to be both safe and efficacious for newborns. The effectiveness of pain relief decreases during circumcision stages that involve significant tissue damage.
- Additional research reports similar effectiveness when employing a 0.5-g dose of lidocaine-prilocaine cream applied beneath an occlusive dressing for 45 to 60 minutes before circumcision.
- When comparing the effects of lidocaine 30 percent cream (1 g) and lidocaine-prilocaine cream (1 g), it was observed that the latter more efficiently reduced crying time and attenuated the increases in heart rate and blood pressure in neonates during circumcision. Additionally, it was deemed safe to use lidocaine cream in newborns, as there were no significant reports of systemic absorption of lidocaine.

Lidocaine (Dorsal Penile Nerve Block—DPNB)

- Lidocaine 1 percent is administered through injection, with 0.2 to 0.5 mL injected into two dorsolateral sites located at the base of the penis, specifically positioned at 2 o'clock and 10 o'clock, approximately 3 to 8 minutes prior to the circumcision procedure.
- Research studies that used the Neonatal Infant Pain Scale (NIPS) scores as their endpoints reached the conclusion that neonates who received DPNB had significantly lower NIPS scores when compared to those who received lidocaine-prilocaine cream, demonstrating a more pronounced reduction in pain.

Subcutaneous Ring Block

- The ring block technique involves the injection of approximately 0.8 mL of lidocaine 1 percent in a circular manner around the penis, placed halfway along the shaft, with this procedure being performed approximately

8 minutes before the circumcision.

- Ring block was found to be the most effective in reducing pain during foreskin separation and incision, as demonstrated by reduced crying and a lower heart rate. Following ring block, DPNB was the second most effective anesthetic, while lidocaine-prilocaine cream was the least effective.

NOTE: With DPNB and ring block, epinephrine should not be mixed with lidocaine due to the vasoconstrictive nature of epinephrine, which can lead to the risk of ischemia and tissue necrosis.

Acetaminophen (Tylenol)

- Acetaminophen is commonly used to reduce fever or pain in infants but is not recommended as the sole pain reliever for circumcision. Research has shown no significant difference in terms of pain tolerance and pain control between a placebo group of newborns and a group that received acetaminophen preoperatively and intraoperatively. The group who had received acetaminophen showed an increase in comfort level at 6 hours post procedure, demonstrating that the acetaminophen may be more effective after the initial postoperative period.

Sucrose (oral)

- Research indicates that using pacifiers dipped in or filled with a sucrose solution is more effective than using water-dipped pacifiers in neonates, resulting in reduced crying during painful procedures like circumcision and heel sticks.
- Although sucrose is not as effective as lidocaine-prilocaine cream or DPNB for pain reduction, the combination of sucrose and other pain-relieving measures has been shown as more effective than either method on its own in alleviating neonatal pain during circumcision.

Care of the Uncircumcised Newborn

When parents choose not to have their baby boy circumcised, the uncircumcised penis does not require any specialized care. To keep it clean, simply wash the outside of the penis with a mild soap and water or use baby wipes when changing diapers. Do not attempt to pull back the infant's foreskin. The foreskin may not pull back completely until the child is older. This is normal. The child's pediatrician can tell parents when it is ready to be pulled back and cleaned (American College of Obstetricians and Gynecologists, 2022).

Care of the Circumcised Newborn

After a baby has been circumcised, care must be taken to keep the area clean. Initially after the circumcision, the area will be checked every 15 minutes for an hour to assess for excessive bleeding at the surgical site. In addition, the nurse will monitor for swelling at the site and for the first void post circumcision. A dressing on the surgical site will consist of a gauze pad with petroleum jelly placed on the tip of the penis. Petroleum jelly can also be placed on the diaper in the area where the penis will touch. A clean dressing should be applied at every diaper change for the first day or two to prevent the surgical site from sticking to the diaper and to help keep the site clean. The tip of the penis will initially appear bright red. Even after the dressing is no longer needed, parents should put a dab of petroleum jelly on the penis tip or on the front of the diaper. It usually takes between 7 and 10 days for the penis to heal. Initially, the tip of the penis may appear slightly swollen, and a small amount of blood may appear on the diaper. That is to be expected and is not a concern. A slight yellow discharge or crust may also appear after a couple of days. This is a normal part of healing. If immediately after the circumcision or at any time during the recovery the penis is actively bleeding, the nurse or caregiver needs to apply direct pressure for 1 to 2 minutes to control the bleeding and must notify the provider. The provider may decide to apply silver nitrate to stop the active bleeding.

When to Call the Health-Care Provider

As with any surgical procedure, circumcision comes with the possibility of risks and complications. With circumcision, complications are rare and are usually minor. Possible complications include bleeding, infection, and scarring. It is less likely for complications to occur if circumcision is done in a medical setting.

If any of the following problems are noticed, the doctor should be called immediately (American College of Obstetricians and Gynecologists, 2022):

- bleeding that is not stopping

- more than a quarter-sized amount of blood on the diaper
- redness getting worse or not going away after 7 to 10 days
- fever, rectal temperature > 100.4° F or 38° C
- other signs of infection, such as swelling or discharge getting worse, or pus-filled blisters
- not urinating normally within 12 hours after circumcision.



REAL RN STORIES

Nurse: Erin, BSN

Years in practice: 5

Clinical setting: Pediatric cardiology floor

Geographic location: The inner city of a large metropolitan area in Ohio

A 6-day-old baby boy with a known ventricular septal defect (VSD) was not given the opportunity to have a circumcision done in the newborn nursery. After seeing his primary care provider and pediatric cardiologist, he was introduced to pediatric surgery and had a circumcision done in the OR with postcare provided by the pediatric cardiology floor.

Erin received a sign-out from the post-anesthesia care unit (PACU). Notably, the patient had had to have sutures placed due to bleeding.

When he arrived on the floor, Erin found that he was tachycardic, pale, and irritable. His mother was concerned that he was in pain. The floor provider prescribed Tylenol for pain.

Erin was also concerned as the patient continued to be inconsolable with a heart rate in the 170s to 180s. During the second diaper change that evening, she found a red-filled diaper and active bleeding at the circumcision site.

Pediatric surgery was alerted to the acute change in the surgical site. Erin followed the orders of both teams as she started infusing packed red blood cells (PRBCs) through a peripheral IV and utilized her change nurse to meet her other patients' needs.

The pediatric surgery team was able to stop the bleeding without requiring further surgery, and the patient improved significantly after receiving blood.

With quick intervention, almost all circumcision-related problems are easily treated.

Postprocedural Pain in the Circumcised Newborn

Postcircumcision pain and initial discomfort are expected and can be lessened for the newborn by:

- providing a pacifier for sucking
- nursing if the baby is breast-fed
- **swaddling**, a traditional practice of wrapping up a baby gently in a light, breathable blanket to help them feel calm and sleepy ([Figure 24.10](#))
- administering acetaminophen as an analgesic
- rocking the baby

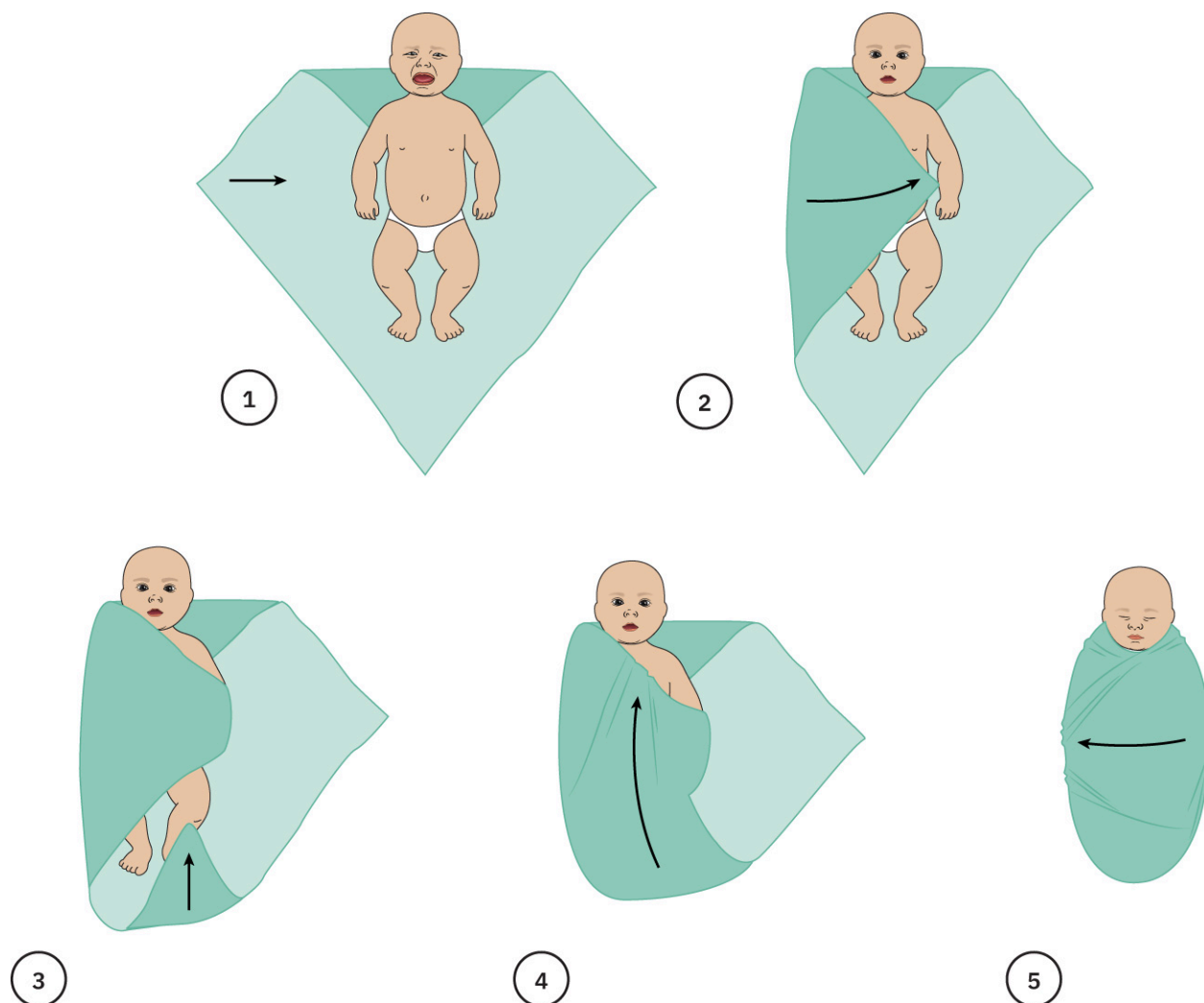


FIGURE 24.10 How to Swaddle an Infant Swaddling calms an infant. 1. Lay the newborn on the diamond-shaped thin cloth with their head on the overturned triangle at the apex. 2. Bring one side of the cloth over to the opposite side of the baby. 3. Tuck the end of the side that has crossed the newborn under them while bringing up the bottom of the diamond to the center and tucking it into the side that is anchored under the newborn. 5. Bring over the last side of the diamond and tuck it under the newborn. (attribution: Copyright Rice University, OpenStax, under CC BY NC-SA 4.0 license)



CULTURAL CONTEXT

Circumcision around the World

[Table 24.5](#) lists the percentage of males who undergo circumcision at some point in their life, likely as a newborn. Cultural, religious, and ethical beliefs of the family result in the procedural choice.

Country	Rate	Country	Rate
Afghanistan	99.8%	Japan	9%
Algeria	97.9%	Jordan	98.8%

TABLE 24.5 Culture and Ethnicity Count: Percentage of Circumcised Males in Countries throughout the World The National Institutes of Health (NIH) estimates that 37% to 39% of men globally are circumcised (Morris et al., 2016, p. 1).
Note: This chart is not inclusive of all 237 countries and territories globally that are addressed by Morris et al.

Country	Rate	Country	Rate
Australia	26.6%	North Korea	0.1%
Austria	5.8%	Libya	96.6%
Bolivia	0.11%	Mexico	15.4%
Botswana	15.1%	Morocco	99.9%
Brazil	1.3%	Netherlands	5.7%
British Virgin Islands	1.2%	Nigeria	98.9%
Canada	31.9%	Norway	3.0%
China	14%	Puerto Rico	0.14%
Colombia	4.2%	Romania	0.34%
Egypt	94.7%	Russia	11.8%
France	14%	Saudia Arabia	97.1%
Gaza Strip	99.9%	Turkey	98.6%
Germany	10.9%	United Kingdom	20.7%
Iran	99.7%	United States	71.2%
Iraq	98.9%	Vietnam	0.2%
Israel	91.7%	Yemen	99.0%

TABLE 24.5 Culture and Ethnicity Count: Percentage of Circumcised Males in Countries throughout the World The National Institutes of Health (NIH) estimates that 37% to 39% of men globally are circumcised (Morris et al., 2016, p. 1).
Note: This chart is not inclusive of all 237 countries and territories globally that are addressed by Morris et al.

24.2 Care of Common Problems in the Newborn

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Describe the pathophysiology and signs and symptoms of hyperbilirubinemia and the care of the newborn with hyperbilirubinemia
- Describe the pathophysiology and signs and symptoms of hypoglycemia and the care of the newborn with hypoglycemia
- List the common newborn infections and describe the care of the newborn with an infection
- List common newborn dermatologic issues including the pathophysiology of both expected and pathophysiologic findings along with their care and management

This section provides a comprehensive understanding of significant issues that commonly arise during the early stages of a newborn's life: hyperbilirubinemia, hypoglycemia, dermatologic problems, viruses, and bacterial

infections. By understanding the pathophysiology, signs and symptoms, risk factors, and preventive measures, as well as the appropriate care and management, for each condition, nurses can effectively address these challenges. They can also differentiate between normal variations and abnormal conditions and can educate parents about both. In providing adept and knowledgeable care of newborns with these problems and educating their caregivers, nurses can help ensure the health and well-being of this vulnerable population.

Hyperbilirubinemia

One common problem in newborns is hyperbilirubinemia, characterized by elevated levels of bilirubin in the blood. Understanding the underlying pathophysiology, including the breakdown of red blood cells, helps identify infants at risk. Recognizing the signs and symptoms associated with hyperbilirubinemia enables prompt intervention and appropriate care to manage this condition effectively.

Care of the Newborn with Hyperbilirubinemia

Many normal and healthy babies develop **jaundice**, or **hyperbilirubinemia**, which is an increase in the concentration of bilirubin in the **serum**, the amber-colored, protein-rich liquid that separates out when blood coagulates. With jaundice, the skin and sclera of the eyes of the newborn may appear noticeably yellow due to the breakdown of fetal red blood cells. Mild jaundice is harmless. However, if the bilirubin level continues to rise and is not treated, it can lead to **kernicterus**, a type of brain injury. Jaundice tends to be more common in breast-feeding infants, particularly in those that are not feeding well. Therefore, breast-feeding parents should nurse their newborns at least 8 to 12 times per day (or every 2 to 3 hours), which will help produce enough milk and keep bilirubin levels low.



LEGAL AND ETHICAL ISSUES

Nurse's Response When Asked about the Preferred Way to Feed a Baby: Breast versus Bottle

Each birthing parent has the autonomy to choose how they would like to feed their newborn. Each way of feeding a newborn has advantages and disadvantages. Human milk is recommended as the optimal source of nutrition for newborns due to the health benefits it provides for both the newborn and the lactating parent. Consequences of insufficient oral intake in the newborn and psychologic distress in the lactating parent may result when the plan does not work. When discussing the topic of feeding with the parent, the nurse must determine what the parent's goals are and what would work best for their newborn and themselves. Nurses have an ethical obligation to provide infant feeding support in a way that is sensitive, individualized, objective, and supportive to the person while avoiding harm.

Pathophysiology of Neonatal Jaundice

The primary source of bilirubin is the breakdown of hemoglobin, leading to the formation of unconjugated bilirubin and related substances. Unconjugated bilirubin then binds to albumin in the bloodstream to facilitate its journey to the liver. Once in the liver, hepatocytes take up bilirubin and, through the action of the enzyme uridine diphosphogluconate glucuronosyltransferase (UGT), conjugate it with glucuronic acid, making it water-soluble.

Due to the common occurrence of temporary jaundice in healthy infants, hyperbilirubinemia can be classified as either physiologic or pathologic. It can also be classified based on whether the hyperbilirubinemia is unconjugated, conjugated, or a combination. Additionally, classification by the underlying mechanism is another method. Most cases of neonatal jaundice involve unconjugated hyperbilirubinemia. Among the most common factors contributing to neonatal jaundice are physiologic hyperbilirubinemia, breast-feeding–related jaundice, breast milk–induced jaundice, and pathologic hyperbilirubinemia associated with hemolytic diseases. Dysfunction or disease of the liver may result in conjugated or mixed hyperbilirubinemia (e.g., parenteral alimentation causing cholestasis, neonatal sepsis, neonatal hepatitis) (Dysart, 2022).

Jaundice first appears on the face, then the chest and abdomen, and finally the arms and legs in some instances. The whites of the infant's eyes may also turn yellow. At the present time, most newborns are routinely screened for jaundice in the skin 24 hours before leaving the hospital, using a painless handheld light meter called a **transcutaneous bilirubin (TCB) monitor**. If jaundice is suspected in the newborn based on skin color, age, and other factors, the pediatrician may order a blood test to make an accurate diagnosis. If parents notice a sudden increase in jaundice once they are home, they should call their health-care provider. The specific blood tests that

may be ordered are as follows: (Cedars Sinai, 2023)

- *Direct and indirect bilirubin levels*—This test will show if bilirubin is bound with other substances by the infant's liver. The level of indirect bilirubin is increased in normal physiologic jaundice. High levels of either type of bilirubin are seen with jaundice caused by more serious problems.
- *Red blood cell counts*—This test is important because jaundice occurs as a result of the breakdown of fetal RBCs.
- *Blood type and testing for Rh incompatibility* (the Coombs test or direct antiglobulin test [DAT])

One major differentiating factor between the four types of newborn jaundice is the timing of when the jaundice first starts. Treatment will depend on the degree of jaundice, the bilirubin level, and the age and weight of the infant (Cedars Sinai, 2023; Kemper et al., 2022).

- Jaundice that develops after the first 24 hours of life in term infants is called developmental jaundice or **physiologic jaundice**. It is considered normal. The bilirubin peaks between the 2nd and 4th days of life and falls to normal levels by 57 days. Jaundice becomes visible when the bilirubin level is greater than 5 mg/dL (Cedars Sinai, 2023).
- Jaundice that develops in the first 24 hours of life is called pathologic jaundice or **nonphysiologic jaundice**. When bilirubin rises higher than expected or remains elevated longer than expected, earlier treatment is needed to prevent severe hyperbilirubinemia. Abnormalities that cause excessive destruction of RBCs or problems in bilirubin conjugation result in nonphysiologic jaundice (Cedars Sinai, 2023; Kemper et al., 2022). These can include incompatibilities between the birthing parent's and infant's blood types, metabolic disorders, and infections. Phototherapy is often the treatment for nonphysiologic jaundice ([Figure 24.11.](#))
- Jaundice that develops in breast-fed infants within the first week after birth is called **breast-feeding jaundice** or **early-onset jaundice**. It involves bilirubin levels of >12 mg/dL and develops in 13 percent of breast-fed infants by 1 week of life (Kemper et al., 2022). The most common cause of jaundice this early in breast-fed infants is insufficient milk intake, dehydration, or low caloric intake. Serum bilirubin may reach dangerous levels if intake is not increased. An increase in enterohepatic circulation may also result from reduced bacteria in the intestine that act to convert bilirubin to nonresorbed metabolites (Dysart, 2022). Babies who are sleepy, have a poor suck, or nurse infrequently do not get sufficient colostrum. Colostrum has a normal laxative effect in eliminating bilirubin-rich meconium. When meconium is not eliminated, bilirubin may be deconjugated in the intestine, absorbed, and recirculated to the liver for conjugation again. Lack of suckling decreases production of breast milk and further increases the problem.
- Jaundice that occurs after the first 5 to 7 days of life and lasts 3 weeks to as long as 3 months, peaking at about 2 weeks of age for some infants is considered true **breast milk jaundice** or late-onset breast milk jaundice. Bilirubin usually peaks at levels of 5 to 10 mg/dL and gradually decreases over several months, but for some infants, levels get as high as 20 to 30 mg/dL. Although the exact cause is unknown, true breast milk jaundice is thought to be caused by an increased concentration of beta-glucuronidase in the breast milk, which causes an increase in the deconjugation and reabsorption of bilirubin (Dysart, 2022). Infants show no signs of illness. Treatment consists of 8 to 12 feedings per 24 hours. If levels of bilirubin become too high, phototherapy may begin while the nursing parent continues to breast-feed. Interruption of breast-feeding is not usually recommended (Cedars Sinai, 2023; Kemper et al., 2022). This type of jaundice generally resolves without further morbidity concerns.

CLINICAL JUDGMENT MEASUREMENT MODEL

Take Action: Setting a Newborn Patient under the Phototherapy Light

The nurse is caring for a 4-day-old who has been showing signs of hyperbilirubinemia with jaundice on the face down to the chest. The breast-fed infant had an elevated level when checked with the noninvasive bili tool (BiliTool) in the nursery.

The nurse knows that to start phototherapy the newborn will need to be uncovered but will require eye protection and groin coverage before being placed under the phototherapy light.

The nurse is successful in ordering goggles and groin coverage from hospital services, and phototherapy is

initiated. A follow-up bilirubin level will be checked in 6 hours.

Nursing Care Plan for the Jaundiced Newborn

Subjective data may come from the parents who may report or the nurse who may observe that the newborn is having difficulty with breast-feeding or is not taking the bottle well. The problem may be infant fussiness related to feedings or lethargy and difficulty in waking to feed. The problem could be an issue with latch or positioning or with suck and swallow. To accurately assess what is happening, the nurse must become more involved with feedings in general. A loss of color in the stool also warrants investigation.

When assessing the infant in daylight, the nurse will most likely observe yellowing of the skin all over the body and in the sclera of the eyes. In newborns with dark skin, yellowing may not be visible, so jaundice should be confirmed with TCB (Ansong-Assoku, et al., 2023). Weight loss will be greater than expected (>10 percent). The infant will be difficult to awaken and, when awake, will be very fussy with a high-pitched cry.

The nurse assesses the infant's skin for abnormalities, noting the color (yellowing) of skin or eyes. When determining yellowing of the skin, the nurse lightly presses on the skin of the baby's forehead. If the skin looks yellow where pressed, the baby is likely jaundiced.

When assessing the infant for neurologic involvement, the nurse should keep in mind expected infant development. Infants experiencing hyperbilirubinemia are likely to be very fussy when awake and difficult to arouse when asleep. Consequently, many parents inadvertently delay waking their babies to feed them. More advanced stages of neurologic sequelae include hyperreflexia (twitching, overexcitability, sensitive reflexes, and convulsions). Symptoms can also include a high-pitched cry. An infant's change in feeding patterns is neurologically significant as well.

Obtaining a good history, including a review of the pregnancy and delivery, may show a stressful delivery. When assistive devices such as vacuum or forceps have been used, they can increase infant trauma and, therefore, the risk of neonatal jaundice. The nurse is aware of high-risk disorders or diseases that may affect the infant (i.e., spleen or liver disease or hypothyroidism). As part of the physical assessment of the newborn, the nurse should obtain serum or transcutaneous bilirubin (TCB) values. TCB is preferred because of the noninvasive nature of the test. Any level greater than 12 mg/dL usually requires treatment, and the nurse should follow the provider's orders and hospital policy and protocol. If a serum bilirubin level is required, it is usually obtained by heel stick, per facility protocol. If the newborn is breast-feeding, the nurse should observe and offer assistance to improve latch, suck, and swallow. The nurse will encourage frequent feedings, every 2 hours, and may suggest that the parent supplement with formula as appropriate/or needed.

Jaundice may be present if infants are having difficulty with breast-feeding, are dehydrated, or are taking in insufficient calories. Frequent feedings promote good hydration of the infant and help to boost the milk supply in the nursing parent. If breast milk is insufficient, even temporarily, infants may require additional calories and nutrients from formula.

The nurse initiates phototherapy per facility protocol and health-care provider order. The newborn is placed under the bili lights in an incubator or thermoregulated environment or in an open crib wrapped in a bili blanket. Phototherapy helps improve the solubility of bilirubin for faster secretion through the stool and urine. This is a noninvasive treatment. The infant wears only a diaper, covering the genital area, and eye patches covering their eyes to allow maximum skin exposure to the phototherapy lights while protecting the genitals and eyes. The nurse assesses the skin and eyes every 2 hours when the infant comes out from under the lights for feeding. The nurse also monitors the infant's temperature for elevations or fever every 2 hours while phototherapy continues. Phototherapy can elevate an infant's body temperature to dangerous levels. Therefore, close monitoring of temperature is necessary during treatment. Additionally, the nurse notes any signs of infection or sepsis.

Hyperbilirubinemia related to Rh incompatibility with the birthing person or severe anemia may require a blood transfusion. As for medication, the infant may require the administration of acetaminophen for fever or may be given phenobarbital, which acts to stimulate the liver to metabolize bilirubin more quickly (Dysart, 2022)

Because much of this treatment and phototherapy itself can be done at home, particularly if parents use a bili blanket, it is essential that the newborn's caregivers receive thorough education about monitoring the infant's skin,

the need for skin surfaces to be exposed, monitoring temperature, and encouraging feedings every 2 hours. It is also very important that they keep scheduled appointments with their care provider because the infant's blood will need to be monitored closely and frequently for bilirubin levels if it is not done by a visiting nurse. Infants who are receiving phototherapy, whether at home or in the hospital, can have brief periods outside the phototherapy lights. Ideally, this could be timed to occur every 2 hours when assessments and feedings occur. This is necessary so that the infants can be cuddled and held and so that they can bond with their parents and breast-feed if that is desired. Eye covers can be removed for parent-baby interaction and eye contact but must be replaced when the baby is returned to phototherapy. Also, the nurse must ensure that phototherapy is turned off during the collection of blood for serum bilirubin levels because both conjugated and unconjugated bilirubin are photo-oxidized when exposed to white or ultraviolet light (Wang et al., 2021).



FIGURE 24.11 Jaundiced Newborn Receiving Treatment under a Bili Light. Treatment for hyperbilirubinemia may include the use of bili lights with both ultraviolet and blue light. The newborn should not wear more than a diaper and eye protection to ensure effective treatment. (credit: "Light Therapy for Nonphysiologic Jaundice" by Robyn Alvarez/Flickr, CC BY 4.0)

Hypoglycemia

Hypoglycemia, another frequently encountered issue, refers to low blood glucose levels. Identifying infants at risk is an important step in newborn care. Early recognition of signs and symptoms is crucial because it allows nurses to implement appropriate care and management strategies. These include monitoring glucose levels and timely feeding or administering glucose water or intravenous glucose in severe cases.

Care of the Newborn with Hypoglycemia

In the term newborn, **hypoglycemia** refers to a blood glucose level below 40 mg/dL. It is a common transient occurrence in the immediate postpartum period; therefore, it is not necessary to routinely monitor the blood glucose of all term newborns. Most hospitals and birthing centers have policies and procedures that require monitoring of at-risk newborns rather than waiting for them to become symptomatic. The most common cause of hypoglycemia in infants is hyperinsulinism, typically occurring right after birth. Newborns at risk include the following:

- small for gestational age (SGA)
- large for gestational age (LGA)
- fetal growth–restricted (FGR) infants
- infants of a diabetic mother (IDM) (Stanford Medicine, 2023b)

See [Chapter 23 Newborn Assessment](#) for a full discussion of gestational age.

Other causes of hypoglycemia in the newborn are poor nutrition of the pregnant parent, incompatible blood types between birthing parent and baby (Rh incompatibility), neonatal pancreatic tumor, birth asphyxia or stressful birth, cold stress, liver disease, preterm birth, being born to a birthing parent treated with terbutaline, and infection (Stanford Medicine, 2023b).

Hospitals, birthing centers, and nurses can help prevent or significantly reduce hypoglycemia in infants by:

- encouraging breast-feeding initiation within the first 30 to 60 minutes after birth
- promoting skin-to-skin contact between birthing parent and baby to prevent cold stress, which depletes the infant's glucose stores
- encouraging breast-feeding 8 to 12 times a day
- encouraging breast-feeding in response to infant feeding cues rather than a set schedule
- teaching that crying is a late cue for hunger; instructing parents not to let the newborn cry for prolonged periods because crying rapidly depletes glycogen stores and can contribute to rapid drops in blood sugar levels
- promoting continuous parent-baby rooming-in.

Pathophysiology of Neonatal Hypoglycemia

Neonatal hypoglycemia may present as transient or persistent. The developing fetus relies on maternal metabolism and placental circulation to obtain vital energy sources like glucose, ketones, free fatty acids, and amino acids to meet their energy demands. The placenta serves as a direct supplier of glucose to the fetal circulation. However, when the umbilical cord is clamped immediately after birth, it abruptly interrupts this continuous glucose supply, resulting in a rapid drop in the infant's blood glucose levels during the first 2 to 3 hours of life (Abramowski et al., 2023).

Low blood glucose levels trigger the release of insulin and other hormones, including catecholamines, glucagon, and corticosteroids. These hormones stimulate the production of glucose through processes like gluconeogenesis and glycogenolysis while also enhancing the oxidation of fatty acids. This creates an internal source of glucose and other necessary energy substrates for the infant's metabolic requirements. As a result, blood glucose levels gradually increase over the next several hours to days. Disrupting the established sequence of these physiologic changes can pose a heightened risk of more severe or extended periods of low glucose in the infant. The highest likelihood of hypoglycemia occurs within the initial hours after birth (Abramowski et al., 2023). Persistent hypoglycemia may arise due to overproduction of insulin, insufficient cortisol or growth hormone, or inherent metabolic disorders (Abramowski et al., 2023).

The signs of hypoglycemia are not always noticeable in the newborn, but those infants who are at risk should be tested per protocol regardless of the presence of symptoms. The diagnosis is made with a simple test on blood obtained by a heel stick. The most common symptoms of hypoglycemia in the newborn include shakiness or jitteriness, hypothermia (low body temperature), poor muscle tone (floppy muscles), **lethargy** (lack of movement and energy, out-of-the-ordinary sleepiness), seizures, and possibly **cyanosis** (blue tint to skin and lips) and **apnea** (stopping breathing) (Stanford Medicine, 2023b).

Treatment of neonatal hypoglycemia depends on the baby's age and overall health and well-being. Depending on the facility's protocol, treatment usually includes giving the baby a fast-acting source of glucose. This may be as simple as an oral glucose gel ("Standard-Dose Oral Dextrose Gel for Neonatal Hypoglycemia," 2022), a glucose and water mixture, formula as an early feeding, or putting the baby to the breast if the infant nurses well. The baby's glucose level is checked after the treatment to see if the hypoglycemia has improved. The baby may need glucose given through an IV as further treatment (Stanford Medicine, 2023b). Because the brain needs glucose to function, severe hypoglycemia, or not enough glucose for a prolonged period, can impair the function of the infant's brain, causing seizures and brain injury. Thus, identifying and treating hypoglycemia as early as possible after birth, with the goal of stabilizing and maintaining a normal blood glucose level in the newborn, is optimal.

Umbilical Cord Conditions

After birth, the umbilical cord is cut, and the newborn is left with an umbilical cord stump that will fall off over time. The nurse educates the newborn's caregiver on caring for the stump at home and the signs or symptoms that would warrant a call to the primary care provider. Some common issues that arise from the stump include granulomas, hernia, and infection.

Umbilical Cord Granuloma

An **umbilical cord granuloma** is a small nodule of tissue, which can measure up to 1 cm, that may become evident after the separation of the umbilical cord (Poenu, 2001). For some infants, after the cord has fallen off, a small

granuloma will form. It will stay on the umbilicus and drain a light yellowish fluid. This condition will usually go away on its own in about a week, but if it does not, the pediatrician may choose to cauterize the area to burn off the granulomatous tissue (AAP, 2021a). Another treatment option for small granulomas may be an application of topical silver nitrate. These procedures are commonly treated in the pediatrician's office. For larger granulomas or those unresponsive to silver nitrate, surgical resection may be indicated (Poenaru, 2001).

Umbilical Hernia

An **umbilical hernia** is present when the baby's umbilical cord area appears to push outward when the baby cries. It is caused by a small hole in the muscular part of the abdominal wall that allows the tissue to bulge out when there is increased abdominal pressure (e.g., crying) (see [Figure 23.9](#)). It is not a serious condition and will usually heal itself in the first 12 to 18 months of life (AAP, 2021a). The healing process may take longer in infants of color for unknown reasons (AAP, 2021a). If the hole does not heal by the age of 3 to 5 years, it may require surgery.



CULTURAL CONTEXT

Care of the Newborn

Culture has a strong influence on behaviors and practices during pregnancy, childbirth, and infancy. The challenges arising from this exciting, yet demanding period of transition often prompt new parents to turn to traditional and cultural practices. Some examples of cultural practices in the early newborn period include the following:

- In Zambia, the care of a baby's umbilical stump involves three main methods: drying (using coal or powder on the cord), moisturizing (using engine oil on the cord), and protection (using breast milk, manure, or chicken feces on the cord).
 - Among Jordanian women and in several other cultures, it is a well-known practice to place a coin on the infant's umbilical stump, which is believed to be beneficial in preventing umbilical hernias.
 - In India, cultural practices include the application of cow's urine on the mother and refraining from breast-feeding the newborn for the initial 3 days of life.
 - In Bulgarian culture, safeguarding infants from malevolent magic is achieved through the wearing of amulets and protective "evil eye" beads (Kuşlu & Koçak, 2023).
-

Umbilical Cord Infection

After birth and until the umbilical cord naturally separates, bacteria can invade the umbilical stump and cause infection called **omphalitis**. While caring for the infant, the nurse's main priority in preventing umbilical cord infection is to keep the cord clean and dry and to teach the parents to do so as well. No dressing is necessary. When changing diapers, the diaper is folded below the umbilical area to avoid urine-induced infection. As part of the discharge instructions, the nurse instructs the parents that once the umbilical cord has separated, they should maintain clean and dry precautions until the base of the umbilicus is dry without secretions. If the area still presents with a large amount of discharge after more than 1 week, they should consult the baby's health-care provider.

The umbilical cord of the newborn is a direct line into the circulatory system. Therefore, if it becomes infected, the infection can quickly spread systemically and become very serious. When an infection enters the bloodstream, it is called sepsis, and it can damage the body's organs and tissues. For up to 15 percent of newborns who get an umbilical cord infection, it is fatal, so it is considered a medical emergency (Healthline, 2019). A culture of the infected area will be taken to determine which antibiotic is best, which will largely depend on the extent of the infection.

If the cord infection is minor, the health-care provider may recommend application of an antibiotic cream to the area a few times daily to fight the infection (Healthline, 2019). If it is more serious, the baby will most likely need to be hospitalized to receive IV antibiotics for a course of 10 days (Healthline, 2019). This may be followed by oral antibiotics. How long the baby is hospitalized is up to the health-care provider, but usually it is for the duration of the IV antibiotic treatment. In some severe cases, the infection may need surgical intervention. Frequently, the infection causes cells to die at the base of the umbilicus, and these dead cells may need to be removed surgically (Healthline, 2019).

Common Dermatologic Conditions of the Newborn

Newborn dermatologic conditions can be a source of great concern for parents, but most of these issues are benign and temporary. While they can be initially frightening, these conditions often resolve with time. From common rashes like baby acne, milia, and cradle cap to mild skin discolorations, most newborn skin problems pose no long-term harm. Pediatricians can provide guidance and reassurance to parents, helping them navigate these early challenges and ensuring the baby's skin health. Understanding that these conditions are a normal part of infancy can ease parental anxiety and promote a sense of confidence in caring for their newborn's delicate skin.

Milia

Tiny white bumps or cysts on the newborn's skin, usually on the face around the cheek, nose, or chin area are called milia (Mount Sinai, 2021) (see [Table 23.2](#)). Occasionally, there may be a narrow red halo around the base of the milia. Milia form when dead skin cells get trapped in small pockets near the surface of the skin. The protein in those cells, called keratin, hardens into tiny cysts that present as small raised white bumps on the skin (Mount Sinai, 2021). No treatment is needed for milia because they will disappear on their own in the first few weeks of life.

Baby Acne

The common short-term skin condition that causes acne breakouts (papules and pustules) on a baby's face, chest, or scalp is called **baby acne** (Cleveland Clinic, 2022e) ([Figure 24.12](#)). It occurs on average at about 2 weeks of age, although some babies are born with it. It resolves within weeks. Infantile acne occurs after 2 months of age and is different from baby acne, lasting up to a year. If an infant develops acne after 2 months of age, parents should see their pediatrician for intervention. Baby acne can develop slowly or suddenly. The cause is varied and may be related to clogged pores, oily skin, maternal or placental hormones, or other causes. The acne starts as red dots and turns into raised pustules, but not blackheads, disappearing in a few days to a couple of weeks. Generally, this acne resolves without treatment other than washing the area gently with mild soap and water, keeping the area clean and dry, and not using lotions or oils on the baby's skin. An antifungal cream or low-potency topical steroid may be prescribed in serious cases (Cleveland Clinic, 2022e).



FIGURE 24.12 Baby Acne Baby acne consists of pustules, not blackheads, and usually resolves on its own. (credit: "Babyakne" by "selbst erstellt (Fragegeist)"/Wikimedia Commons, Public Domain)

Erythema Toxicum

The skin condition in newborns that causes a red rash and small, fluid-filled bumps on the infant's face and/or limbs is called **erythema toxicum neonatorum (ETN)** (Cleveland Clinic, 2022d) (see [Table 23.2](#)). ETN is not dangerous, it does not itch, and it is not uncomfortable for the baby. It does not have any long-term effects and may go away within 5 to 14 days after forming. The condition may come back and once again resolve in a week or two. Although often confused with baby acne, ETN is different. It can be differentiated by the fact that the bumps disappear and form in new areas over a few hours. Between the bumps, the skin has what appears to be a red rash or red patches. Symptoms usually show up only on parts of the body that have hair follicles, such as the arms, legs, chest, or face (Cleveland Clinic, 2022d). The bumps and rash will get paler when pressure is applied to them. No specific treatment is needed for ETN, and parents should be instructed not to squeeze or pick at pustules because that may cause infection or scarring.

Pustular melanosis

The normal and harmless skin condition that affects term newborns and presents with skin bumps, pustules, or blisters anywhere on the infant's body is called **transient neonatal pustular melanosis (TNPM)** (Cleveland Clinic, 2022a). The pus-filled bumps are noticeable at birth and will rupture, causing white-encircled dark spots on the

skin. The darkened skin will fade in 3 to 4 weeks (Cleveland Clinic, 2022a). Because blisters rupture easily, care must be taken to avoid infection. TNPM affects boys and girls equally and affects infants of color more than white infants. TNPM is benign, and it does not itch or cause scarring. The condition resolves without treatment.

Management of Common Newborn Skin Ailments

Most common skin ailments in the newborn are benign and require little management. It is important to understand the expected and pathophysiologic findings in the skin. Nurses can differentiate between normal variations and abnormal conditions and can educate parents about both. Appropriate care and management approaches are discussed to address issues effectively.

Diaper Rash

A common form of **dermatitis**, skin inflammation, in the diaper area of the buttocks, thighs, and genitals is called **diaper rash** (Mayo Clinic, 2022b). Diaper rashes are often uncomfortable and tender, causing fussiness and crying during diaper changes and in between. They can be caused by:

- *Delay in changing wet or soiled diapers.* Babies have sensitive skin. Diarrhea may also cause a rash.
- *Chafing or rubbing.* Rash may also occur if diapers are too tight or too small.
- *Using a new product* such as baby wipes, diapers, detergent, bleach, or fabric softener. Ingredients in lotions or oils might add to the problem.
- *Developing a bacterial or yeast (fungal) infection.* Skin creases around the diaper area are perfect breeding grounds for bacterial or yeast infections because they are moist and warm. If a yeast infection has developed, parents might notice red dots in the area, and the skin may be bright red and painful.
- *Introducing new foods.* As infants are introduced to new foods, their stool changes. This increases the likelihood of developing a diaper rash.
- *Having sensitive skin.* Infants with skin conditions such as atopic dermatitis (eczema) are more likely to develop diaper rashes (Mayo Clinic, 2022b). The skin affected by eczema is usually in areas not covered by diapers.
- *Using antibiotics.* Antibiotics can contribute to rashes by killing off bacteria that keep yeast growth in check, thereby allowing yeast to grow. Antibiotic use also increases the risk of diarrhea.

The best way to prevent a diaper rash is to keep the area clean and dry and to change diapers often. The nurse should teach the parents to use warm water and a mild soap to cleanse the area, or a baby wipe that does not contain alcohol, which would sting when a rash is present. Most commercial wipes do not contain alcohol. Parents or caregivers should gently pat the area dry or let it air dry. Cream, paste, or ointment should be applied regularly to the diaper area as a barrier to protect the skin. Petroleum jelly and zinc oxide are ingredients present in many proven diaper rash products. Diapers should fit securely but not too tightly, and when possible, the baby should have time without wearing a diaper. After each diaper change, it is important to maintain good handwashing to avoid the transfer of bacteria and yeast to other parts of the baby's body, to the caregiver, or to other people.

Cradle Cap

The common, harmless skin condition on an infant's scalp that presents as yellow scaly patches with a red rash is called **cradle cap** or **seborrheic dermatitis** (Cleveland Clinic, 2020). It is not uncomfortable for the baby, and it is not contagious. The exact cause of cradle cap is unknown, but overproduction by sebaceous glands in the baby's scalp or a type of yeast in the oil produced by these glands may contribute to this condition (Cleveland Clinic, 2020). Infants who have family members with eczema or asthma are more likely to have cradle cap. It occurs equally in males and females and does not affect one ethnicity more often than another. Cradle cap looks like a reddened area with crusty brown or yellow scales on the scalp that resemble fish scales. The scales feel flaky, or waxy and greasy, to the touch. Cradle cap is seen in the first weeks or months of life and usually disappears completely by 12 months of age. Home treatment is all that is needed to manage most cases of cradle cap. Parents should massage petroleum jelly or mineral oil into the scalp, use a soft brush to gently remove the scales, and wash the baby's hair daily with a mild baby shampoo. If this does not resolve the cradle cap, other over-the-counter baby products are available for this purpose. Once the cradle cap is resolved, the infant's hair should be washed 2 to 3 times weekly with a mild baby shampoo to prevent it from returning.

Eczema

The common skin condition that causes patches of skin to become dry, itchy, and scaly is called **eczema**. It most

commonly affects babies on their face, scalp, feet, hands, and legs. Eczema is a chronic condition that is not contagious. In the United States, baby eczema affects 15 percent to 20 percent of infants up to the age of 2 years (Cleveland Clinic, 2022b). This condition can come and go unexpectedly throughout life regardless of age. It is believed that a combination of genetics and environmental factors causes baby eczema, and these factors include:

- skin irritants and allergens, including fabrics, soaps, and certain foods
- immune system reaction
- genetics

Treating eczema can often be a frustrating experience for parents. The first step is to eliminate skin irritants and allergens. To do that, parents need to know what they are. Unfortunately, that is often a process of elimination and trial and error. If parents can identify these triggers, avoiding them will help the baby's skin to heal and will prevent or lessen future flare-ups. Next, parents may use topical corticosteroids, which are rubbed on the baby's skin like lotion. These are steroids prescribed by the infant's provider, generally for no more than twice a day for 2 weeks. Longer or more frequent use may lead to discoloration or thinning of the infant's skin. Finally, parents can apply moisturizers to the baby's skin. By keeping the skin well hydrated, symptoms will be reduced, skin will be soothed, discomfort will be alleviated, and flare-ups will be prevented. Moisturizers without fragrance should be used and can be applied after bathing and several times a day as needed for dry skin.

Common Newborn Illnesses

Differentiating between common newborn viral illnesses and bacterial infections is not always easy and often requires a trip to the pediatrician. However, viral illnesses are more common than bacterial infections in the newborn period. Both may cause similar symptoms, such as fever, irritability, and listlessness, while the treatments for each are different. Testing may be required to determine the causative factor.

Management of Common Newborn Viral Illnesses

Some common viral agents in the newborn include herpes simplex viruses, HIV, cytomegalovirus (CMV), and hepatitis B. Intrapartum infection with HIV or hepatitis B can occur as the newborn passes through an infected birth canal or by ascending infection if delivery is delayed after rupture of membranes (Tesini, 2022). It is possible for these viruses to also be transmitted transplacentally, which commonly occurs. Specifically, CMV (cytomegalovirus) is commonly transmitted in this manner.

Upper Respiratory Infections

Many common newborn viruses, such as upper respiratory infections (URIs), or "common colds," present with a runny nose, cough, low-grade fever with decreased feeding, and difficulty in sleeping. No antibiotics or antiviral medications will help the infant recover more quickly from a cold. Treatment is to keep the infant as comfortable as possible. Clear their nasal passages so that breathing and eating are easier. Advise caregivers to not overdress the infant with a fever and to medicate as directed by the infant's care provider with acetaminophen (Tylenol) or ibuprofen (Motrin). Aspirin should not be given to newborns. Aspirin has been linked to Reye syndrome, a serious and potentially fatal condition for infants and children that causes swelling of the liver and brain after a viral infection. Acetaminophen is a safer alternative for fever or pain in babies up to 6 months of age, while both acetaminophen and ibuprofen are recommended for use in infants 6 months and older.

Caregivers should monitor the baby's temperature, and if it gets worse, notify the pediatrician. Parents should be alert for signs of dehydration, particularly if the baby is not eating well because of a runny or stuffy nose. Infants can dehydrate very quickly due to decreased feedings and the immature nature of the neonatal kidneys, which are not as efficient in concentrating urine. For infants and children, the "common cold" can last from 10 to 14 days, and they occur an average of 6 to 8 times per year (Duke Health, 2019) and up to twice as often for infants in daycare.

Respiratory Syncytial Virus (RSV)

The contagious virus causing an illness more serious than a cold or upper respiratory infection is called **respiratory syncytial virus (RSV)**. Its symptoms start similarly, with fever (over 100.4° F or 38° C or higher), cough (dry or wet sounding), congestion, runny nose, sneezing, fussiness, and poor feeding. Symptoms may progress to bronchiolitis, a lower respiratory infection, which includes cold symptoms as well as rapid breathing; **nasal flaring** (when the nostrils flare out with each breath) and head bobbing with breathing; rhythmic **grunting** (occurs during breathing out, which is the infant's way of trying to keep air in the lungs so the lungs will stay open); abdominal breathing;

intercostal retraction (a sucking-in between the ribs when the infant breathes in) or an upside-down V shape under the infant's neck when breathing in; and wheezing. These are all signs that the infant is working too hard to breathe. If their skin turns blue or purple, they are not getting enough oxygen. On darker skinned infants, look for changes in color to lips, tongue, gums, and around the eyes. Parents should be educated to notify their health-care provider if infants develop symptoms of bronchiolitis; dehydration (less than 1 diaper every 8 hours); long pauses (greater than 10 seconds between breaths) or difficulty in breathing; gray or blue color to tongue, lips, or skin; or significant decrease in activity and/or alertness (AAP, 2023b). For infants and certain toddlers, the RSV immunization nirsevimab (Beyfortus) can be administered via injection and may be integrated into their routine immunization schedule. Nirsevimab has been proven to reduce the risk of RSV-related hospitalizations and health-care visits in infants by approximately 80 percent (AAP, 2023b). This injection functions uniquely compared to traditional vaccines. It supplies antibodies that initiate immediate protection for infants, offering safeguarding throughout the standard RSV season. A single nirsevimab dose is suggested for infants under 8 months of age, to be given during or just before the RSV season. Additionally, a single dose is recommended for certain children between 8 and 19 months of age who are entering their second RSV season and face an increased risk of severe illness (AAP, 2023b).

Influenza

Another viral illness, **influenza**—also commonly referred to as the flu—can cause many of the same symptoms as the common cold but is accompanied by severe body aches and higher fever. If diagnosed within the first 48 hours of illness, influenza can be shortened by antiviral medication (Duke Health, 2019). A dose of flu vaccine (or two doses given a month apart in the young child receiving the flu vaccine for the first time) given at the start of each flu season can help to prevent influenza infections. The American Academy of Pediatrics (2023a) recommends annual influenza vaccination for all children without medical contraindication starting at 6 months of age (injection or intranasal). Although all children, particularly those under the age of 5 years, are considered at a higher risk for complications from the flu virus, the highest risk is for those younger than 2 years.

COVID-19

Infants and children of all ages can get **COVID-19**, an infectious illness caused by the coronavirus SARS-CoV-2 that became a pandemic disease in 2020. In fact, babies can test positive from birth if the birth parent is positive, which is why it is important for pregnant persons to keep up to date with their immunizations and monitor their health. Newborns can get COVID-19 from the people who care for them. The nurse provides education on good handwashing techniques when caring for their infant. The infant's crib can remain in the room with the parent while in the hospital, but keeping a reasonable distance from the newborn when not providing direct care or feeding is important. These precautions help to keep the risks of the infant getting COVID-19 low. If the birth parent is very sick and symptomatic, it would then be best to temporarily separate parent and baby by moving the baby out of the parent's room (Mayo Clinic, 2023b).

Infants who have tested positive for COVID-19 but remain asymptomatic may be allowed to return home from the hospital, depending on the circumstances. To ensure protection, it is recommended that the caregivers of the baby wear face masks and maintain rigorous hand hygiene. Continuous monitoring and follow-up with the infant's health-care provider, conducted through phone consultations, virtual check-ins, or in-person visits, are necessary for the next 14 days. Infants who test negative for COVID-19 may also be discharged from the hospital (Mayo Clinic, 2023b).

In the United States, vaccinations for COVID-19 are not available for infants under the age of 6 months. The Pfizer-BioNTech COVID-19 vaccine can be given at age 6 months if requested by the parents. It is given to children between 6 months and 4 years and consists of three doses to bring the child "up to date" with the vaccine. After the first dose, the second dose is given 3 to 5 weeks later, and the third dose is given at least 8 weeks after the second (Mayo Clinic, 2023b). The alternative is the Moderna COVID-19 vaccine, which can be given between ages 6 months and 5 years. This vaccine consists of two doses, with the second dose given 8 weeks after the first (Mayo Clinic, 2023b).

Management of Common Newborn Bacterial Infections

Bacterial infections are any illness or condition caused by bacterial growth or toxins. Harmful bacteria can attack the skin, gastrointestinal (GI) system, lungs, heart, brain, blood, or anywhere in the body. Most bacteria are not harmful, and many are helpful. Many of the vaccines that infants and children receive are meant to prevent serious bacterial infections.

Commonly seen bacterial agents affecting newborns include group B streptococci, enteric gram-negative organisms (primarily *Escherichia coli* or *E. coli*), *Listeria monocytogenes*, gonococci, and chlamydia (Tesini, 2022).

With bacterial infections:

- Symptoms tend to persist longer than the 10 to 14 days that a virus usually lasts.
- Fever is usually higher than expected from a virus.
- Rather than improving, the fever and symptoms get worse a few days into the illness.

Antibiotics can treat most bacterial infections, but only a few viral infections have medications that can treat them. The primary treatment for neonatal bacterial infections is prompt empiric antimicrobial therapy with drugs such as ampicillin and gentamicin or ampicillin and cefotaxime (Tesini, 2022). Once culture results are returned, the drug, dose, and frequency will be adjusted to best fight the identified organism.

Bacteria in the blood, or **sepsis**, and a bacterial infection in the lining of the brain and spinal cord, or **bacterial meningitis**, are two serious and concerning kinds of bacterial infections. Infants have few subjective symptoms. Diagnostic tests are required to ascertain that bacterial infections are part of their current or presenting illness.



LINK TO LEARNING

Read [the current guidelines from the American College of Obstetricians and Gynecologists \(ACOG\) and AAP \(https://openstax.org/r/77groupBstrep\)](https://openstax.org/r/77groupBstrep) regarding prophylactic treatment of group B streptococcus (GBS) sepsis, a dangerous pathophysiology resulting from a bacterial infection.

Helping Parents Recognize and Respond to Signs of Illness in a Newborn

Having a newborn is both exciting and stressful for new parents for many reasons. One of these is concern for the baby's health. How does a new parent know if their baby is getting sick? They may not know what their baby's normal behavior is, and that makes it difficult to determine if their newborn's behavior is not normal. Changes in newborn behavior can be subtle, so they are not always easy for new parents to spot. The best advice the nurse can give a new parent is to have them note any behavior that seems abnormal to them. Use the following list to teach new parents about signs of illness in newborns. New parents should watch for:

- any suspicion of illness, such as crying more than usual, irritability, coughing, diarrhea, or vomiting (if vomit is green, which means bile, notify the health-care provider immediately)
- changes in feeding patterns, such as having to wake the baby for feedings or if the baby no longer finishes their feedings, which could indicate illness
- a fever of greater than 100.4° F (38° C), which warrants a call to the health-care provider
- low body temperature, less than 96.8° F (36° C), which warrants a call to the health-care provider
- changes in the baby's cry—if the cry becomes weak, sounds strange, or becomes frantic or inconsolable
- weak suckling or not being able to suck for very long
- sweating while eating
- sleeping more than usual
- decreased muscle tone, floppy limbs, floppy neck when the infant previously could hold head up
- moaning or grunting noises when breathing, with or without flaring of nostrils
- decreased urination (fewer wet diapers) and dry mouth (dehydration)
- any color change, such as pale, bluish, or gray arms and legs

Any of these signs and symptoms of infant illness can occur independently or in combination. Babies do not often get sick, but when they do, they can deteriorate quickly (Kliegman et al., 2020).

When Contacting Health-Care Providers: Be Prepared

When contacting health-care providers or taking a baby to the emergency department (ED) for any problem or emergency, parents should be prepared to assist medical personnel in understanding what is happening with their baby and why they are concerned. [Table 24.6](#) provides a summary of the helpful information parents will be asked to give health-care providers who are caring for their child. Being prepared will save both parents and their health-care provider time during a phone call, office visit, or trip to the ED, when time is of the essence. Parents need to be

as objective as possible in relaying the facts of the situation. When parents can accurately and calmly describe in detail what they observed and what took place as well as any pertinent history, this allows the health-care provider to make quick and necessary assessments and decisions to provide the best care for their baby. Photos or videos of concerning symptoms can also be valuable.

Category	Information
The baby's symptoms	What prompted parents to contact their health-care provider or seek medical advice?
The baby's medical history	Be prepared to discuss the history of the current symptoms or illness. When did it start? How has it progressed? Is the baby up to date on their immunizations?
Changes in the baby's feeding or bowel movements	Is the baby feeding on a normal schedule, retaining feedings, spitting up, vomiting? Do parents need to wake the baby for feedings, is the baby refusing to eat, not interested in feeding, not taking the full feeding? Does the baby show signs of watery stools, diarrhea, change in stool volume, consistency, amount, effort? Are there any known allergies or sensitivities to food, formula? Are there any known chronic conditions?
Changes in the baby's body temperature	What is the baby's temperature, and what time was it last taken? Make sure to mention how it was taken (e.g., rectally, axillary, temporally, forehead).
Any home remedies or medicines	Has the infant been given any home remedies, over-the-counter, or prescription medicines? If so, what strength, what dose, and when?
Possible exposures	Is anyone in the household or daycare ill? Has the infant been exposed to anyone who has been ill? Has the baby or any family member recently received any immunizations (e.g., COVID-19 or flu)?

TABLE 24.6 Information Parents Should Know When They Suspect Their Baby Is Ill

Parents should be prepared to record any specific care instructions from their care provider, either on their phone or with paper and pen. They should also carry with them the phone number and location of their family pharmacy in case a prescription is ordered.

Parental education regarding common conditions that may occur in newborns is important to fostering parental bonding and feelings of confidence and competence as parents. The American Academy of Pediatrics (2021a) has identified a number of conditions common during the first couple of weeks of life as being of particular importance to new parents of newborns.

Abdominal Distention

Most babies have round bellies that stick out right after a feeding, but the abdomen (stomach) should feel soft between feedings. If it feels swollen or hard, there could be a problem with gas or constipation. If the baby has not had a bowel movement in more than a day or two, if the stool is like currant jelly or has blood in it, or if they are vomiting, a swollen stomach could be an indication of an intestinal problem. Parents should notify the baby's health-care provider immediately.

Birth Injuries

Babies can be injured during birth, particularly if they are very large. While they usually recover quickly from these injuries, some symptoms may persist. Occasionally, a broken collar bone may occur. During the initial assessment, the nurse will detect a **concavity** (the curving in of a surface) and/or **crepitus** (a crackling or crunching sound made by the damaged bone) when palpating the newborn's clavicle. After a few weeks, a small lump may form at the

fracture site, a sign that new bone is forming to mend the injury.

Muscle weakness, or brachial plexus injury, is another common injury. This occurs during labor when pressure, compression, or stretching damages the nerves that send signals from the spinal cord to the shoulder, arm, and hand. Muscles are usually weakened on one side of the face or one shoulder or arm and generally return to normal after several weeks. Nurses and health-care providers can show parents how to nurse and hold the baby to promote healing of the muscles and nerves. [Chapter 25 Care of the Newborn at Risk](#) provides more information on birth injuries and their management.

“Blue Baby”

Newborns may have acrocyanosis, mildly blue or purple hands and feet, when they are cold, which is normal (Kutlubay et al., 2017). This condition is not related to the infant’s temperature and is very common in newborns in their first few hours of life as they adjust to extrauterine circulation and life. Acrocyanosis is caused by the constriction of the small blood vessels that deliver oxygen-rich blood to the extremities. An infant’s face, tongue, or lips may occasionally turn a little blue when the newborn is crying hard, but once they are calm, their color should quickly return to their typical shade. However, persistent blue coloring, or grey coloring in darker skinned infants, blue coloring circling the mouth, or blue coloring plus breathing or feeding difficulties is an emergency. It could mean that the heart or lungs are not working correctly, and the baby should be taken to the emergency department or 911 should be called immediately!.

Unusual Bowel Movements

Unusual bowel movements or stooling patterns can include failure to pass meconium during the first 48 hours after birth. If the newborn has not passed the meconium in that time, evaluation of the lower bowel is indicated to detect potential problems.

Blood in newborn stool is not expected. Newborns may have a small amount of blood in their stool in the first few days of life. If this occurs, it usually means the infant has a **fissure**, or tiny crack, opening, or split, in the skin or tissues of the body, such as the anus from stooling (AAP, 2021a). Although this is generally harmless, it is suggested that parents notify their health-care provider about any signs of blood to confirm the reason because other causes require further investigation and treatment.

Coughing

Newborns may cough, gag, or sputter as they learn to feed. If breast-feeding, this may happen if the nursing parent’s milk lets down very fast or when switching from the breast to a bottle. When solely bottle-feeding, the size and shape of the nipple could be the issue. If the baby coughs or gags regularly when trying to feed and adjustments have not helped, parents should consult their care provider because these symptoms could indicate an underlying problem in the lungs or digestive tract.

Excessive Crying

All newborns cry and sometimes for no reason at all. If a newborn is crying, the parent or caregiver should “go to the basics” by making sure the baby is fed, burped, and have a clean diaper. After that, swaddle them and hold them, rock them, talk softly, sing, sway, or do whatever works to calm them down. The nurse should teach parents that they cannot “spoil” a newborn by picking them up and holding them, so they should not hesitate to do that when their baby is crying. Soon enough, parents will know their baby’s crying patterns and be better able to tell why they are crying. If the baby’s crying sounds different, such as shrieking, or it goes on for an unusually long time, parents should call their health-care provider.

Forceps Marks

If forceps were used to assist in the delivery, they can often leave bruised, red marks or even superficial scrapes or scratches on the newborn’s face and head. These marks may not appear immediately after birth and may first appear as redness or puffiness of the face ([Figure 24.13](#)). It may take a few hours for bruising and forceps marks to become visible. These marks will generally disappear within a few days of birth. Sometimes, a firm, flat lump develops in one of these areas due to damage of the tissue under the skin and bleeding in that area. Parents could, and should, bring this to the attention of their newborn’s care provider, who will likely tell them that this will go away within 2 months (AAP, 2021a).



FIGURE 24.13 Marks from Forceps Delivery If forceps were used to assist in the delivery, they can often leave bruised, red marks, or even superficial scrapes or scratches on the newborn's face and head. (credit: "Forceps Marks" by Joanne Lee/Flickr, CC BY 4.0)

Lethargy and Sleepiness

Newborns sleep an average of 16 to 17 hours in a 24-hour period. Some may sleep even more. They will most likely set their own sleep-wake patterns, waking every 2 to 4 hours for feedings throughout the day and night. Parents need to expect their newborns to spend most of their time asleep. If they wake every few hours, eat well, seem content, and are alert at least part of the day, it is perfectly normal for babies to sleep the rest of the time. If the baby is rarely alert, does not wake on their own for feedings, or seems too tired or uninterested to eat, those are indicators that parents should contact their health-care provider. This lethargy—particularly if it is sudden or a change in their usual behavior pattern—may be a symptom of a serious illness.

Respiratory Distress

Within a few hours after birth, the typical newborn has settled into a relaxed, comfortable, and stable breathing pattern. After this, if the newborn has trouble breathing, it is most likely because their nasal passages are blocked. Newborns are nasal obligate breathers (Hamming & Walner, 2012), meaning they breathe through their noses. The only time newborns breathe through their mouths is when they are crying. Therefore, clear nares are necessary for effortless breathing. When at home, troubled breathing is normally easy to remedy by using saline. It may become necessary to suction the infant's mouth and nose to provide an open airway and to remove secretions or regurgitated feeding from these areas. The mouth must *always* be suctioned before the nose. When the nose is suctioned, the infant will often gasp, choke, or aspirate any contents in the mouth. Suctioning the mouth first reduces the risk of aspiration.



CLINICAL SAFETY AND PROCEDURES (QSEN)

QSEN Competency: Safety: Nasal and Oral Suctioning

Definition: Minimize the risk of harm to patients and providers through both system effectiveness and individual performance.

Knowledge: Examine human factors and other basic safety design principles as well as commonly used unsafe practices.

Skill: Demonstrate effective use of technology and standardized practices that support safety and quality.

Procedure for suctioning of the infant's mouth and nose using a bulb syringe:

Thoroughly wash and dry hands prior to suctioning the infant's mouth and nose.

1. The infant's head is positioned to the side, as the infant is prone. This position will allow fluid to pool in the lower cheek.
2. The bulb syringe is compressed *prior to* inserting it into the lower cheek. (Do not compress while it is in the mouth because any secretions that are in the bulb will be expelled back into the mouth and may cause choking or respiratory distress).
3. Gently position the tip of the bulb syringe into the side of the infant's mouth between the cheek and the gums. Do not insert it into the back of the throat, which could stimulate the gag reflex, causing regurgitation, or produce a vagal response that could result in bradycardia or apnea.

4. Release the bulb while it is in the infant's mouth, between the lower gums and cheek. This will cause the bulb to suction or draw secretions into the bulb. Remove the bulb syringe and empty it by compressing it several times, outside the mouth, before using it again. Emptying it prepares it for use again.
5. Repeat the procedure to suction the mouth again. Suction the nose following the mouth, only if necessary. Infants may gasp when the nose is suctioned and might aspirate secretions in the mouth if it is not cleared first. Therefore, always suction the mouth before the nose.
6. If suctioning the nose is necessary, do it gently. Suctioning of the nose can cause edema and trauma, which will obstruct the delicate nasal passages and cause unnecessary respiratory difficulties. It is best to suction the baby's nose before a feeding or bedtime. Do not suction after a feeding because it may cause the baby to vomit.
7. When suction is completed, clean the bulb syringe with hot soapy water, squeezing water from the bulb. Air dry. This will prepare it for future use.

Procedure for suctioning of the infant's nose using a NoseFrida (Frida.com, 2003):

Thoroughly wash and dry hands prior to suctioning the infant's nose.

1. The disposable hygiene filter needs to be in place to prevent mucus or bacteria transfer. Be sure that the assembly is complete and secure.
2. Place the large tube against the child's nostril, not inside the nostril, creating a seal.
3. Use the red mouthpiece to suck out the mucus from the nostril. Wipe the exterior if needed and repeat by creating a seal against the child's other nostril.
4. After the mucus-sucking session is completed, dispose of the filter.
5. Wash the large tube with warm soap and water. Clean the tube with a few drops of rubbing alcohol.
6. Firmly snap dry pieces together, inserting a new filter in place, preparing for the next use.

By following this procedure, the item is cleaned, assembled, and ready for use.

Attitude: Value the contributions of standardization/reliability to safety.

24.3 Newborn Discharge Planning and Parent Education

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Summarize individualized parent teaching that will enhance parents' confidence and abilities to care for a newborn during the first month at home
- Verbalize safety needs of the newborn
- Identify activities that parents should include in the activities of daily living for the newborn

Many new parents enjoy their time in the hospital after giving birth. It is a time to relax, get to know their newborn, and begin their lives together as a family while having the comfort and convenience of nursing staff to assist with care issues and needed education. Other parents feel just the opposite. These new parents are anxious to be discharged with their newborns to begin their lives as a family in the comfort of their home. Education in anticipation of discharge of the normal newborn is the topic of this section.

Ideally, discharge teaching, also referred to as parent education, should begin after delivery. If the nurse waits until discharge to begin the parent education, the amount of information can be overwhelming for the parents. Much of the information may be forgotten or lost in the flurry of activity that surrounds an infant's homecoming. Because hospital stays are relatively short after childbirth, providing necessary parental education can be challenging to the nurse, who must be organized and persistent in education efforts. Nurses use various educational methods, such as videos, classes, and educational handouts available in various languages, to supplement their discharge education sessions. Additionally, some hospitals provide an educational channel on TV featuring parenting videos that demonstrate infant bathing, feeding, use of car seats, and other necessary skills. Hospitals may also provide websites with additional information and support for patients. After discharge, referrals for visitation by home care nurses may be an option for follow-up care, as well as support groups, when necessary.

Parent Education about Newborn Behaviors

Often, new parents do not know what is considered “normal” or expected behavior for a newborn. Even parents who have other children at home may not know or remember what to expect. Babies develop at different rates, but they all engage in many of the same behaviors and behavioral patterns. Parents appreciate anticipatory guidance from nurses regarding continuing infant care. Being given the tools to recognize and understand behaviors and patterns demonstrated by their newborns provides parents with a sense of accomplishment and control in their newly acquired roles. It also allows them to move forward in the bonding process with less worry and more confidence.

Breathing Patterns of the Newborn

Often a concern for new parents is their newborn’s breathing pattern: the rate and rhythm of breathing, which in the newborn is “regularly irregular.” Because newborns often have irregular breathing patterns, their breaths should be counted for a full minute, preferably when they are quiet and at rest. They are noisy breathers who have been known to squeak, gurgle, grunt, and whistle while breathing “normally.” Newborns are obligate nose breathers, and synchronous abdominal movement occurs with each breath. Chest movement is symmetric and not labored. But newborns can experience occasional periods of irregular respirations in which they may stop breathing for 5 to 10 seconds and then start breathing again on their own without any intervention. This is considered an expected breathing pattern for a newborn (Mohr et al., 2015). Parents should be informed about these periods of irregular breathing so that they do not worry unnecessarily. If their baby stops breathing for more than 10 seconds or begins to turn blue, they should call their provider or take their baby to the nearest emergency department. When an infant stops breathing for 20 seconds or more and develops cyanosis and bradycardia, the infant is said to have apnea.

Sleep Patterns of the Newborn

The nurse educates the new parent on expected newborn sleeping patterns prior to discharge. Many parents do not know how to recognize the signs of sleep readiness in their newborns, how long a newborn may sleep in a day, or what sleep position is best for their baby. The nurse can answer these questions and more.

Although every baby is different, most will show one or more of the following signs when they are ready for sleep:

- rubbing eyes
- yawning
- looking away, ignoring behavior
- fussing, irritability, possibly crying (depending on how long the other signs are ignored)

These are also signs of overstimulation. These signs will progress if they are ignored. That is, the initial behaviors will become fussing, then fussing will progress to irritability, irritability will become crying, and crying will worsen to inconsolable crying (Kim, 2011).

Not every baby knows how to put themselves to sleep. Many parents want to rock their baby or breast-feed their baby to sleep. Most experts recommend establishing a bedtime routine, and they suggest not putting a baby to sleep in a parent’s arms or while feeding. A bedtime routine may include a bath, soft music, turning the lights down, reading a bedtime story, or rocking in a chair. If the baby were to go sleep only while being held, this would become a habit. The baby could quickly learn to expect this behavior and not go to sleep on their own. Most experts recommend placing the baby into their sleep space while still awake. This will help the baby learn to go to sleep on their own or will help condition the newborn to establish sleep time behaviors.

The average newborn sleeps approximately 16 to 17 hours per day, but this can vary greatly. Some may sleep close to 20 hours a day. Generally, they sleep about 8 to 9 hours in the daytime and about 8 hours at night. Most babies do not begin sleeping through the night (6 to 8 hours) without waking until they are at least 3 months of age or weigh 12 to 13 pounds (Raising Children Network, 2023; Stanford Medicine, 2023c). Once again, this will vary greatly depending on the infant. Some babies will not sleep through the night until they are closer to a year old. Newborns and young infants have small stomachs and need to be fed often. The infant’s age as well as what they are being fed will determine how often they wake to be fed. For instance, breast-fed infants need to be fed more frequently than formula-fed infants because breast milk is digested more easily and therefore more quickly than formula. In most cases, the infant will awaken and be ready to feed every 3 hours or less with an average of 8 to 12 feedings per day.

Babies will generally set their own sleep patterns. Parents should be educated that if their baby is sleeping consistently and suddenly begins waking, it might be an indication of a growth spurt, a developmental change, or

overstimulation. If it continues and their infant shows other signs such as pulling or rubbing their ear or unusual irritability, they should consider notifying their health-care provider for a possible ear infection or other problem.

Infants do not sleep as deeply as adults, spending approximately 50 percent of their time in REM (rapid eye movement) sleep (Raising Children Network, 2023). In REM sleep, babies often make noises loud enough to wake parents in the same room. They may also move about in their crib as if they are about to awaken. Going to them at this time will surely awaken them because they are in a very light sleep. If left alone, infants may return to a quiet sleep. It is not uncommon for babies to experience these cycles as they pass from deep sleep to light sleep in the first few months of life.

Growth and Development Patterns of the Newborn

During the first year, an infant goes through a time of rapid change. Their birth weight usually doubles by about 4 to 6 months and triples by the end of their first year (Boston Children's Hospital, 2023). During this period, they grow approximately 1 foot in height. At about 6 months, teeth begin to erupt; and by the end of their first year, they have between 6 and 8 deciduous teeth. Their physical growth and development are largely dependent on the birthing parent's prenatal nutrition and the quality and type of feeding in infancy. The changes in body proportions mirror changes in developing internal organs. The nervous system demonstrates increased control over body movements, which allow infants to sit, stand, and walk, usually taking their first steps around 1 year old. Generally, walking is mastered sometime between 12 and 18 months, and many infants walk much earlier. Sensory function also improves, allowing infants to discriminate visual images, sounds, and tastes. Kidney and liver function helps older infants excrete drugs or other toxic substances much more efficiently than newborns do.

Cognitively, the brain continues to increase in complexity during this time. Most of the growth involves maturation of cells. For example, a newborn's eyes may widen in response to a sound, whereas a 1-year-old will turn their head to the sound and recognize its significance. A 2-month-old cries and coos, and a 1-year-old says a few words and understands many more. A 6-week-old infant grasps a rattle for the first time while a 1-year-old infant reaches for toys and self-feeds. Infants receive input from the environment from birth onwards, and as they age, their internal cognitive abilities continue to mature, as does the ability of their growing brain to interpret external stimuli (State of Michigan, 2023).

Parent Education about Safety of the Newborn

Supporting parents, particularly new parents, as they prepare to go home involves education and forethought regarding the future developmental needs of the newborn. It is normal for parents to feel a mix of excitement and fear when caring for a newborn at home for the first time, or even the tenth time. This section focuses on parent education surrounding the safety of the newborn.

Safe Sleep Practices

Parental education is essential regarding safe sleep practices. Approximately 3,500 preventable infant deaths occur each year in the United States due to unsafe sleeping arrangements (CDC, 2024). The unexplained death, usually during sleep, of a seemingly healthy baby that is less than a year old is called **sudden infant death syndrome (SIDS)** (Mayo Clinic, 2022a). The cause of SIDS is unknown, but it may be associated with defects in the infant's brain that control breathing and arousal from sleep (Mayo Clinic, 2022a).

Although SIDS can strike any infant, research has identified the following potential risk factors (AAP, 2022a; Mayo Clinic, 2022a; Moon et al., 2016):

- *Sex*—Boys are slightly more likely to die of SIDS.
- *Age*—Infants are at the highest risk for SIDS between the 2nd and 4th months of life.
- *Race*—Non-White infants are at a higher risk for developing SIDS.
- *Family history*—Infants who have had a sibling or a cousin die of SIDS are at a higher risk of SIDS.
- *Secondhand smoke*—Infants who live with smokers or are exposed to secondhand smoke are at a higher risk for SIDS.
- *Prematurity*—Both prematurity and low birth weight increase an infant's chances of SIDS.

To reduce the risk of SIDS, it is important not to overheat the infant. Advise parents to use an infant sleep sack or other sleep clothing to keep their baby warm rather than additional blankets (see [Figure 23.20](#)). When possible, breast-feeding is recommended for at least 6 months because it lowers the risk of SIDS (AAP, 2022a; Mayo Clinic,

2022a). Offering the baby a pacifier without a strap or string at naptime and bedtime may also reduce the risk of SIDS (AAP, 2022a; Mayo Clinic, 2022a). Parents should also make sure that the infant continues with routine immunizations. Some research reports that routine immunizations reduce the risk of SIDS. Parents should not use products for sleep that are not specifically marketed for infant sleep.

According to the CDC (2024) and the American Academy of Pediatrics (2022a), parents should follow these recommended guidelines to keep infants safe while sleeping:

1. Place the baby on their back for *all* sleep times, naps, and at night. Supine is the safest position to place a newborn to sleep.
2. *Always* use a firm sleep surface, such as a safety-approved mattress and crib. The sleep surface should be flat and non-inclined.
3. Eliminate *all* soft bedding, blankets, pillows, crib bumper pads, soft toys, and stuffed animals from the baby's sleep space.
4. Have the baby share the parent's room, but *not* their bed.

Safe Transportation

The American Academy of Pediatrics most recently updated its car-seat guidelines in 2018 (Durbin & Hoffman, 2018). All 50 states require the restraint of infants and young children in car seats when they are riding in automobiles (Durbin & Hoffman, 2018). The nurse should teach parents that the safest place for their baby in the car is in a rear-facing infant safety seat located in the middle of the back seat. An infant that is held by an adult in a moving vehicle, even if that adult is wearing a safety restraint, is *not* safe.



LINK TO LEARNING

Review this information on [the proper use of car seats, car seat ratings, and recalls of car seats](https://openstax.org/r/77carseats) (<https://openstax.org/r/77carseats>) from the National Transportation Safety Board.

Infant and child safety seats are essential to reduce injury and death to infants and children when accidents occur. Infants and toddlers are at greater risk for head and spinal cord injuries if they are in a forward-facing car seat instead of a rear-facing car seat, which provides better head and neck support (Durbin & Hoffman, 2018). Infants should remain in the rear-facing car seats for travel until they reach the highest weight or height allowed by the seat's manufacturer. Most infant-specific car seats range from birth to 1 year or a weight less than 20 lb (9 kg) (Durbin & Hoffman, 2018). The car seat must be latched at 2 points to the car at the base of the car seat. Once installed, car seats should not move more than 1 inch side to side or front to back by regulation. Most local police, hospitals, and fire departments can advise parents where to have car seats fitted locally.



LINK TO LEARNING

Safe Kids Worldwide connects users to [Car Seat Fitting Stations](https://openstax.org/r/77carseatfitting) (<https://openstax.org/r/77carseatfitting>) all over the world. For the United States, the user can start at the state level to find a site.

An infant discharged from the hospital is placed into a rear-facing infant car seat in the back of the automobile by a parent. Many hospitals do not permit staff to place the infant in the car seat due to potential liability. Some hospitals have technicians who are specially trained to determine if car seats are installed properly and if they have been correctly fitted to the newborn. It is generally up to the parent to see that the car seat has been properly installed prior to hospital discharge. New car seats come with detailed instructions for installation in the packaging, but most local police and fire stations offer car seat installation services free of charge with appointments.

Infant CPR Caregiver Education

The American Heart Association has long claimed that the sooner cardiopulmonary resuscitation (CPR) is begun after a cardiac event is witnessed, the better the chances of reviving the person will be. Each second that the heart is not pumping oxygen-rich blood to the brain and organs, brain cells are lost. Infant CPR training is often offered to parents after birth and prior to discharge from the hospital in the form of CPR videos, written materials, or physical

classes or instruction. Other hospitals offer Infant CPR Anytime Kits to parents prior to their discharge. These kits give parents the opportunity to learn infant CPR in the hospital setting with an infant manikin that they can take home with them to practice on. The whole self-instruction course takes about 20 minutes to complete, and parents have nurses to help if they have any questions (American Heart Association, 2023). The fact that caregivers can practice at home helps them become more confident in the skills and more likely to act should an emergency occur, and CPR be needed.



LINK TO LEARNING

The [Infant CPR kit \(https://openstax.org/r/77InfantCPRkit\)](https://openstax.org/r/77InfantCPRkit) contains everything parents need to learn lifesaving skills at home. The self-learning kit is perfect for anyone who wants to learn infant CPR and choking skills but does not need a course completion card to meet a job or school requirement.

Preventing Newborn Injury

Hundreds of infants younger than 1 year old die every year in the United States because of injuries—most of which could have been prevented (AAP, 2017). Injuries often occur because new parents are not aware of what their newborns can do, such as rolling off a bed or grabbing a hot cup of coffee. Therefore, parental education about newborn/infant safety issues is an important responsibility of the nurse during the postpartum period and throughout the first year of life. The most common accidents are falls, burns, choking, and suffocation.

Babies wiggle, move, and push against objects from the moment they are born. In fact, they have been practicing these movements in utero for months. Even these very first movements can result in accidental falls. Nurses should remind parents to be especially cautious when the infant is wet after bathing or when in the arms of a sibling. Newborns should never be held by a young unsupervised child due to babies' sudden, unpredictable, and jerky movements. Caregivers should not leave the baby alone on changing tables, beds, sofas, or chairs. As the infant grows and can roll over, they may fall off unless protected. When the baby is not being held, they should be placed in a safe spot, such as a crib, play yard, or infant seat. Infants can crawl as early as 6 months (AAP, 2017). Parents or caregivers should be advised to use gates on staircases and to close doors to rooms where infants may get injured. Parents should install window guards on all windows above the first floor. Baby walkers should not be used because they can tip over, and the baby could be injured. In addition, an infant in a baby walker can fall down the stairs, causing serious head injuries. If the infant falls and does not act normally after the fall, parents should call the health-care provider or take the child to the emergency department.



LINK TO LEARNING

The American Academy of Pediatrics provides information about [newborn falls \(https://openstax.org/r/77newbornfalls\)](https://openstax.org/r/77newbornfalls) and how to prevent them.

Nurses should educate parents never to carry the baby and hot liquids, such as coffee, tea, or soup, at the same time. The baby could easily be burned. Also, parents should check the baby's bath water prior to putting the baby in it. If the infant is burned, immediately put the burned area in cold water, keeping it in cold water for several minutes to cool it off. Then, parents should cover the burn loosely with a dry bandage or clean cloth and call their doctor. If the burned area is blistering, parents should take the baby to the emergency department immediately. House smoke alarms should be checked every month for battery life, and batteries should be changed every year unless long-life batteries are installed.

Babies explore their world by putting everything into their mouths whether it is edible or not. Nurses should remind parents never to leave small objects in the baby's reach, even for a short time. Parents of a newborn should be educated about the risks of suffocation and instructed to not leave loose blankets in the baby's sleep area. They also need to be informed to keep all plastic wrappers and plastic bags away from their infants because these can form a tight seal covering the mouth and nose and can suffocate the infant. Many hospitals and pediatric offices will provide parents with instruction on how to care for a choking infant.



LINK TO LEARNING

To learn what to do [when an infant is choking \(https://openstax.org/r/77infantchoking\)](https://openstax.org/r/77infantchoking) check out these safety actions recommended by the American Academy of Pediatrics.

About Activities of Daily Living with a Newborn

Relationships between parents and their child begin before birth and continue throughout the lifespan. Attachment is a strong emotional bond that can begin in the newborn period when the baby is first introduced to their birthing parent after birth. Immediately after birth, newborns are typically in a quiet alert state when they are receptive and follow the parent's face carefully with their eyes. This first interaction fosters bonding between the birthing parent and the baby. For many families, this experience also involves bonding with the other parent and the siblings. In the first months of life, the newborn quickly learns about food, safety, and security. When those needs are met, the newborn learns to trust the people who provide needed care and to explore their environment more actively. During periods when the baby is more alert, they will focus on the faces of their caretakers and learn the positive aspects of interpersonal relationships. Before long, the newborn will be trading smiles, making faces, sticking out their tongue, laughing, and imitating behaviors.

Educating Parents on How to Soothe a Newborn

Newborns may cry or fuss for several hours a day. It is their way of letting others know that they need or want something or that something is wrong. Crying peaks at approximately 6 weeks of age at about 3 hours per day. By 3 months, crying decreases to about 1 hour per day (Feigelman, 2016). Infants have no other way of communicating that their needs are not being met. Parents find infant crying most frustrating when they do not know why the baby is crying. When the cause of newborn crying is not obvious, parents often see it as a sign of their own inadequacies. Research has shown that when an infant's needs are met consistently in a calm, warm, and prompt manner, trust begins to develop between the newborn and their caregiver. Additionally, infants who are held consistently when they are in distress have been found to cry less at 1 year of age and be less aggressive at 2 years of age (Sanford Health, 2022).

Often, parents can determine the cause of the infant's distress by the nature of the crying. Newborns will cry when they:

- are hungry
- are tired
- are too cold or too hot
- need their diaper changed
- have gas
- are overstimulated
- are bored
- are sick

Sometimes, though, it is not possible to determine why a newborn is crying, and it may not be possible to comfort the baby. This need not be the fault of the parent or caregiver. If the newborn cries more than usual, cries at different times of the day than usual, or if the crying sounds different or more frantic than usual, it is a good idea to contact the health-care provider. These might be signs that the newborn is sick.

Treating Known Causes of Crying

If the infant is hungry and it has been more than 30 minutes since the last feeding, suggest that parents try feeding the baby. It is possible that an air bubble may have caused a feeling of fullness before the baby had completed the last feeding. The infant may also be going through a growth spurt and need more frequent feedings to provide the nutrients to support rapid growth. Remind parents of the signs of satiety so that they can avoid overfeeding, which will cause abdominal discomfort, fussiness, and potential spitting up.

Teach parents that when the infant is pulling up their legs or crying with bursts or intermittent screams of pain and kicking, it is likely that the baby is "gassy" and has gas or air bubbles. Fussy infants may need more frequent burping during and after feedings compared to other infants, regardless of whether they are breast-fed or bottle-fed. It is

also helpful to burp during crying spells because the infant may swallow air then. Changing the baby's position to lying prone across a parent's lap (or over a warmed blanket) may help expel gas. Placing the infant in the supine position and gently flexing the knees on the infant's abdomen may also help a gassy baby.

Most newborns do not seem to mind wet or soiled diapers but may fuss or cry if they get a chill or if their skin becomes irritated. It is best to set up a schedule for diaper changes, perhaps before every feeding, to help wake the infant fully. Teach parents that consistent diaper changes will help prevent skin irritations and rashes.

The nurse should show parents how to check the infant's clothing for anything that could cause discomfort (buttons, zippers, tags, stiff collars or seams, tight elastics, etc.). Remind parents not to overheat the newborn. They should place the palm of their hand on the baby's abdomen to feel the baby's body. It should feel comfortably warm, not hot or cold, even if the infant's feet and hands are slightly cool. The newborn should be dressed as warmly as the parent, with one additional layer, such as a receiving blanket or a sweater (American Academy of Pediatrics et al., 2019). Babies who are overdressed do not perspire but will cry instead to show their discomfort.

If the newborn is overstimulated—from too much noise, too many visitors, too many people “playing” with them, or too many lights—this can also be a cause for crying. Holding or swaddling the infant in a quiet, preferably darkened, environment and gently rocking, walking, or swaying the infant may prove helpful.

Soothing Techniques for Crying Newborns

The best advice to soothe a crying baby is to remain patient and calm. Most babies will calm and be comforted by gentle rocking, talking softly, or swaddling in a blanket (see [Figure 24.10](#)). Once the baby is calm, the caregiver can go about their investigation to find the cause of the initial crying.

When an infant is difficult to soothe, it can lead to parental frustration. When possible, the parent or caregiver should seek relief and have someone else attempt to soothe the baby. Friends and family members can assist as well. This will help to keep parents fresh, ease their frustration, and give them a chance to rest. Often, something as simple as a change in position when transferring the baby from one person to the next is enough to end a bout of crying. But there are times when infants cry inconsolably for long stretches of time, starting when they are around 2 weeks old and continuing until 3 to 4 months of age. Inconsolable crying can last up to 5 hours a day and is a normal part of development, termed the period of PURPLE crying (National Childbirth Trust [NCT], 2022). Each letter of PURPLE represents a characteristic of the crying: “P—Peak of crying, U—Unexpected, R—Resists soothing, P—Pain-like face, L—Long lasting, E—Evening” (NCT, 2022). Since 2007, the National Center on Shaken Baby Syndrome has run the Period of PURPLE Crying Program. It is an evidence-based program for the prevention of shaken baby syndrome/abusive head trauma (SBS/AHT). This program has a dual purpose:

- offering support to parents and caregivers in understanding and coping with a baby's early heightened crying
- working to decrease the frequency of SBS/AHT incidents. (National Center on Shaken Baby Syndrome, n.d.)

Unfortunately, a parent's or caregiver's feelings of helplessness, frustration, and anger are often closely related to their inability to cope with an infant's inconsolable crying. Remind parents that if their efforts at soothing their baby are not working, it is all right to feel frustrated, and it is all right to ask for help. While it is hard to bear, infant crying is unavoidable. If parents are feeling overwhelmed and helpless, let them know that these are normal feelings. Have them place the baby down in a safe place and reach out for help before their frustrations cloud their judgment or impede their mental health. Instruct them to call a friend or family member to come and help them. If no one is available and the baby is in a safe place, they should step into another room and calm themselves before returning to the baby and trying again.

Instruct the parent or caregiver to contact the baby's health-care provider *immediately* if the infant displays any of the following symptoms (*Colicky crying*, n.d.):

- if nonstop crying lasts more than 2 hours
- if the infant cries out when you touch, move, or hold them
- if the infant looks or acts abnormal
- if the infant has a temperature $>100.4^{\circ}\text{F}$ (38°C) or higher
- if the infant has bulging or swollen fontanelles
- if the infant has a swollen groin
- if the infant is vomiting

- if the infant refuses to drink or consumes very little for more than 8 hours

Educating Parents on Skin Care for the Newborn

Bathing their newborn is an experience that many new parents find terrifying at first and enjoyable after they are confident in their skills. The bath is a time for bonding and watching their newborn relax in the warm, soothing water. At least that is how it is supposed to be. But not all newborns enjoy the bath right away. The air is cold, and the water is a shock. The washcloth is rough, and the baby wash is cold. Babies do not quite know what to make of it, and it is not unusual for them to cry through the first few experiences with bathing.



CLINICAL SAFETY AND PROCEDURES (QSEN)

QSEN Competency: Patient-Centered Care: Giving Baby a Bath

Definition: Recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patient's preferences.

Knowledge: Examine common barriers to active involvement of patients in their own health-care process.

Skill: Remove barriers to the presence of families and other designated surrogates based on patient preferences.

1. Sponge baths are needed until the umbilical cord stump falls off. This will happen between 10 days and 2 weeks postpartum. Infection prevention is the primary reason for this. Sponge baths allow for normal healing to take place and for the cord to dry and fall off. Sponge bathing includes regular "wipe downs" of the face, hands, feet and genitals and any other areas that may be visibly dirty. Continue to give sponge baths once to twice weekly until the cord stump falls off.
2. Once the cord falls off, plan on bathing the baby 1 to 3 times a week. More frequent bathing may dry and irritate the skin. Plan bath time for when the baby is well rested and not hungry.
3. Bath products should be natural, unscented, and simple.
4. Gather supplies *before* putting the baby in the bath. You will need a well-cushioned and well-supported baby tub, warm water in the tub or sink, bottles open and ready to pour, and washcloths and towels at the ready. Baby washcloths are very soft. Placing a bath pad or towel under the baby can help keep the baby in one spot.
5. Fill the baby tub or sink with a few inches of warm water. You will want just enough water to cover the bottom of the baby's body. To gauge the temperature of the water, use the inside of your wrist or elbow. It should feel warm, about 100° F (37.8° C).
6. Thermoregulation is a primary concern with the newborn, who will have difficulty maintaining body temperature. Keep the baby covered during the bath. Even in a warm bath, the baby can lose body heat quickly. Use a warm washcloth to cover the baby and swap it out as needed.
7. Go slowly and stay calm. The baby will stay calm if you are feeling relaxed. Make sure your setup feels relaxed to you before beginning the bath. *Never*, under any circumstances, leave a baby alone in the bath.
8. Start washing the face first (no soap), then the rest of the body. Clean around their mouth, behind their ears, and under their chin, where milk and drool can hide in the folds. Rinse the washcloth and wash the rest of their body, getting into the creases and folds, under their arms and between their fingers and toes. When it comes to their genitals, wash girls from front to back and between their skin folds. For boys, uncircumcised or not, wipe their penis clean. Other than their face, use soap on the rest of their body, being sure to rinse it off completely so their skin will not dry out.
9. Skip the lotions and powders unless advised. Babies normally have dry, peeling skin that will soften on its own after peeling. Lotions or creams are unnecessary and may cause skin irritation. When the bath is completed, wrap the baby in a warm, soft towel and cuddle them close. Dry them and dress them warmly. Be sure to cover their head to avoid heat loss until their hair is dry.

Attitude: Respect patient preferences for degree of active engagement of care.

When to Take a Baby's Temperature

It is often difficult to discern when a baby has a fever or when to take a newborn's temperature because their behavior can often mimic normal newborn behavior. Caregivers need to be cognizant of the signs and symptoms of a fever in infants and be mindful if these changes in behavior occur. When they are observed, the baby's temperature

should be taken. Behaviors often indicative of newborn fever are the following (Mayo Clinic, 2023a):

- Crying or fussiness—If occurring more than usual, this is often the first sign of fever or illness.
- Excessive fatigue—If the newborn would rather sleep than eat, it might be a sign of fever or illness.
- Decreased appetite—If the infant is not waking for meals or eating with their usual appetite, check their temperature.
- Cold/Flu symptoms—If the baby has developed a cough or congestion, check their temperature. (Then notify the pediatrician.)
- Spitting up—If the baby is spitting up more frequently and in excess quantities, this could point to vomiting rather than spitting up.
- Feeling warm—It can be hard to gauge the temperature of your baby, especially on a warm day. Taking their temperature internally, that is, rectally (rather than just feeling their forehead) is the best way to be sure.
- Pulling at ear—Ear infections can cause discomfort in the ears. Because babies cannot communicate with words, pulling at their ear is a tell-tale sign that they are feeling pain or discomfort in that area. Take their temperature.
- Rash—Any type of rash should be evaluated by your pediatrician, especially if your baby has been exposed to or has chickenpox symptoms. Take their temperature.

The preceding situations are examples of when to take a baby's temperature, but they are not exclusive. Simply stated, when in doubt, take the baby's temperature.

Educating Parents about Taking a Baby's Temperature

Digital thermometers make taking a baby's temperature quick and easy. The nurse should teach parents to always use a digital thermometer to check a baby's or infant's temperature. Never use a glass mercury thermometer because health and safety risks are inherent with their use. If parents report having a glass thermometer, the nurse should instruct them to take it to their pharmacy or health department for proper disposal.

For babies and toddlers up to 3 years of age, the American Academy of Pediatrics recommends taking the temperature rectally using a rectal thermometer placed in the baby's anus (Johns Hopkins Medicine, 2019). This method is accurate and gives a quick reading of the baby's internal or core temperature. Teach parents that oral and rectal thermometers have different shapes and should not be used interchangeably. Using oral thermometers rectally can cause damage. A rectal thermometer has a round rather than an elongated security bulb at the insertion end specifically for safely taking rectal temperatures.

To take a baby's rectal temperature, the parent should place the baby across their lap or on a changing table, on their abdomen, facing down. Next, they place their hand nearest the baby's head on their lower back and separate the baby's buttocks with their thumb and forefinger. Using the other hand, they gently insert the lubricated end of the thermometer $\frac{1}{2}$ to 1 inch, or just past the anal sphincter muscle. The thermometer should be pointed toward the infant's umbilicus or belly button. The parent should hold the thermometer with one hand on the baby's buttocks so that the thermometer will move with the baby. The parent uses the other hand to comfort the baby and prevent moving. Caution parents never to leave a baby unattended with a rectal thermometer inserted. They should hold the thermometer until it beeps or signals, remove the thermometer, wipe the bulb, and read and immediately record the temperature. The thermometer can be cleaned with soap and water or rubbing alcohol. If the baby has a rectal temperature of 100.4° F (38° C) or higher, parents should call the baby's health-care provider (Johns Hopkins Medicine, 2019).

An **axillary temperature** is taken under the arm (in the armpit). If parents are more comfortable checking the infant's temperature this way, they must be careful that none of the infant's clothing gets between the thermometer and the skin. The thermometer should have skin touching it on all sides. Axillary measurement may be used as a "screening" method to get an idea of whether an infant is febrile. If it shows a fever, a more accurate measure should be utilized. Digital thermometers are used for axillary measurement.

A **tympanic thermometer** uses an infrared ray to measure the temperature inside the ear canal. This method may not be accurate for newborns or any infant under a year old. Parents should refer to the manufacturer's recommendations. These thermometers need to be positioned very carefully within the ear canal to get a precise reading, which is not possible in newborns. Skin strips that are pressed on the skin to measure temperature are also not recommended for babies. Touching the skin of a baby can let the care provider know if the infant is warm or

cool, but it cannot measure body temperature.

Another, newer method to measure temperature is called **temporal artery thermometry**, which measures the temperature of the blood flowing through the temporal artery on the forehead. This method is approved for newborns, infants, and toddlers under the age of 3 years. This method causes less discomfort than a rectal thermometer and is also considered very accurate. To take a baby's temporal artery temperature, place the thermometer sensor in the middle of the baby's forehead. Press and hold the scan button. Slowly move the thermometer across the baby's forehead toward the top of the baby's ear, making sure the sensor always touches the skin. Stop at the hairline and release the scan button. Remove the thermometer and read the temperature. If a baby's temporal temperature is 100.4° F (38° C) or higher, parents should call the baby's health-care provider (Johns Hopkins Medicine, 2019).

Educating Parents about Follow-up Care

When the infant is born and before discharge, they are given a complete physical examination by their health-care provider. The provider assesses the baby's eyes, ears, mouth, skin, hips, legs, abdomen, heart, lungs, and genitalia. This exam is a precursor to nursery admission, eye prophylaxis, vaccinations, hearing tests, blood work, feedings, and eventual discharge. Newborn infants born vaginally are usually discharged after 48 hours but can leave as early as 12 to 24 hours with provider permission and from certain birthing facilities. For babies delivered by cesarean section, discharge does not usually happen until 72 hours after birth but may occur earlier.

The U.S. Department of Health and Human Services (2022a) strongly recommends that newborns see their health-care providers a minimum of 6 times before their first birthday, to have a complete assessment of physical and behavioral changes. The nurse should explain to parents the reasons for and the importance of these early health-care visits. The first year of life sees such tremendous periods of growth and change that regular visits are important.

The infant's first visit with their provider outside the hospital should take place after they have been home for 2 to 3 days, making the newborn 3 to 5 days old (U.S. Department of Health and Human Services, 2022a). The health-care provider will assess weight, length, head circumference, signs of jaundice, number of wet and soiled diapers in a 24-hour period, and number of feedings in a 24-hour period. If the infant is formula-fed, they will ask how much formula the baby takes at each feeding and how often the baby is fed. If the infant is breast-feeding, they will want to know how often the baby is nursing and for how long on each side. They will probably ask about the latch to ensure that the baby is not suckling on the nipple alone but has a good deal of the areola in the mouth. The provider may ask to observe a feeding.

After that initial visit, the infant should be scheduled to see their provider at 1 month of age, 2 months of age, 4 months of age, 6 months of age, and 9 months of age (U.S. Department of Health and Human Services, 2022a). This equals the 6 visits before the first birthday. This is the minimum recommended number of visits in the first year of life. If parents or caregivers are worried or concerned about the baby's health or if the baby shows any signs of illness, parents must be instructed not to wait until the next scheduled visit. They should call and see their provider right away.

Summary

24.1 Basic Newborn Care

Basic care of the newborn involves many important topics. Infant safety is essential, both in the hospital and at home, and nurses must reinforce this topic as often as possible. Nurses teach parents to identify hospital staff by their picture ID badges and, if badges are not easily visible, to ask to see them. Nurses should check parents' and infant's ID bands to make sure that the numbers match any time the family has been separated. Parents should not release their baby to anyone without a hospital ID and should never leave their baby in the room unattended. Safety discussions should begin with parents immediately upon admission and continue with reinforcement until both parent and baby are discharged. Safety topics should also include precautions to be taken once the family arrives home.

Breast-feeding and bottle-feeding issues, including establishing feeding patterns, how to feed, when to feed, and how much to feed, all need to be addressed. Each baby is different, and even parents who have had previous children must learn the patterns for the new baby. Stooling needs to be reviewed because this is often a concern of parents and is quite different for breast- and bottle-fed infants. Growth spurts and cluster feeding are another area worthy of review.

Immunizations are a necessary area for education because the newborn will likely get their first immunization shortly after birth. For parents who have chosen to circumcise their newborn son, there is likely much teaching to be done. For those who have chosen not to circumcise their son, care of the uncircumcised penis should be reviewed.

24.2 Care of Common Problems in the Newborn

This section of the chapter examined the pathophysiology, recognition, and treatment of hyperbilirubinemia, hypoglycemia, dermatologic issues, as well as common viral and bacterial infections. By understanding these conditions, nurses can effectively provide optimal care for newborns.

This section reviewed signs of illness in the newborn and when to call the primary health-care provider. This information needs to be reviewed and reinforced with new parents. Although newborns rarely get ill, when they do, they can decline very quickly. [Table 24.6](#) is a great tool that parents can use to prepare for the phone call to the health-care provider. Having this information completed avoids delay in the care and treatment of their ill newborn.

24.3 Newborn Discharge Planning and Parent Education

Hospital stays for childbirth are relatively short, ranging from 2 days or less for a vaginal delivery to 4 days or less for a cesarean delivery. Nurses must use every opportunity to teach parents about caring for themselves and their baby postpartum. When parents have the baby at the bedside, it is an ideal time to educate them about their baby. Teach them about normal behaviors, breathing patterns, and what would be considered abnormal or warning signs, sleep-wake periods, feeding patterns, crying, and so on. It is much easier for parents to understand when the baby is demonstrating what you are talking about, and you will have a captive and interested audience.

Crying is a major source of concern for new parents. They need reassurance that all babies cry and that it is the only way for them to communicate when their needs are not being met. Reassure parents that they will become aware of their infant's different cries and what they mean, but this may take a little time. When their infant cries, this does not mean that they are a bad parent or that they are doing something wrong. Reinforce with the parents that infants are not spoiled by prompt attention to their needs. Attention provides comfort and security to their infant, who will learn to soothe and settle more quickly. At times a baby will cry for no reason, and then the only thing a parent can do is ensure that the baby's needs are met and then provide soothing and settling comfort.

Parents are educated regarding infant safe sleep practices, potential risk factors for SIDS, and the recommended guidelines to keep infants safe while sleeping.

Signs of illness in the newborn and when to call the primary health-care provider are other areas that need to be reviewed and reinforced with new parents. Although newborns rarely get ill, when they do, they can decline very quickly.

Provide your patient with as much information as you can about how to safely care for their new baby when they go

home. Their job is to ask questions. Provide them with a pen and paper to note questions when you are not available so that they can ask you when you are. This way their questions can be answered before they are discharged. By working with your patient as a team, you can send them home feeling confident in the care they are able to give to their baby.

Key Terms

analgesic drug or medication that reduces pain or discomfort

apnea stopped breathing

axillary temperature temperature taken under the arm (in the armpit)

baby acne common short-term skin condition that causes papules and pustules to break out on a baby's face, chest, or scalp

bacterial meningitis bacterial infection in the lining of the brain and spinal column

breast milk jaundice (also: **late-onset breast milk jaundice**) jaundice occurring in the first 3 to 5 days of life and lasting 3 weeks to as long as 3 months for some infants

breast-feeding jaundice (also: **early-onset jaundice**) type of jaundice in which bilirubin levels of >12 mg/dL develop in 13 percent of breast-fed infants by 1 week of life; most commonly caused this early in breast-fed infants by insufficient intake

circumcision surgical removal of the foreskin, the layer of skin that covers the glans (head) of the penis

cluster feeding when an infant chooses to space several feedings closely together with little time between the end of one feeding and the beginning of another

colostrum first breast milk produced in breast-feeding

concavity curving in of a surface

cord care keeping the cord stump and surrounding skin clean and dry, which prevents infection and helps the stump to fall off and the navel to heal more quickly

COVID-19 infectious illness caused by the coronavirus SARS-CoV-2 that became a pandemic disease in 2020

cradle cap (also: **seborrheic dermatitis**) common, harmless skin condition on an infant's scalp that presents as yellow, scaly patches with a red rash

crepitus crackling or crunching sound made by the damaged bone

cyanosis blue tint to skin and lips

dermatitis skin inflammation

diaper rash common form of dermatitis (skin irritation) in the diaper area of the buttocks, thighs, and genitals

donor breast milk milk from lactating persons who pump or express breast milk and donate it to a regulated breast milk bank, following their policies and procedures

early-onset jaundice (also: **breast-feeding jaundice**) type of jaundice in which bilirubin levels of >12 mg/dL develop in 13 percent of breast-fed infants by 1 week of life; most commonly caused this early in breast-fed infants by insufficient intake

eczema common skin condition that causes patches of skin to become dry, itchy, and scaly

erythema toxicum neonatorum (ETN) skin condition in newborns that causes a red rash and small, fluid-filled bumps on the face and/or limbs

fissure crack, opening, or split in the skin or tissues of the body, such as the anus from stooling

gastroesophageal reflux (GER) spitting up of liquid or food, when the stomach contents move back up from a baby's stomach into the esophagus

grunting while breathing out (expiratory grunting), the infant's way of trying to keep air in the lungs so they will stay open

hyperbilirubinemia increase in the concentration of bilirubin in the serum

hypoglycemia blood glucose level below 40 mg/dL in the term infant; a common transient occurrence in the immediate postbirth period

immunization process by which someone becomes protected against a disease through injections into the skin, nasal spray, or by mouth

influenza viral illness that can cause many of the same symptoms as the common cold but is accompanied by severe body aches and higher fever; commonly referred to as the flu

intercostal retraction sucking-in between the ribs when the infant breathes in

jaundice hyperbilirubinemia in which the skin and sclera of the eyes of the newborn may appear noticeably yellow

due to the breakdown of fetal red blood cells

kernicterus type of brain injury that can result from high levels of bilirubin in the baby's blood

lethargy lack of movement and energy, out-of-the-ordinary sleepiness

nasal flaring when the nostrils flare out with each breath

nonphysiologic jaundice (also: **pathologic jaundice**) jaundice that may appear in the first 24 hours of life

omphalitis life-threatening infection of the umbilical cord

physiologic jaundice (also: **developmental jaundice**) jaundice not present in the first 24 hours of life in term infants

physiologic regurgitation (also: *reflux*) spitting up of stomach contents in infants, or reflux, that occurs when the lower esophageal sphincter muscle lets the stomach contents back into the esophagus because it is not fully developed

respiratory syncytial virus (RSV) contagious virus causing an illness that is more serious than a cold or upper respiratory infection

seborrheic dermatitis (also: **cradle cap**) common, harmless skin condition on an infant's scalp that presents as yellow, scaly patches with a red rash

sepsis bacterial infection in the blood

serum amber-colored, protein-rich liquid that separates out when blood coagulates

sudden infant death syndrome (SIDS) unexplained death, usually during sleep, of a seemingly healthy baby that is less than a year old

swaddling traditional practice of wrapping up a baby gently in a light, breathable blanket to help them feel calm and sleepy, thereby offering comfort

temporal artery thermometry measures the temperature of the blood flowing through the temporal artery on the forehead

transcutaneous bilirubin (TCB) monitor painless handheld light meter that is routinely used to scan for bilirubin in the skin

transient neonatal pustular melanosis (TNPM) normal and harmless skin condition that affects term newborns and presents with skin bumps, pustules, or blisters anywhere on the infant's body

transitional stool stool that follows meconium and is yellowish-green

tympanic thermometer thermometer that uses an infrared ray to measure the temperature inside the ear canal

umbilical cord granuloma small nodule of tissue, which can measure up to 1 cm, that may become evident after the separation of the umbilical cord

umbilical hernia hernia caused by a small hole in the muscular part of the abdominal wall that allows the tissue to bulge out when there is increased abdominal pressure (e.g., crying)

Assessments

Review Questions

1. The nurse provides discharge instructions to a parent about umbilical cord care. What statement by the parent indicates effective health teaching?
 - a. "My child can have a tub bath every day."
 - b. "I will clean the stump with antiseptics daily."
 - c. "Water and soap can be used if the stump is dirty."
 - d. "I need to apply an antibiotic ointment every day."
2. When teaching umbilical cord care to a new parent, the nurse would include which information?
 - a. Apply peroxide to the cord with each diaper change.
 - b. Cover the cord with petroleum jelly after bathing.
 - c. Keep the cord dry and open to air.
 - d. Wash the cord with soap and water each day during a tub bath.
3. A home health nurse visits a 2-week-old infant and observes the umbilical cord has dried and fallen off. The area appears healed with no drainage or erythema present. Given these assessment findings, what instruction should the nurse give the parent?

- a. cover the umbilicus with a band-aid
 - b. continue to clean the stump with alcohol for 1 week
 - c. apply an antibiotic ointment to the stump
 - d. give the baby a bath in an infant tub now
4. A 24-hour-old newborn male was circumcised 20 minutes ago. The nurse is doing 15-minute checks of the circumcision site. It appears that the newborn has had a bowel movement as meconium is leaking from the diaper leg. He is not crying and has just soothed from the last diaper check. What should the nurse do?
- a. Wait an additional 10 minutes until the next circumcision check is due to change his diaper because he is comfortable and not crying. If he starts to fuss, then change him. Keep checks at times scheduled.
 - b. Change him immediately, regardless of how long it has been since his last circumcision check and use packaged wipes to be sure to get the meconium completely off the circumcision site. Keep checks at scheduled times.
 - c. Change him now, trying not to disturb him, using only water (and soap as needed) to clean the meconium. Change the dressing at the circumcision site and resume checks in 15 minutes.
 - d. Change him now, trying not to disturb him, using only water (and soap as needed) to clean the meconium. Do not change the dressing at the circumcision site until the next circumcision check, which is due in 10 minutes, and then continuing checks at times scheduled.
5. What directional order best describes the body progression of jaundice in the newborn infant?
- a. feet, legs, body, face, head
 - b. abdomen, extremities, face, head
 - c. face, chest, abdomen, arms, legs
 - d. chest, face, head, abdomen, arms
6. What newborn blood test determines blood type and testing for Rh incompatibility?
- a. direct bilirubin level
 - b. indirect bilirubin level
 - c. RBC count with type and cross match
 - d. Coombs test
7. Treatment of neonatal jaundice depends on what factors? Select all that apply.
- a. degree of jaundice
 - b. bilirubin level
 - c. age and weight of infant
 - d. when jaundice began
8. Transient dermatologic conditions are common in newborns. What is the term for temporary, tiny white bumps or cysts on the newborn's skin, usually on the face around the cheek, nose, or chin area?
- a. newborn acne
 - b. milia
 - c. pustular melanosis
 - d. erythema toxicum
9. What is the term for a common and harmless skin condition on an infant's scalp that presents as yellow scaly patches with a red rash?
- a. erythema toxicum
 - b. eczema
 - c. a skin allergy
 - d. cradle cap
10. Parents and caregivers are strongly advised by health-care providers NOT to give their newborns aspirin for fever or pain. What is the reason for this advice?

- a. Aspirin is too strong and will cause severe stomach upset or damage to their immature digestive system.
 - b. Aspirin is not made in a liquid form, making it impossible for infants to take.
 - c. Aspirin is linked to Reye syndrome, which is a potentially fatal condition for infants.
 - d. Aspirin is a blood thinner and may cause intracranial bleeding due to the infant's recent birth.
- 11.** What is acrocyanosis in the newborn?
- a. a mildly blue or purple color of the hands and feet when the newborn is cold
 - b. a common occurrence in the first few weeks of life
 - c. a bluish-gray coloring around the nose and mouth in the first few hours of life as the newborn adjusts to extrauterine circulation.
 - d. a bluish color to the infant's face when the infant is resting quietly, which lasts throughout most of the first day after birth
- 12.** A postpartum nurse is giving guidance to a mother whose breast-fed newborn is experiencing hyperbilirubinemia. What are the best instructions for the nurse to give the mother in this case?
- a. It is best for the infant if she stops breast-feeding and switches to bottle-feeding permanently.
 - b. The mother should switch to bottle-feeding until the baby's bilirubin returns to normal range.
 - c. The mother should alternate breast-feeding and bottle-feeding to ensure adequate fluid intake, until the baby's bilirubin returns to normal range.
 - d. The mother should continue to breast-feed the infant every 2 to 3 hours or more frequently as tolerated (every 2 hours if under phototherapy).
- 13.** The nurse is aware that a newborn with a mother who has diabetes is at risk for what complication?
- a. anemia
 - b. microcephaly
 - c. hypoglycemia
 - d. SGA
- 14.** A patient with blood group AB, whose husband has blood group O, has recently given birth. What is the main complication or test result to watch for in the newborn concerning ABO incompatibility?
- a. negative Coombs test
 - b. bleeding from the nose and ear
 - c. jaundice after the first 24 hours of life
 - d. jaundice within the first 24 hours of life
- 15.** A postpartum nurse is teaching umbilical cord care to new parents as part of discharge teaching. The nurse would be sure to include which information in her teaching?
- a. Apply rubbing alcohol to the cord with each diaper change to help it dry out.
 - b. Cover the cord with bacitracin after bathing to prevent infection.
 - c. Keep the cord dry and open to the air.
 - d. Wash the cord with soap and water each day during a tub bath.
- 16.** When educating the parents of a newborn about newborn positions, patterns, and cues, what statement by the mother confirms that more teaching is needed?
- a. "When my baby is sleepy, he may yawn or rub his eyes."
 - b. "My baby may start looking away or ignoring us when she is overstimulated or sleepy."
 - c. "Crying or fussing happens when I don't pick up on her other sleep cues."
 - d. "My baby will fuss, get irritable, or cry inconsolably when he is starting to get sleepy."
- 17.** The average newborn sleeps how many hours in a 24-hour period?
- a. 16–17 hours
 - b. 10–15 hours

- c. 12–13 hours
 - d. 8–12 hours
- 18.** A nurse is providing discharge instructions to a parent on preventing SIDS. What action by the parent signifies that they have effectively grasped what has been taught?
- a. The parent wraps the baby in layers of blankets.
 - b. The parent puts several stuffed animals in the baby's crib.
 - c. The parent places the infant on the infant's back to sleep.
 - d. The parent sleeps or shares a bed with the infant.
- 19.** Which infant is at the greatest risk for SIDS?
- a. an infant between 1 and 4 months of age
 - b. a post-date neonate
 - c. a baby 6 to 12 months of age
 - d. a baby 4 to 6 months of age
- 20.** When traveling in a car, where are infants the safest?
- a. in an approved safety seat secured properly, either rear or forward facing
 - b. in a child safety-approved car seat that they can grow into, with pillow supports for their head
 - c. in an infant car seat, safely secured, in the car's front or rear seat
 - d. in a rear-facing, safety-approved infant car seat, located in the middle of the back seat of the car
- 21.** When giving a newborn a bath, what is a concern for the nurse (or caregiver)?
- a. hyperbilirubinemia
 - b. hypoglycemia
 - c. thermoregulation
 - d. contact dermatitis
- 22.** During discharge teaching, the parents ask the nurse which type of thermometer is the most accurate to take their newborn's temperature. What is the nurse's best reply to this question?
- a. a tympanic thermometer
 - b. a glass rectal thermometer (mercury)
 - c. a digital axillary thermometer
 - d. a digital rectal thermometer
- 23.** What is a routine health provider visiting schedule for a newborn in their first year of life, beginning at 1 month of age?
- a. 1 month, 2 months, 4 months, 6 months, 9 months, and 12 months of age
 - b. 1 month to 12 months, visiting once each month
 - c. 1 month, 3 months, 6 months, 9 months, and 12 months
 - d. 1 month, 3 months, 6 months, 12 months

Check Your Understanding Questions

- 1.** When educating the birthing parent on infant feeding, what are some questions that the nurse should ask first?
- 2.** When talking to the birthing parent about their newborn's voiding and stooling patterns, what would be important to ask and address?
- 3.** What effects would the nurse discuss regarding the vaccination given prior to going home?
- 4.** What are the most common causes of hypoglycemia in newborns?
- 5.** What is true about newborn bacterial infections?

6. During a neonatal assessment, which finding, other than low body temperature, is the most indicative of neonatal hypothermia?
7. One major differentiating factor among the four kinds of neonatal jaundice is the timing of when the jaundice first occurs. Which jaundice occurs in the first 24 hours and may otherwise be known as “pathologic” jaundice?
8. While a newborn nurse is assessing the respirations of a neonate, what findings would cause the nurse concern?
9. What risk factors are concerning for SIDS in a newborn?

What Should the Nurse Do?

James, a 2-day-old male, has been brought to the pediatric clinic for a routine checkup by his parents. James is exclusively breast-fed, and his parents express concern about his feeding patterns and voiding behavior. James’s mother reports that he has been feeding for shorter durations than expected, and they have noticed a decrease in the number of wet diapers. Additionally, James underwent circumcision shortly after birth, and his parents are uncertain about the appropriate care. James has a medical history of uncomplicated full-term birth with no complications during delivery. Vital signs include a heart rate of 130 beats per minute, respiratory rate of 30 breaths per minute, and a temperature of 98.6° F (37° C).

1. Analyze the significance of James being exclusively breast-fed and the reported decrease in wet diapers. How might breast-feeding patterns influence the expected voiding patterns, and what factors could contribute to the observed changes?
2. What immediate actions should the nurse take during James’s checkup to address the reported feeding concerns and the decrease in wet diapers? How would the nurse involve James’s parents in the care process?

Laura, a 2-day-old female, has been brought to the pediatric clinic by her parents due to concerns about jaundice. Laura’s parents noticed yellow discoloration of her skin and eyes. Laura was born at full term with an uneventful vaginal delivery. Her medical history includes ABO incompatibility between the mother and infant, as the mother is blood type O and the infant is blood type A. Laura is exclusively breast-fed, and her parents report challenges with breast-feeding initiation. Vital signs include a heart rate of 140 beats per minute, respiratory rate of 38 breaths per minute, and a temperature of 98.4° F (36.9° C).

3. Analyze how ABO incompatibility might contribute to the development of hyperbilirubinemia in Laura. How would you differentiate between ABO incompatibility-related jaundice and other causes?
4. Generate solutions to address Laura’s breast-feeding challenges and improve milk transfer. How would you involve the parents in the care process and support successful breast-feeding while managing hyperbilirubinemia?

Competency-Based Assessments

1. In what ways might the expected voiding and stooling patterns differ between a breast-fed and a formula-fed newborn, and how would you address parental concerns related to variations in these patterns?
2. As a nursing student, how would you explain circumcision care to new parents, including proper cleaning and signs of potential issues, and when would you advise them to reach out to the health-care provider?
3. As a clinical nurse, how would you analyze the potential interplay between hyperbilirubinemia and hypoglycemia in a newborn? How might the pathophysiology of hyperbilirubinemia impact glucose metabolism, and how would you prioritize care for a newborn presenting with both conditions?
4. Evaluate the implications of common newborn infections for dermatologic health. How might infections contribute to skin issues, and what nursing strategies would you employ for the holistic care of a newborn presenting with both an infection and dermatologic concerns?

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