THE FIRST HOUR OF LIFE

The primary focus at this time is the transition from intrauterine to extrauterine life, with an introduction to family members as the neonate's condition warrants.

NEONATAL ASSESSMENT DATA BASE (FULL-TERM)

Circulation

Apical pulse may fluctuate from 110–180 beats per minute (bpm).
Blood pressure 60–80 mm Hg (systolic), 40–45 mm Hg (diastolic).
Heart Sounds: Located in mediastinum with point of maximal intensity just to the left of the midsternum at third or fourth intercostal space.
Murmurs common during the first few hours of life.
Umbilical cord white and gelatinous; contains two arteries and one vein.

Elimination

May void at birth
May have passed meconium at birth

Food/Fluid

Weight: 2500–4000 g (5 lb 8 oz–8 lb 13 oz)
Length: 44–55 cm (18–22 in)
Skin turgor elastic (varies according to gestational age)

Neurosensory

Muscle Tone: Hypertonic flexion of all extremities.
Awake and active, demonstrates sucking reflex for first 30 min following birth (first period of reactivity).
Asymmetrical appearance (molding, edema, hematoma).
Cry strong, lusty, medium pitch (high-pitched cry suggests genetic abnormality, hypoglycemia, or prolonged narcotic effect).

Respiration

Apgar Score: 1/5 optimal score 7–10
Rate ranges from 30–60/min; periodic pattern may be noted
Breath sounds bilateral; occasional crackles common initially
Thorax cylindrical; prominent xiphoid cartilage common

Safety

Temperature ranges from 97.7°F–99.4°F (36.5°C–37.5°C).
Some vernix present (amount and distribution dependent on gestational age).
Skin: Smooth, flexible; peeling of hands/feet may be noted; pink-tinged or ruddy color; may be mottled, display minor bruising (e.g., forceps delivery), or harlequin color changes; petechiae on head/face (may reflect increased pressure associated with delivery or nuchal cord); port-wine stains, telangiectatic nevi (eyelids, between brows, or on occiput), or mongolian spots (primarily lower back and buttocks) may be noted.
Scalp abrasion may be present (internal electrode placement).

DIAGNOSTIC STUDIES

Cord pH: Levels of 7.20–7.24 reflect a preacidotic state; lower levels indicate significant asphyxia.
Hb/Hct: Hb level of 15–20 g and Hct of 43%–61%.

Direct Coombs' Test on Cord Blood: Determines presence of antigen-antibody complexes on red blood cell (RBC) membrane, reflecting hemolytic condition.

NURSING PRIORITIES

1. Promote effective cardiopulmonary effort.
2. Provide a thermoneutral environment, and maintain body temperature.
3. Prevent injury or complications.
4. Promote parent-infant attachment.

NURSING DIAGNOSIS:	**GAS EXCHANGE, risk for impaired**
Risk Factors May Include:	Prenatal intrapartal stressors, excess production of mucus, and cold stress
Possibly Evidenced By:	[Not applicable; presence of signs/symptoms establishes an *actual* diagnosis]
DESIRED OUTCOMES/EVALUATION CRITERIA—NEONATE WILL:	Maintain patent airway with respiratory and heart rates within normal limits (WNL); generalized cyanosis absent. Be free of signs of respiratory distress.

ACTIONS/INTERVENTIONS	RATIONALE
Independent	
Measure Apgar score at 1 and 5 min following delivery.	Helps determine need for immediate intervention (e.g., suctioning, oxygen). A total score of 0–3 represents severe asphyxia or possible dysfunction in neurological and/or chemical control of respiration. Scores of 4–6 signify moderate difficulty adapting to extrauterine life. Scores of 7–10 indicate no difficulty adapting to extrauterine life.
Identify prenatal complications affecting placental and/or fetal status (e.g., cardiac or kidney disorders, pregnancy-induced hypertension [PIH], or diabetes).	Such complications may result in chronic hypoxia and acidosis, increasing risk of central nervous system (CNS) damage and requiring correction after delivery.
Review intrapartal fetal status, including fetal heart rate (FHR), periodic changes in FHR, beat-to-beat variability, scalp pH level (if done), and color and amount of amniotic fluid.	As in prenatal complications, intrapartal events may create fetal distress and hypoxia that persist into the immediate postdelivery period, resulting in depressed or ineffective respiratory effort. Fetus with scalp pH level <7.20, prolonged, variable, or late decelerations, and reduced FHR variability; oligohydramnios, or meconium-stained amniotic fluid will require greater efforts to achieve stabilization following birth than fetus with no signs of hypoxia or distress.

Determine duration of labor and type of delivery.	Thoracic compression during passage through the birth canal aids in clearing the lungs of approximately 80–110 ml of fluid. An infant delivered following precipitous labor (less than 3 hr) or delivered by cesarean section has excessive mucus because of inadequate thoracic compression.
Note times at which medications (e.g., magnesium sulfate or meperidine hydrochloride [Demerol]) were administered to mother.	Medications may depress newborn's respiratory efforts and reduce the newborn's ability to oxygenate tissues.
Assess initial respiratory rate and effort.	The first breath, which is the most difficult, establishes a functional residual capacity (FRC), so that 30%–40% of lung tissue remains fully expanded, provided that adequate surfactant levels are present. Failure to achieve an FRC makes each subsequent breath as tiring and difficult as the initial breath. Tachypnea (respiratory rate>60/min) is usually associated with normal anticipated changes in the first period of reactivity (30 min following birth), but may also represent an attempt to eliminate excess carbon dioxide.
Note presence of nasal flaring, chest retractions, expiratory grunting, crackles, or rhonchi.	These signs are normal and transient in the first period of reactivity, but may indicate respiratory distress if they persist. Crackles may be heard until fluid is reabsorbed from lungs. Rhonchi indicate aspiration of oral secretions.
Clear airway; gently suction nasopharynx, as needed, using a bulb syringe or DeLee mucus-trap catheter (preferably while neonate's head is on maternal perineum if meconium-stained amniotic fluid is present). Monitor apical pulse during suctioning.	Helps remove accumulated fluid, facilitates respiratory effort, and helps prevent aspiration. Suctioning of the oropharynx causes vagal stimulation leading to bradycardia.
Dry infant with warm blankets, place stockinette cap on head, and place either in parent's arms or in prewarmed heating unit.	Reduces effects of cold stress (i.e., increased oxygen needs) and associated hypoxia, which can further depress respiratory efforts and result in acidosis as neonate resorts to anaerobic metabolism with lactic acid end products. (Refer to ND: Body Temperature, risk for altered.)
Place newborn in modified Trendelenburg position at a 10-degree angle.	Facilitates drainage of mucus from nasopharynx and trachea by means of gravity.
Note pitch and intensity of cry.	Initially, a lusty, strong cry increases alveolar Po_2 and produces the necessary chemical changes to convert fetal to neonatal circulation, so that the heart rate increases to 175–180 bpm and then usually returns to normal within the next 4–6 hr.
Auscultate/evaluate apical pulse.	A heart rate less than 100 bpm indicates severe asphyxia and the need for immediate resuscitation. Tachycardia (heart rate>160 bpm) may indicate recent asphyxia or a normal response associated with the first period of reactivity.
Provide appropriate tactile and sensory stimulation.	Stimulates respiratory effort and may increase inspired oxygen.

Note presence of wide-eyed stare.	Indicates chronic intrauterine hypoxia, which is possibly associated with acidosis and requires resuscitative measures.
Observe skin color for location and extent of cyanosis. Assess muscle tone.	Acrocyanosis, suggesting sluggish peripheral circulation, occurs normally in 85% of newborns during the 1st hr; however, generalized cyanosis and flaccidity indicate inadequate tissue oxygenation.
Suction gastric contents if amniotic fluid was meconium-stained.	Helps reduce incidence of aspiration pneumonia in early neonatal period.

Collaborative

Assist with intubation at birth in presence of frank meconium in amniotic fluid.	Prevents neonate taking first breath before airway is cleared, reducing risk of meconium aspiration and subsequent pneumonia.
Administer warmed oxygen via mask at 4–7 L/min, if indicated.	Provides additional oxygen and supports respiratory effort, if marked pallor or generalized cyanosis is present. In cases of prolonged hypoxia, fetal circulation may persist, because elevated Po_2 levels are necessary to reduce pulmonary vascular resistance, enhance blood flow to the lungs, and increase pressure on the left side of the heart, which closes the ductus arteriosus and the foramen ovale.
Assist with drawing of cord blood.	If there is indication of respiratory distress in the newborn, a cord pH level may be obtained to confirm presence and duration of prenatal asphyxia.
Perform deep suctioning if newborn shows evidence of respiratory depression that does not respond to gentle suction or to gentle tactile stimulation.	Promotes patent airway. Note: If meconium staining is present, deep suctioning, in conjunction with suctioning while infant's head is on perineum, is necessary to prevent meconium aspiration.
Administer medications, as indicated (e.g., Naloxone [Narcan], administered intravenously or through umbilical vessel catheter).	Narcan is a fast-acting narcotic antagonist that counteracts respiratory depression caused by exposure to maternal anesthetics or narcotics.
Provide resuscitative measures, and prepare for transfer of newborn to a neonatal intensive care unit (NICU) or level III/IV facility, as indicated.	Infants requiring extensive resuscitative efforts must be observed and cared for by personnel who have been specifically trained to care for sick newborns.

NURSING DIAGNOSIS:	**BODY TEMPERATURE, risk for altered**
Risk Factors May Include:	Extreme of age (inability to shiver, large body surface in relation to mass, limited amounts of insulat-ing subcutaneous fat, nonrenewable sources of brown fat and few white fat stores, thin epidermis with close proximity of blood vessels to the skin)
Possibly Evidenced By:	[Not applicable; presence of signs/symptoms establishes an *actual* diagnosis]
DESIRED OUTCOMES/EVALUATION CRITERIA—NEONATE WILL:	Maintain core, skin, and axillary temperature and vital signs WNL.
	Be free of signs of respiratory distress and cold stress.

ACTIONS/INTERVENTIONS	RATIONALE
Independent	
Ascertain medications mother received during prenatal and intrapartal periods. Note presence of fetal distress or hypoxia.	Fetal hypoxia or maternal use of meperidine (Demerol) alters fetal metabolism of brown fat, often causing significant drop in neonate's temperature. Magnesium sulfate can cause vasodilation and interfere with infant's ability to retain heat.
Dry newborn's head and body, place stockinette cap on head, and wrap in warm blankets.	Reduces evaporative and conductive heat loss, protects moist infant from drafts or cooling air currents, and limits stress of movement from a warm uterine environment to a much cooler environment (possibly 15°F [9.4°C] lower than intrauterine temperatures). Note: Because of the relatively large surface area of the newborn head in relation to that of the body, an infant may experience dramatic heat loss from a moist, uncovered head; however, research suggests that in healthy neonates of normal weight, a cap may not be necessary if the head is dried well.
Place newborn in prewarmed environment or in parent's arms. Warm objects coming in contact with infant (e.g., scales, stethoscopes, examination tables, and hands.)	Prevents heat loss by conduction, whereby heat is transferred from the newborn to objects or surfaces cooler than the newborn. Being held close to the parent's body and skin-to-skin contact reduce the newborn's heat loss.
Note environmental temperature. Eliminate drafts and minimize use of air conditioners; warm oxygen if it is administered via mask.	A decrease in the environmental temperature of 3.6°F (2°C) is sufficient to double the oxygen consumption of a term neonate. Heat loss by convection occurs when infant loses heat to cooler air currents. Loss by radiation occurs when heat is transferred from the newborn to objects or surfaces not in direct contact with newborn (e.g., incubator sides or walls).
Assess neonate's core temperature, monitor skin temperature continually with skin probe as appropriate.	Skin temperature should be maintained close to 97.6°F (36.5°C). Core temperature (rectal) is usually 0.9°F (0.5°C) higher than skin temperature, yet continuous transfer from core to skin occurs, so that the greater the difference between core and skin temperature, the more rapid the transfer and the faster the core temperature cools.
Provide gradual warming for cold-stressed infant, keeping air temperature 2.7°F (1.5°C) warmer than body temperature.	Too-rapid increase in temperature may result in apnea in cold-stressed Infant.

Observe newborn for signs of cold stress (e.g., drop in skin temperature, increased activity, flexion of extremities, pallor and/or mottling, and cool skin, hands, and feet).	When the environmental temperature falls below the thermoneutral zone (89.6°F–96.8°F [32°C–34°C]) the neonate increases activity levels (increasing metabolic rate and oxygen consumption), flexes extremities to reduce amount of body surface exposed, and releases adrenal catecholamines, which promote heat release from stored brown fat and cause vasoconstriction, further cooling the skin.
Note signs of respiratory distress (e.g., apnea, generalized cyanosis, bradycardia, and severe grunting, retraction of respiratory muscles, and nasal flaring). Provide support as needed.	These signs indicate negative effects of prolonged cold stress, which necessitate close monitoring. Peripheral vasoconstriction leads to metabolic acidosis; pulmonary vasoconstriction results in respiratory compromise and persistence of fetal circulation with failure of ductus arteriosus and foramen ovale to close.

Collaborative

Provide metabolic support (glucose or buffer), as indicated.	Side effects of prolonged hypothermia (cold stress) may include increased oxygen consumption, leading to hypoxia, acidosis, and respiratory compromise; increased metabolic rate and glucose consumption, resulting in hypoglycemia; as well as release of free fatty acids in the bloodstream, which compete with bilirubin binding sites on albumin, therefore increasing the risk of jaundice and kernicterus. Administration of glucose or bicarbonate can correct hypoglycemia, acidosis, and/or asphyxia.
Consider admission to special care nursery (SCN) or neonatal intensive care unit (NICU).	Permits close observation and use of aggressive care methods in cases of severe neonatal cold stress with secondary symptoms.

NURSING DIAGNOSIS:	**FAMILY PROCESSES, altered [bonding process]**
May Be Related To:	Developmental transition and/or gain of a family member
Possibly Evidenced By:	Hesitance of parent(s) to hold/interact with infant, verbalization of concerns
DESIRED OUTCOMES/EVALUATION CRITERIA—PARENT(S) WILL:	Initiate attachment process in ways that are meaningful to family members. Properly identify infant to assure correct family association.

ACTIONS/INTERVENTIONS	RATIONALE
Independent	
Inform parents of neonate's immediate needs and of care being provided.	Alleviates parents' anxiety regarding condition of their newborn. Helps parents to understand rationale for interventions in initial newborn period.

Place newborn in mother's/father's arms as soon as neonatal condition permits.	The 1st hr of life is an especially significant time for family interaction in that it can promote initial attachment between parents and infant and acceptance of the newborn as a new family member.
Encourage parent(s) to stroke and speak to newborn; encourage mother to breastfeed infant, if desired.	Provides opportunity for parents and newborn to initiate acquaintance and attachment process.
Share information gained from initial physical assessment of newborn.	Helps parents to view infant as a separate person with unique physical characteristics.
Discuss neonate's capabilities for interaction. (Refer to CP: Stage IV [First 4 Hours Following Delivery of the Placenta]; ND: Family Processes, altered [bonding process].)	Helps clarify expectations and facilitate parent-infant interaction.
Using legally acceptable identification system, place arm or leg bands on infant and one wrist band on mother. Take infant's footprints and mother's fingerprint (index finger).	Establishes family unit and prevents confusion regarding identification of infant. A more accurate method of identification, DNA fingerprinting, is being used and may eventually supplant traditional footprinting and fingerprinting.
Provide appropriate information in the event of unanticipated complications or the need for transfer to SCN/NICU.	Keeping parents informed about infant's change in status, and actual or potential actions to be instituted, helps to assure them that everything possible is being done to care for infant and promotes parental cooperation with emergency measures.

NURSING DIAGNOSIS:	**INJURY, risk for**
Risk Factors May Include:	Undetected or untreated congenital anomalies, exposure to infectious agents
Possibly Evidenced By:	[Not applicable; presence of signs/symptoms establishes an *actual* diagnosis]
DESIRED OUTCOMES/EVALUATION CRITERIA—NEONATE WILL:	Be free of injury/complications.

ACTIONS/INTERVENTIONS	RATIONALE
Independent	
Perform routine physical assessment of newborn, noting number of cord vessels and presence of anomalies.	Helps detect abnormalities and neurological defects, establishes gestational age, and identifies the need for closer monitoring and more intensive care. Cord should contain three vessels. Presence of only one artery is associated with genitourinary abnormalities.

Bathe newborn immediately after delivery if exposure to infectious agents has occurred.	Prevents newborn from contracting hepatitis B virus or from becoming a chronic carrier when exposed to maternal serum blood products at delivery.
Describe to parents the appropriate rationale for actions taken to prevent injury (e.g., prophylactic administration of eye ointment and vitamin K).	Reduces parental anxiety created by a lack of understanding of the need to protect neonate against eye infection and hemorrhagic disease.

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Clamp umbilical cord approximately ½–1 in from newborn's abdomen within 30 sec after birth, while neonate is at the level of the mother's introitus.	Holding newborn below the level of the introitus or delaying cord clamping accounts for transfer of 50–100 ml of blood from the placenta, possibly contributing to polycythemia and hyperbilirubinemia in the neonatal period.
Administer eye prophylaxis in the form of erythromycin ointment (Ilotycin) approximately 1 hr after birth (after period of parent-infant interaction).	Helps prevent ophthalmia neonatorum, caused by *Neisseria gonorrhoeae*, which may be present in the mother's birth canal. Erythromycin effectively eradicates both gonorrheal and chlamydial organisms. Note: Eye prophylaxis clouds newborn's vision, reducing infant's ability to interact with parents.
Administer Vitamin K (AquaMEPHYTON]) IM, within 2 hr after birth.	Prevents hemorrhagic disease in the newborn.
Administer hepatitis B immune globulin (HBIG) and hepatitis B vaccine if mother's serum contains hepatitis B surface antigen (HB_SAG), hepatitis B core antigen (HB_CAg), or $_e$ antigen (HB_eAg).	Provides passive immunity for newborn in presence of viral infection. First dose is administered at birth for infants of HB_SAg-positive mothers.