

TENNESSEE PERINATAL CARE SYSTEM

**EDUCATIONAL OBJECTIVES FOR NURSES
LEVELS I, II, III, IV
AND
NEONATAL TRANSPORT NURSES**

Fifth Edition



2014

Tennessee Department of Health
Family Health and Wellness



TENNESSEE PERINATAL CARE SYSTEM

Tennessee Code Annotated 68-1-802 (passed in 1974) directed the Department of Health to develop a plan to establish a program for the diagnosis and treatment of certain life-threatening conditions in the perinatal period. The program was to develop a regionalized system of care, including highly specialized personnel, equipment, and techniques to decrease the high infant mortality rate and life-long disabilities in surviving newborns.

From this beginning, Tennessee created the infrastructure for a perinatal regionalization system with five Regional Perinatal Centers across the state. These Centers provide perinatal care for high risk pregnant women and newborns if no other appropriate facility is available to manage significant high risk conditions. All Centers provide the following to health care providers and hospitals within their geographic region:

- 24-hour consultation and referral for facilities and for health care providers within the respective perinatal region
- Professional education for staff of hospitals and for other health care providers within the region
- Maternal and neonatal transport
- Site visits
- Post-neonatal follow-up

The Regional Perinatal Centers provide a statewide system of high-risk maternal and infant care. Research indicates that ensuring that high-risk pregnant women and newborns receive risk-appropriate care can reduce maternal and infant morbidity and mortality.

Indirectly, the system impacts all mothers and babies in Tennessee by assuring that health care providers are educated on high risk perinatal care and have a system of consultation available to them. In FY 2013, Tennessee's Regional Perinatal Centers provided direct care for 4,976 high-risk neonates and 15,728 high-risk maternal patients.

Since the 1970s, the Perinatal Advisory Committee, established by statute as an expert advisory group to the Department of Health, has been responsible for the development and revision of manuals related to perinatal care in Tennessee. Using the national guidelines from the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists, work groups of health care providers from across the state have been responsible for review and revision of four manuals:

- *Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities*
- *Guidelines for Transportation*
- *Educational Objectives for Nurses Levels I, II, III, IV and Transport Nurses*
- *Educational Objectives in Medicine for Perinatal Social Workers*

Educational Objectives for Nurses, Levels I, II, III, IV and Neonatal Transport Nurses, Tennessee Perinatal Care System

The fifth edition of the *Educational Objectives for Nurses, Levels I, II, III, IV, and Neonatal Transport Nurses* was developed by two work groups of experienced obstetric and neonatal nurse educators and nurses working with transport of high risk newborns. These educational objectives were originally published in 1982. The objectives are designed to be used to prepare nurses for providing the best

possible family-centered, culturally sensitive care to low and high risk mothers and newborns. The objectives are divided by hospital levels of care and by specialty and list the knowledge and skills necessary to provide quality nursing care to mothers and newborns.

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LEVELS I, II, III, IV
AND
NEONATAL TRANSPORT NURSES
(FIFTH EDITION)**

**Prepared by the
Work Groups on Educational Objectives for Nurses Levels I, II, III, IV
And
Neonatal Transport Nurses**

**And Approved by the
Perinatal Advisory Committee**

2014

Web Address
<http://health.state.tn.us/MCH>
(click on Perinatal Regionalization Program, scroll down to Publications)

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INTRODUCTION

These *Educational Objectives for Nurses*, developed by a group of experienced obstetric and neonatal nurse educators, list the knowledge and skills necessary to provide quality nursing care to mothers and newborns. In this revised (5th) edition of the *Educational Objectives for Nurses*, the material has been separated by hospital levels of care and by specialty. Each section can stand alone. Like its predecessors, this manual has been written primarily for nurses practicing in a hospital setting.

These objectives may be met by practicing nurses in a number of ways. Some of the material presented here will have been learned during basic nursing education, while other objectives will be covered during new employee orientation or in continuing education settings. Also, there are several nationally recognized programs available, including nursing education modules published by the March of Dimes; the AWHONN Perinatal Orientation Education Program (POEP), fetal monitoring program, and Neonatal Orientation Education Program (NOEP); the American Academy of Pediatrics (AAP) / American Heart Association (AHA) Neonatal Resuscitation Program; The S.T.A.B.L.E. Program and S.T.A.B.LE cardiac module; the Perinatal Continuing Education Program (PCEP); and the National Association of Neonatal Nurses (NANN) orientation program that can help to provide the knowledge and skills necessary to provide quality care. Nurse educators at each of the Regional Perinatal Centers are always available to consult in the development of educational programs or to actually provide such programs.

Educators will find that much has been left to their judgment. These objectives must be adapted to meet the needs of individuals in terms of sequence of presentation, time allotment to individual topics, and modalities of presentation. Information contained in the most recent editions of the *Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities* and the *Guidelines for Transportation*, both published by the Tennessee Department of Health, Division of Family Health and Wellness, should be used to supplement this material.

In publishing this revised (5th) edition of the *Educational Objectives for Nurses*, it is hoped that they will be used to prepare nurses for providing the best possible family-centered, culturally sensitive care to low and high risk mothers and newborns.

**OBSTETRIC OBJECTIVES FOR
NURSES IN LEVEL I FACILITIES**

OBSTETRIC OBJECTIVES FOR NURSES IN LEVEL I FACILITIES

These objectives may be met by practicing nurses in a number of ways. Some of the material presented here will have been learned during basic nursing education, while other objectives will be covered during new employee orientation or in continuing education settings.

The nurse caring for obstetric patients in a Level I facility should be able to:

PRECONCEPTION

- I. Demonstrate an understanding of significant issues related to the preconception period.
 - A. Describe the anatomy and physiology of the non-pregnant reproductive system.
 - B. Describe the menstrual cycle.
 - C. Explain the process of conception, including fertilization and implantation.
 - D. Identify indications for preconception counseling.

PRENATAL

- II. Demonstrate an understanding of significant issues related to the prenatal period.
 - A. Describe maternal physiologic changes of pregnancy by both organ system and trimester of pregnancy.
 - B. Identify alterations in values associated with pregnancy in commonly ordered laboratory tests.
 - C. Describe psychosocial adaptations made by the typical family to pregnancy.
 - D. Describe the stages of fetal growth and development.
 - E. Discuss the importance of good nutrition in pregnancy.
 - F. Explain the benefits of breastfeeding for mother and baby.
 - G. Explain the maternal and fetal effects of substance use/abuse during pregnancy.
 - H. Identify maternal and/or fetal risk factors based on a review of the prenatal record, including the history and physical assessment.
 - I. Identify indications for and the significance of common maternal-fetal assessment techniques. Examples are:
 1. non-stress testing
 2. biophysical profile

- J. Identify the essential components which should be included in prenatal and childbirth education.
- K. Explain the importance of screening for domestic violence in the pregnant woman.
- L. Discuss the care of a woman who had no or limited prenatal care or for whom no records are available.
- M. Identify indications and resources for prenatal referral.

INTRAPARTAL

- III. Demonstrate an understanding of significant issues related to the intrapartal period.
 - A. Identify the risk status of mother and fetus based on a review of recent history, laboratory data, and a physical assessment, including labor evaluation and pelvic examination, if indicated.
 - B. Describe the stages and phases of labor.
 - C. Describe maternal physiologic and psychologic responses to labor.
 - D. Evaluate the fetal response to labor.
 - E. Evaluate and promote maternal and fetal well-being, based on assessment of fetal monitor tracings, utilizing the NICHD terminology currently recommended by ACOG and AWHONN.
 - F. Demonstrate unit-based competency in interpretation and intervention regarding electronic fetal monitor tracings.
 - G. Outline appropriate emotional and physical support for the laboring woman and her support structure.
 - H. Describe the response of the mother and fetus to commonly used analgesics and types of anesthesia.
 - I. Identify indications, procedures, and protocols for cervical ripening and/or labor induction/augmentation.
 - J. Describe nursing management of the surgical obstetric patient, both intraoperatively and postoperatively.
 - K. Identify, stabilize, and manage the patient with intrapartal complications and recognize indications for referral. Examples of complications include:
 - 1. preterm labor
 - 2. premature rupture of membranes
 - 3. hypertensive disorders

4. diabetes mellitus
 5. infectious diseases
 6. acute obstetric emergencies
 7. placental abnormalities (e.g., accreta, increta, percreta, and previa)
 8. trauma
 9. obesity (based on BMI)
- L. Explain the role of the nurse in assisting with the spontaneous and operative vaginal delivery.
 - M. Describe appropriate procedure for initial assessment and resuscitation of the newborn as specified by the most recent edition of the *Textbook of Neonatal Resuscitation* published by AHA and AAP.
 - N. Identify indications and resources for intrapartal referral.

POSTPARTAL

- IV. Demonstrate an understanding of significant issues related to the postpartal period.
 - A. Identify the risk status of the postpartal woman based on a review of recent history, including a labor and delivery summary, laboratory data, and a physical assessment.
 - B. Describe maternal physiologic and psychologic adaptation to the postpartal period.
 - C. Identify risk factors, early symptoms, and interventions for postpartum hemorrhage.
 - D. Outline the emotional and physical support necessary for the postpartal woman and her significant others.
 - E. Describe measures to promote infant safety, including safe sleep, during and after the hospital stay.
 - F. Describe, plan, and implement nursing measures to facilitate parent-infant attachment.
 - G. Describe nursing care for the breast and/or bottle feeding mother, including strategies to promote success.
 - H. Describe the risks and benefits of various methods of contraception.
 - I. Develop, implement, and document postpartal education, including maternal and infant care and family adaptation.
 - J. Recognize the stages of grief and support the family during the process.
 1. Identify normal and pathologic responses to grief.

2. Describe the techniques of intervention with families experiencing grief.
 3. Institute appropriate referrals as necessary.
- K. Identify, stabilize, and manage the patient with postpartal complications and recognize indications for referral.
- L. Assess, stabilize, and manage the newborn after delivery.

CONSULTATION/REFERRAL

- V. Demonstrate an understanding of significant issues related to consultation and/or referral during the perinatal period.
- A. Identify common indications for consultation regarding care and/or transport of the high risk mother or fetus utilizing the current edition of the *Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities* published by the Tennessee Perinatal Care System, Tennessee Department of Health, Division of Family Health and Wellness.
 - B. Describe the process of initiating consultation/referral with the Regional Perinatal Center or another hospital providing an appropriate level of care.
 - C. Outline stabilization measures commonly used either prior to or during transport.

**NEONATAL OBJECTIVES FOR
NURSES IN LEVEL I FACILITIES**

NEONATAL OBJECTIVES FOR NURSES IN LEVEL I FACILITIES

These objectives may be met by practicing nurses in a number of ways. Some of the material presented here will have been learned during basic nursing education, while other objectives will be covered during new employee orientation or in continuing education settings.

All neonatal nurses should maintain current NRP and S.T.A.B.L.E. provider status.

The nurse caring for neonatal patients in a Level I facility should be able to:

- I. Identify those maternal risk factors in the preconceptional and intrapartal periods that place the fetus and/or neonate at risk.
- II. Describe the significance of normal and abnormal results for state-of-the-art preconceptional fetal assessment.
- III. Describe the significance of baseline fetal monitor information and variations in the fetal heart rate pattern.
- IV. Identify pharmacologic agents commonly used by the obstetric patient, assess their effects on the fetus and neonate, and plan care in the well baby nursery.
- V. Identify normal fetal circulation and describe the physiologic changes that occur at birth.
- VI. Manage the neonate's response to extrauterine life.
 - A. Describe the rationale for delaying cord clamping for up to 30-120 seconds after birth.
 - B. Assign the appropriate 1 and 5 minute Apgar scores. Continue to assign a score every 5 minutes for up to 20 minutes until the Apgar score is greater than 7.
 - C. Establish priorities for assessment based on maternal history, labor-delivery history, and neonatal status.
 - D. Provide routine assessment and resuscitation at delivery in accordance with the principles of the latest edition of the *Textbook of Neonatal Resuscitation* published by the American Heart Association and the American Academy of Pediatrics.
 - E. State the rationale and procedure for administering prophylactic eye medication to the neonate and the institutional protocol for parental refusal.
 - F. State the rationale and procedure for administering Vitamin K to the neonate and the institutional protocol for parental refusal.
- VII. Identify the physiologic changes that occur during the transitional period.
- VIII. Perform a comprehensive and systematic assessment of the neonate and take action based on findings.

- A. State the homeostatic range for the following during neonatal life:
1. temperature
 2. heart rate
 3. oxygen saturation
 4. respiratory rate
 5. blood pressure
 6. hematocrit/hemoglobin
 7. blood glucose
- B. When given a neonate to assess, identify normal physical characteristics and common variations related to:
1. body contour, proportions, and posture
 2. head (including occipital frontal circumference, names of fontanelles and sutures)
 3. face (including mouth and nose)
 4. eyes
 5. ears (hearing screening)
 6. skin
 7. chest
 8. abdomen
 9. genitalia and rectum
 10. extremities
 11. vertebral column
 12. reflexes
 13. pain
- C. When given a neonate to assess:
1. identify, describe and locate point of maximal impulse of the heart
 2. count and record apical heart rate
 3. identify obvious heart murmurs
 4. auscultate the lungs to identify normal and abnormal breath sounds
 5. describe skin texture, color, and perfusion
 6. identify flaring of the nostrils, retractions, grunting, and inspiratory stridor, and relate the significance of these findings to problems experienced by the neonate
 7. identify the placement and strength of brachial and femoral pulses
 8. describe abdominal girth and shape, bowel sounds, stooling pattern, and voiding pattern
 9. describe level of consciousness, activity, and comfort / pain
 10. measure and record vital signs
 11. measure and record blood glucose
 12. describe signs and symptoms of trauma, congenital anomaly, and infection
 13. perform a complete physical assessment, record findings, identify patient needs, and initiate appropriate action based upon findings

IX. Accurately determine the gestational age of a neonate by using a standardized scoring system.

A. Define the following terms:

1. early term, full term, and late term neonate
2. preterm neonate
3. late preterm neonate
4. post-term neonate
5. small for gestational age (symmetric and asymmetric)
6. intrauterine growth restriction (IUGR) (symmetric and asymmetric)
7. large for gestational age
8. appropriate for gestational age

B. Determine the gestational age of a neonate.

C. Describe problems associated with preterm, late preterm and post-term birth.

D. Describe early stabilization, assessment, and transfer plans for gestational age ≤ 35 weeks.

E. Determine a neonate's growth classification by plotting the birthweight, head circumference, and length on the growth chart.

F. When given a simulated or actual patient situation, state the significance of abnormal intrauterine growth.

X. Describe and provide developmentally appropriate care.

XI. Apply knowledge of thermoregulation through assessment of the neonate's temperature status and maintenance of an optimal thermal environment.

A. Define neutral thermal balance.

B. List four physiologic characteristics in the neonate which influence heat loss and describe how each characteristic influences heat loss.

C. List four modes of heat transfer in the neonate, give an example of how each occurs, and identify interventions to decrease heat transfer by each of the four modes.

D. When given a hypothetical or actual patient situation, identify measures to prevent heat loss by each of the four modes.

E. Describe the physiologic process by which the neonate attempts to maintain body temperature.

F. List major physiologic problems which may result from cold stress.

G. List major physiologic problems associated with hyperthermia of the neonate.

- H. Identify optimal skin, axillary and core temperatures for both premature and term neonates.
 - I. Compare and contrast methods for monitoring a neonate's temperature with regard to safety and accuracy.
 - J. Compare and contrast methods of providing external heat for the neonate and identify advantages and disadvantages of the following:
 - 1. skin-to-skin care
 - 2. warm, draft free room (operating, delivery, nursery, NICU)
 - 3. incubator
 - 4. radiant warmer
 - 5. servocontrol
 - 6. manual control (use only to preheat the bed)
 - 7. heat packs and mattresses
 - 8. polyethylene plastic bags or wraps
 - K. Describe safe methods of increasing and decreasing a neonate's temperature.
 - L. Provide a thermal environment for the neonate which minimizes metabolic activity.
 - M. Describe an education plan that includes appropriate temperature assessment and management by the parents.
 - N. Plan nursing care to maintain an optimal temperature.
 - O. Utilize all thermoregulation equipment safely.
- XII. Assess the neonate's fluid and nutritional needs based upon gestational age, growth and weight.
- A. Recognize fluid, nutritional, and caloric needs of the term neonate based upon weight and postnatal age.
 - B. Describe gestational age, growth, muscle activity, level of consciousness, and cardiorespiratory patterns associated with nipple feeding success.
 - C. Initiate feedings based on physiologic readiness.
 - D. Encourage, promote and support breast feeding or collection of breast milk for infants who are transferred to another hospital.
 - E. Describe techniques for encouraging optimal feeding and nutrition of the well term and late preterm neonate. Utilize the services of a lactation consultant as appropriate.
 - F. Describe methods of assessing for adequate hydration in the hospital and the home.

- G. Identify measures which minimize fluid loss in the healthy, growing infant and the neonate being prepared for transport.
- XIII. Identify respiratory and / or cardiovascular problems and initiate emergency and supportive care until transport of the neonate can be accomplished.
- A. List the physiologic changes which must occur at birth in order for the lungs to function and provide oxygenation.
 - B. When given a neonate to assess, differentiate between a normal and abnormal respiratory assessment.
 - C. Identify, record, and report the following:
 - 1. shift of mediastinum to right or left
 - 2. obvious murmurs
 - 3. abnormal heart rate (include both tachycardia and bradycardia)
 - 4. abnormal rhythm/arrhythmia
 - 5. blood pressure in all four extremities
 - 6. strength of pulses in all four extremities
 - 7. pulse pressure
 - 8. pre- and post-ductal oxygen saturation
 - D. Describe indications for oxygen therapy, methods for delivering oxygen to the neonate, and appropriate use of oxygen analyzers, saturation monitors, and arterial blood gases.
 - E. Briefly describe the pathogenesis and management of pulmonary and non-pulmonary respiratory distress.
 - F. Administer appropriate care and medications needed to stabilize the neonate with a suspected or confirmed ductal (ductus arteriosus) dependent cardiac defect/condition.
- XIV. Evaluate the neonate for inappropriate glucose metabolism and take appropriate action based upon findings.
- A. Recognize in clinical practice normal depletion of glycogen stores and initiate routine monitoring and reporting techniques to identify problems.
 - B. List sources and storage reservoirs for fetal and neonatal glucose.
 - C. Identify neonates at risk for hypoglycemia based on maternal history, birthweight, gestational age, neonatal pathology, and symptoms of hypoglycemia.
 - D. Utilize history and physical assessment to plan glucose screening.
 - E. Utilize nursing measures to correct and maintain blood glucose levels within the normal range by:
 - 1. administering feedings as prescribed

2. administering oral and intravenous glucose based on the neonate's blood glucose level, clinical stability, and health care provider's order.
- XV. Plan, provide and evaluate the nursing care of neonates with hyperbilirubinemia.
- A. Define direct reacting bilirubin (conjugated bilirubin, bilirubin glucuronide), indirect reacting bilirubin (unconjugated bilirubin), and total bilirubin.
 - B. Describe the metabolism of bilirubin.
 - C. Describe the mechanism responsible for physiologic jaundice.
 - D. List the criteria for differentiating physiologic and pathologic jaundice in the neonate.
 - E. Describe the pathophysiologic changes that may be responsible for intravascular hemolysis, extravascular hemolysis, and impaired hepatic function as related to hyperbilirubinemia.
 - F. Describe those factors that increase the risk of neurotoxicity due to hyperbilirubinemia.
 - G. Define and explain the difference between breast feeding and human milk jaundice.
 - H. Describe briefly the mechanism by which different types of phototherapy decrease bilirubin levels.
 - I. Correctly administer and evaluate the method(s) of phototherapy used at your hospital to provide maximum effect and to decrease and/or lessen the side effects of therapy.
 - J. Identify indications and rationale for exchange transfusions.
 - K. Describe the rationale for routine bilirubin screening prior to discharge.
- XVI. Plan, provide and evaluate nursing care for neonates with selected hematological disorders.
- A. State the normal circulating blood volume in the neonate.
 - B. Identify the normal laboratory values of the following tests:
 1. hematocrit/hemoglobin
 2. reticulocyte count
 3. platelet count
 4. Coombs test
 5. G6PD
 - C. List common causes of hemolytic and hemorrhagic anemia in the newborn during the first day of life.

- D. List the symptoms and laboratory data characteristics of acute and chronic anemia.
 - E. Identify the factors which indicate the need for a Coombs test, type, Rh, and reticulocyte count.
 - F. Discuss the pathogenesis of Rh and ABO incompatibility.
- XVII. Identify common sources for perinatal infections, symptoms of infections, and methods to prevent health care associated infections.
- A. Identify sources of congenital and health care associated infections.
 - B. Utilize maternal history, birth history, clinical presentation, and serial laboratory results as a basis for planning neonatal infectious disease screening and management.
 - C. Explain the importance of conscientious handwashing / hand sanitizing by staff, parents, and visitors to prevent health care associated infections.
 - D. Describe the pathogenesis of common perinatal infections.
 - E. Discuss and provide care required for the infant based on maternal infection-related history (hepatitis B status, HIV, sexually transmitted infections, other).
 - F. Identify and report symptoms of sepsis in the neonate.
 - G. List the normal white blood count, differential, and platelet count in the neonate.
 - H. Identify antimicrobial agents appropriate for community-acquired neonatal colonization.
 - I. Calculate the correct dosage of antibiotics used to treat infection based upon an approved dose.
 - J. Describe initial management of the septic neonate awaiting transport.
 - K. Describe rationale for and appropriate implementation of universal precautions.
- XVIII. Evaluate the neonate for gastrointestinal problems, record findings, and initiate action based upon findings.
- A. List clinical signs of gastrointestinal dysfunction in the first 48 hours of life.
 - B. Describe signs and symptoms of pathology which would indicate the need for:
 - 1. no feedings (NPO)
 - 2. holding feedings
 - 3. intermittent GI suction
 - 4. changing of infant's position

5. sterile protective covering of exposed organs
 6. consultation / possible transfer to a higher level of care
- C. Identify pathogenesis, presentation, and early management of esophageal and gastrointestinal fistulas, obstructions, and abdominal wall defects.
- XIX. Assess and manage the infant with suspected neonatal abstinence syndrome (NAS).
 - A. Identify the infant at risk for NAS.
 - B. Describe signs and symptoms of NAS.
 - C. Demonstrate use of appropriate NAS scoring system.
 - D. Describe non-pharmacologic and pharmacologic management of NAS.
 - E. Recognize the requirement to report cases of NAS to the Tennessee Department of Health.
- XX. Discuss the concept of culturally-sensitive, family-centered care, utilizing current concepts in parent-infant attachment.
- XXI. Recognize the stages of emotional stress and grief and appropriately support the family during this process. This includes both families dealing with an infant loss and those dealing with an infant requiring palliative care.
 - A. Identify both normal and pathologic responses to crisis and grief.
 - B. Describe techniques of intervention with families experiencing crisis and grief.
 - C. Intervene therapeutically and institute appropriate referrals.
- XXII. Describe a management and education plan that promotes infant safety in the hospital and the community. One place where information can be located is the AAP “parenting corner” section on their Healthy Children website. The website can be accessed at www.HealthyChildren.org. Topics addressed in the “parenting corner” include, among others, the following:
 - A. Bathing and skin care
 - B. Conscientious hand washing / hand sanitizing and appropriate hygiene
 - C. Immunizations per current recommendations from the American Academy of Pediatrics
 - D. Falls
 - E. Burns
 - F. Safe sleep

- G. Emergency preparedness / disaster planning (examples are infant security, Code Pink, evacuation, etc.)
 - H. Infant restraint device / institutional policy regarding car seat tolerance testing
 - I. According to state statute (TCA), at least one infant parent or caregiver must receive information regarding infant CPR before discharge from the hospital. Tennessee Hospital Association member hospitals have been granted permission to refer caregivers to the website www.learncpr.org.
 - J. Information regarding Shaken Baby Syndrome and other forms of child abuse / neglect
 - K. Reasons for avoiding second hand smoke around infants and children
 - L. Reasons to contact the baby's primary care provider (no stool in 24 hours, decreased urine output, refusal to feed, change in activity, abnormal temperature, etc.)
- XXIII. Discuss current state laws related to hospital care of the neonate.
- A. Explain the rationale for newborn metabolic, hearing, and critical congenital heart disease screening.
 - B. Explain the rationale for child safety regulations and the role of the nurse in implementing them.
 - C. Perform car seat safety check prior to hospital discharge when indicated. Describe the role of the nurse in car seat tolerance testing for selected infants.
- XXIV. Discuss the history, principles, and purpose of perinatal health care regionalization.
- XXV. Identify responsibilities of the community hospital and the individual nurse in the regionalization process.
- XXVI. Demonstrate an understanding of significant issues related to consultation and/or referral during the neonatal period.
- A. Identify common indications for consultation regarding care and/or transport of the high- risk neonate utilizing the current edition of the *Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities* published by the Tennessee Perinatal Care System, Tennessee Department of Health, Division of Family Health and Wellness.
 - B. Describe the process for initiating consultation/referral with the appropriate referral center.
 - C. Outline stabilization measures commonly used either prior to or during transport using the S.T.A.B.L.E. mnemonic.

- D. Utilize the most recent edition of the Tennessee Perinatal Care System Guidelines for Transportation as the basis for planning and managing transfer.

**OBSTETRIC OBJECTIVES FOR
NURSES IN LEVEL II FACILITIES**

OBSTETRIC OBJECTIVES FOR NURSES IN LEVEL II FACILITIES

These objectives may be met by practicing nurses in a number of ways. Some of the material presented here will have been learned during basic nursing education, while other objectives will be covered during new employee orientation or in continuing education settings.

The nurse caring for obstetric patients in a Level II facility should be able to:

PRECONCEPTION

- I. Demonstrate an understanding of significant issues related to the preconception period.
 - A. Describe the anatomy and physiology of the non-pregnant reproductive system.
 - B. Describe the menstrual cycle.
 - C. Explain the process of conception, including fertilization and implantation.
 - D. Identify indications for preconception counseling.

PRENATAL

- II. Demonstrate an understanding of significant issues related to the prenatal period.
 - A. Describe maternal physiologic changes of pregnancy by both body system and trimester of pregnancy.
 - B. Identify alterations in laboratory values associated with pregnancy.
 - C. Describe psychosocial adaptations made by the family to both low and high-risk pregnancy.
 - D. Describe the effects of exposure to teratogens on the fetus at each stage of fetal growth and development.
 - E. Describe the importance of good nutrition in pregnancy.
 - F. Explain the benefits of breastfeeding for mother and baby.
 - G. Explain the maternal and fetal effects of substance use/abuse during pregnancy.
 - H. Identify maternal and/or fetal risk factors based on a review of the prenatal record, including the history and physical assessment.
 - I. Identify indications for and the significance and interpretation of currently used and newly developing maternal-fetal assessment techniques. Examples are:
 - 1. maternal assays using multiple marker screens
 - 2. high resolution ultrasonography

3. fetal lung maturity studies
 4. chromosomal evaluation
 5. biophysical profile
- J. Identify components which should be included in comprehensive prenatal and childbirth education.
 - K. Explain the importance and process of screening for domestic violence in the pregnant woman.
 - L. Discuss the care of a woman who had no or limited prenatal care or for whom no records are available.
 - M. Identify indication and resources for prenatal referral.

INTRAPARTAL

- III. Demonstrate an understanding of significant issues related to the intrapartal period.
 - A. Identify the risk status of mother and fetus based on a review of recent history, laboratory data, and a physical assessment, including labor evaluation and pelvic examination, if indicated.
 - B. Describe the stages and phases of labor.
 - C. Describe maternal physiologic and psychologic responses to labor.
 - D. Evaluate the fetal response to labor.
 - E. Explain and promote maternal and fetal well-being, based on assessment of fetal monitor tracings, utilizing the NICHD terminology currently recommended by ACOG and AWHONN.
 - F. Demonstrate unit-based competency in interpretation and intervention regarding electronic fetal monitor tracings.
 - G. Outline appropriate emotional and physical support for the laboring woman and significant others.
 - H. Describe the responses of the mother and fetus to commonly used analgesics and types of anesthesia.
 - I. Identify indications, procedures, and protocols for cervical ripening and/or labor induction/augmentation.
 - J. Describe nursing management of the surgical obstetric patient, both intraoperatively and postoperatively.
 - K. Identify, stabilize, and manage the patient with intrapartal complications and recognize indications for referral. Examples of complications include:

1. preterm labor
 2. premature rupture of membranes
 3. hypertensive disorders
 4. diabetes mellitus
 5. infectious diseases
 6. acute obstetric emergencies
 7. placental abnormalities (e.g., accreta, increta, percreta, and previa)
 8. trauma
 9. obesity (based on BMI)
- L. Explain the role of the nurse in assisting with the spontaneous and operative vaginal delivery.
- M. Demonstrate the appropriate procedure for initial assessment and resuscitation of the newborn as specified by the most recent edition of the *Textbook of Neonatal Resuscitation* published by AHA and AAP.
- N. Identify the legal implications of perinatal nursing, including appropriate documentation.
- O. Identify indications and resources for intrapartal referral.

POSTPARTAL

- IV. Demonstrate an understanding of significant issues related to the postpartal period.
- A. Identify the risk status of the postpartal woman based on a review of recent history, including a labor and delivery summary, labor data, and a physical assessment.
 - B. Describe maternal physiologic and psychologic adaptation to the postpartal period.
 - C. Identify risk factors, early symptoms, and interventions for postpartum hemorrhage.
 - D. Outline emotional and physical support necessary for the postpartal woman and her significant others.
 - E. Identify measures to promote infant safety, including safe sleep, during and after the hospital stay.
 - F. Describe, plan, and implement nursing measures to facilitate parent-infant attachment.
 - G. Describe nursing care for the breast and/or bottle feeding mother, including strategies to promote success.
 - H. Describe the risks and benefits of various methods of contraception.

- I. Develop, implement, and document postpartal education, including maternal and infant care and family adaptation.
- J. Recognize the stages of grief and support the family during the process.
 - 1. Identify normal and pathologic responses to grief.
 - 2. Describe techniques of intervention with families experiencing grief.
 - 3. Institute appropriate referrals as necessary.
- K. Identify, stabilize, and manage the patient with postpartal complications and recognize indications for referral.

CONSULTATION/REFERRAL

- V. Demonstrate an understanding of significant issues related to consultation and/or referral during the perinatal period.
 - A. Identify common indications for consultation regarding care and/or transport of high-risk mother or fetus utilizing the current edition of the *Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities* published by the Tennessee Perinatal Care System, Tennessee Department of Health, Division of Family Health and Wellness.
 - B. Describe the process of initiating consultation/referral with the Regional Perinatal Center or another hospital providing an appropriate level of care.
 - C. Outline stabilization measures commonly used either prior to or during transport.

**NEONATAL OBJECTIVES FOR
NURSES IN LEVEL II FACILITIES**

NEONATAL OBJECTIVES FOR NURSES IN LEVEL II FACILITIES

These objectives may be met by practicing nurses in a number of ways. Some of the material presented here will have been learned during basic nursing education, while other objectives will be covered during new employee orientation or in continuing education settings.

All neonatal nurses should maintain current NRP and S.T.A.B.L.E. provider status.

The nurse caring for neonatal patients in a Level II facility should be able to:

- I. Identify factors from an obstetric history which might cause fetal compromise and evaluate the neonate for physiologic distress.
 - A. Describe the physiologic changes in the mother which occur during labor.
 - B. Given patient situations, identify neonates at risk as a result of precipitous or prolonged labor.
 - C. Identify the most common examples of fetal malpresentation and describe neonatal problems which might result from each.
 - D. Given maternal histories, identify maternal problems which might result in a preterm birth.
 - E. Identify maternal, fetal, and iatrogenic problems which might result in fetal asphyxia.
 - F. Given a variety of fetal heart rate monitor patterns, identify fetal/neonatal sequelae which might result from each.
 - G. Describe appropriate antepartal and intrapartal fetal surveillance tests and interpret results.
 - H. Given a hypothetical situation, identify neonatal sequelae related to:
 1. placental abnormalities
 2. maternal hypertensive disorders
 3. maternal metabolic abnormalities (i.e., diabetes)
 4. maternal age
 5. maternal chemical dependency (prescribed vs abused)
 6. maternal social-sexual history
 7. preexisting maternal medical conditions
 8. maternal medications and anesthetics
 9. multiple gestation
 10. maternal smoking
 - I. Develop an appropriate neonatal plan of care based on an understanding of the maternal history.
- II. Discuss in detail fetal circulation and identify the physiologic changes that occur at birth.

- A. Using a diagram, trace blood through the entire fetal circulation and identify the sites of venous admixture that are unique to the fetus.
- B. Identify or describe the changes which occur at birth in the neonate's cardiovascular system and state the rationale for each change.
- C. State the role of the placenta in gas exchange.
- D. Describe maternal, fetal, and environmental factors which influence placental exchange.
- E. Explain the interrelationships of blood flow, pressure and resistance.
- F. List the effects of the following on resistance in all vascular beds:
 - 1. pH
 - 2. PO_2/SaO_2
 - 3. PCO_2
 - 4. prostaglandins

III. Manage the newborn's transition to extrauterine life.

- A. Manage early transition and resuscitation as specified in the most recent edition of the *Textbook of Neonatal Resuscitation* published by AHA and AAP.
- B. Given patient situations, develop a plan of care that would allow early recognition and management of sequelae from asphyxia and cardiopulmonary resuscitation, including consultation and referral when indicated.
 - 1 Cord clamping 30-120 seconds after birth
 - 2 Head or total body cooling if ≥ 36 weeks
- C. Develop a management plan for the moderately ill neonate that would enhance transition from the fetal cardiopulmonary circuit to the neonatal cardiopulmonary circuit.

IV. Perform a comprehensive and systematic assessment of the neonate and take action based on findings.

- A. Identify factors that influence the homeostatic range for the following during neonatal life:
 - 1. temperature
 - 2. heart rate
 - 3. respiratory rate and pattern
 - 4. color
 - 5. oxygen saturation
 - 6. blood pressure
 - 7. hematocrit/hemoglobin
 - 8. blood glucose

- B. When given a neonate to assess, identify normal physical characteristics and common variations related to:
1. body contour, proportions, and posture
 2. head (including occipital frontal circumference, names of fontanelles and sutures)
 3. face (including mouth and nose)
 4. eyes
 5. ears
 6. skin
 7. chest
 8. abdomen
 9. genitalia and rectum
 10. extremities
 11. vertebral column
 12. reflexes
- C. When given a neonate to assess:
1. identify, describe, and locate point of maximal impulse of the heart
 2. count and record apical heart rate
 3. identify obvious heart murmurs
 4. auscultate the lungs to identify normal and abnormal breath sounds
 5. identify flaring of the nostrils, retractions, grunting, inspiratory stridor, apnea, and choanal atresia, and relate the significance of these findings to problems experienced by the neonate
 6. identify placement and strength of brachial and femoral pulses
 7. describe abdominal girth and shape, stooling pattern, and voiding pattern
 8. describe skin turgor, texture, color, and perfusion
 9. describe level of consciousness, activity / tone, and comfort / pain
 10. measure and record vital signs
 11. measure and record blood glucose
 12. perform a complete physical assessment, record findings, identify patient needs, and initiate appropriate action based upon findings
- D. Establish a plan for stabilization of all infants and appropriate management of moderately ill infants utilizing the NRP and S.T.A.B.L.E. Program resources.
- E. Describe an education plan that includes infant assessment by the parent / caregiver at home.
- V. Accurately determine the gestational age of a neonate by using a standardized scoring system.
- A. Define the following terms:
1. early term, full term, and late term neonate
 2. preterm neonate
 3. late preterm neonate
 4. postterm neonate

5. small for gestational age (symmetric and asymmetric)
 6. intrauterine growth restriction (IUGR) (symmetric and asymmetric)
 7. large for gestational age
 8. appropriate for gestational age
 9. low birth weight
 10. very low birth weight
- B. Define the significance of symmetry in maturity and growth of the neonate.
 - C. Identify those factors in a maternal history which increase risk for growth and gestational age complications.
 - D. Determine the gestational age of a neonate.
 - E. Determine a neonate's growth classification by plotting the birthweight, head circumference, and length on the growth chart.
 - F. State the major implications of abnormal intrauterine growth.
 - G. Given a variety of patient gestational ages and growth parameters, develop a plan of care which reflects consideration of these issues, including the need for consultation and referral as appropriate.
- VI. Apply knowledge of thermoregulation through assessment of the neonate's temperature status and maintenance of an optimal thermal environment.
- A. Define neutral thermal balance.
 - B. List the physiologic characteristics in the neonate which influence heat loss and describe how each characteristic influences heat loss.
 - C. List the modes of heat transfer in the neonate, give an example of each, and identify interventions to decrease heat transfer by each of the modes.
 - D. When given a patient situation (i.e., bathing, etc.), identify measures to promote a neutral thermal environment.
 - E. Describe the physiologic processes by which the neonate attempts to maintain body temperature.
 - F. List major physiologic problems which may result from hypo- and hyperthermia.
 - G. Identify optimal skin, axillary, and core temperatures for neonates.
 - H. Compare and contrast methods for monitoring a neonate's temperature with regard to safety and accuracy.
 - I. Compare and contrast methods of providing external heat for the neonate, including:
 1. skin-to-skin care

2. warm, draft free room (operating, delivery, nursery, NICU)
 3. incubator
 4. radiant warmer
 5. servocontrol
 6. manual control
 7. heat packs and mattresses
 8. polyethylene wraps or bags
- J. Describe safe methods of increasing and decreasing a neonate's temperature.
- K. Identify factors other than body temperature which may indicate the status of the neonate's thermal balance.
- L. Utilize theoretical knowledge of thermoregulation to provide an optimal ambient temperature, relative humidity and wind velocity for the neonate.
- M. Utilize all thermoregulation equipment safely.
- N. Describe appropriate long-term thermal management of the neonate, including weaning from warmer to incubator or incubator to crib.
- O. Utilize head/body cooling if indicated after consultation with referral facility.
- P. Describe an education plan that includes appropriate temperature assessment and management by the parents.
- VII. Manage the neonate's fluid and nutritional needs based upon gestational age.
- A. Calculate the fluid and caloric needs of the neonate based upon weight, age, physiologic problems, and rate of growth. Anticipate and provide appropriate interventions.
 - B. Calculate the appropriate protein, fat, carbohydrate, mineral, and vitamin content needed by a neonate. Anticipate and provide appropriate interventions.
 - C. Discuss the indications and contraindications for initiating feeding.
 - D. When total oral feeding is not an option, develop a plan of care to meet fluid, electrolyte, and nutritional needs.
 - E. Describe the appropriate use of human milk, supplements, and commercial formula to meet fluid, nutrient, mineral, and vitamin requirements of neonates.
 - F. Evaluate a neonate's postnatal growth using a postnatal growth chart and identify appropriate management responses.
 - G. Develop a plan to teach parents appropriate oral nutrient and fluid sources and indications that consultation is necessary to alter oral intake after discharge.
- VIII. Select the most appropriate technique for feeding the high-risk infant.

- A. List advantages and disadvantages of continuous gastric, intermittent gastric, nipple, and breast feeding based on knowledge of the infant's physiologic status, gestational age, and weight.
 - B. Describe safe and effective procedures for feeding infants receiving continuous gastric, intermittent gastric, gastrostomy, breast and/or nipple feedings.
 - C. Recognize and report signs of feeding intolerance and differentiate care-related problems from actual changes in the infant's clinical status.
 - D. Describe the correlation of blood glucose levels to the neonate's feeding regimen.
 - E. List measures to decrease oxygen consumption, trauma, infection, air ingestion, vomiting, and aspiration in relationship to feeding techniques.
 - F. Describe methods for assisting the mother of a sick infant with feeding techniques.
- IX. Correctly administer intravenous fluids.
- A. Calculate the fluid needs of the neonate, based upon weight, age, and physiologic status.
 - B. Describe care-related causes of the following:
 - 1. overhydration
 - 2. underhydration
 - 3. infection at intravascular sites
 - 4. clotting of intravascular lines
 - 5. hemorrhage
 - 6. hypoglycemia
 - 7. hyperglycemia
 - 8. infiltration
 - 9. embolism
 - 10. thrombosis
 - C. Describe nursing measures that will enhance the positive effects and minimize the side effects of the following:
 - 1. glucose and electrolyte solutions
 - 2. umbilical venous and arterial lines
 - 3. peripheral intravenous lines
 - 4. peripherally inserted central catheter (PICC lines)
- X. Anticipate and identify fluid and electrolyte imbalance in the sick neonate.
- A. Define fluid and electrolyte loads for moderately ill neonates.
 - B. Recognize clinical histories, major signs, symptoms, laboratory values, and appropriate intervention for the following:

1. shock
 2. insensible water loss
 3. Syndrome of Inappropriate Anti-Diuretic Hormone Secretion (SIADH)
 4. renal insufficiency or failure
 5. moderate sodium and potassium imbalance
- C. Recognize abnormal electrolyte values and differentiate those abnormal values which require immediate medical intervention from those which require more frequent or thorough assessment without immediate intervention.
- XI. Apply knowledge of acid-base balance in the management of the moderately ill newborn.
- A. Identify pathophysiologic changes which result from acidosis and alkalosis.
 - B. Define pH, acid, base, base excess, and buffer.
 - C. Describe how blood, respiratory, and renal buffers compensate for acid-base imbalance.
 - D. Identify acceptable neonatal parameters for blood gas values (pH, PO₂, PCO₂, HCO₃, base excess, and pre / post oxygen saturation).
 - E. Discuss the clinical significance of blood gases obtained from various sites.
 - F. Differentiate normal from abnormal blood gases that require a change in therapy.
 - G. Recognize blood gas reports that indicate the following with the assistance of the S.T.A.B.L.E. blood gas nomogram:
 1. compensated and uncompensated metabolic acidosis
 2. compensated and uncompensated metabolic alkalosis
 3. compensated and uncompensated respiratory acidosis
 4. compensated and uncompensated respiratory alkalosis
 5. mixed metabolic and respiratory imbalances
 - H. Describe the relationship of the following to acid-base balance (pH) and measures to optimize each factor.
 1. PO₂, PCO₂, base excess
 2. diffusion gradient/O₂ and CO₂ sources
 3. respiratory rate/drive
 4. functional residual capacity (FRC)/air trapping/atelectasis
 5. tidal volume/diffusing surface
 6. blood flow
 7. Hgb function
 8. nutrient metabolism
 9. infant and ambient temperature
 10. infant activity and sleep pattern
 11. urinary and GI losses

- XII. Apply knowledge of respiratory physiology in the management of newborns with respiratory disorders.
- A. List physiologic events which must occur at birth in order for the lungs to function postnatally and list factors responsible for each event.
 - B. Describe nursing measures which would enhance cardiopulmonary function at birth.
 - C. Describe physiologic factors in the premature infant which limit respiratory function at birth.
 - D. Describe the etiology of the pathophysiologic changes which occur in the following: respiratory distress syndrome, transient tachypnea of the newborn, apnea of prematurity, air leak syndromes, pneumonia, aspiration syndromes, and persistent pulmonary hypertension of the newborn.
 - E. Describe specific observations and radiologic findings which may assist in identifying the problems listed above.
 - F. Recognize indications for supplemental oxygen, continuous positive airway pressure (CPAP), intubation, and assisted ventilation.
 - G. Describe safe management of current modes of oxygen support, CPAP, endotracheal tube, laryngeal mask airway, chest physiotherapy, airway suction, and air leaks.
 - H. Describe a plan for the safe use of respiratory monitoring and support devices in collaboration with respiratory therapy staff.
 - I. Identify and define common terms associated with ventilator therapy.
 - J. Describe safe methods of adjusting respiratory support based on the clinical condition of the neonate, oxygen saturation, blood gases, and radiologic findings.
- XIII. Demonstrate theoretical knowledge of the most common cardiac disorders that occur during the newborn period.
- A. Describe common cyanotic and acyanotic heart defects in the newborn period.
 - B. Describe the physiologic problems associated with patent ductus arteriosus.
 - C. Identify the data base which is necessary to differentiate heart disease from respiratory disease.
 - D. Describe the indications, mechanism of action, and side effects of common pharmacologic agents used in the management of cardiopulmonary disease.
 - E. Explain the rationale for critical congenital heart disease (CCHD) screening and perform appropriately.

- XIV. Plan, provide, and evaluate the nursing care of newborns with hematologic disorders.
- A. Identify normal neonatal values for the following tests:
1. hematocrit
 2. hemoglobin
 3. platelets
 4. bilirubin (total and direct)
 5. reticulocyte count
 6. Coombs test
 7. normal circulating blood volume
 8. red cell morphology
 9. G6PD
- B. Correlate lab data with sampling technique, infant's pathology, gestational age, weight, and treatment, and report immediately any unusual findings.
- C. Discuss each of the following disease processes, including etiology, signs and symptoms, laboratory data, and management plan:
1. Rh and ABO incompatibility
 2. acute anemia
 3. chronic anemia
 4. thrombocytopenia
 5. pathologic jaundice
 6. breast feeding and human milk jaundice
 7. physiologic jaundice
 8. vitamin K deficiency
 9. polycythemia
 10. DIC
- D. Describe the pathophysiologic changes that may be responsible for intravascular hemolysis, extravascular hemolysis, and impaired hepatic function as related to hyperbilirubinemia.
- E. Describe those factors that increase the risk of neurotoxicity due to hyperbilirubinemia.
- F. Describe briefly the mechanism by which phototherapy decreases bilirubin levels.
- G. Describe methods of providing phototherapy using the devices available at your hospital that will enhance the positive effects and diminish the side effects of this therapy.
- H. Describe indications for transfusions, exchange transfusions, and partial volume exchange transfusions.
- I. Describe the appropriate use of pharmacologic agents for hematologic disorders when indicated.

- J. Describe signs, symptoms, laboratory values, and treatment requirements that would indicate the need for consultation or transfer.
 - K. Recognize the components of and the rationale for newborn hemoglobinopathy screening in the state of Tennessee and perform appropriately.
- XV. Plan, provide, and evaluate the nursing care of newborns with selected metabolic disorders.
- A. Describe the normal pattern of serum glucose changes in the newborn period and utilize this information in planning glucose screens for well term and late preterm neonates.
 - B. Identify infants at risk for abnormalities in glucose metabolism and plan glucose screening appropriate to the risk factor.
 - C. Describe a safe and effective treatment plan for moderately ill infants who have abnormal glucose metabolism.
 - D. Identify infants at risk for abnormalities in calcium and magnesium metabolism.
 - E. Identify abnormal serum calcium and magnesium levels from lab reports and differentiate those that require immediate intervention from those which should be further monitored.
 - F. Demonstrate awareness of rare metabolic disorders which require immediate consultation and/or referral.
 - G. List the components of and the rationale for newborn metabolic screening in the state of Tennessee and perform appropriately.
- XVI. Plan, provide, and evaluate the nursing care of newborns with gastrointestinal disorders.
- A. Characterize the functional limitations of the preterm and term neonate's gastrointestinal tract.
 - B. List major clinical signs of gastrointestinal dysfunction.
 - C. Identify problems outside the gastrointestinal tract which will alter digestion, absorption, and motility.
 - D. When given a patient situation, differentiate between signs of upper and lower gastrointestinal obstructions.
 - E. When given a hypothetical situation, identify therapeutic measures that will alleviate or diminish gastrointestinal problems.
 - F. Describe signs of pathology which would indicate the need for:
 - 1. no feedings (NPO)
 - 2. holding feedings

3. gastric aspiration
 4. intermittent GI suction
 5. hematest on stools
 6. reducing substances test on stools
 7. suppository
 8. changing of infant's position
 9. protective sterile covering of exposed organs
- G. Discuss the pathogenesis and emergent management of necrotizing enterocolitis, intestinal obstructions, and congenital anomalies of the gastrointestinal tract.
- H. Describe a teaching plan that would assist parents in notifying the health care provider appropriately about gastrointestinal dysfunction after discharge.
- XVII. Identify common sources of perinatal infections, clinical indications of infections, and methods to prevent health care associated infections.
- A. Identify major pathways of congenital and health care associated infections.
 - B. Explain the importance of conscientious handwashing / hand sanitizing by staff, parents, and visitors to prevent health care associated infections.
 - C. Utilize maternal history, birth history, clinical presentation, and serial laboratory results as a basis for planning neonatal infectious disease screening and management.
 - D. Identify signs of localized and systemic congenital and health care associated infections in the neonate.
 - E. Describe how the neonate's immature immune system is a predisposition for infection and affects laboratory values.
 - F. Identify those laboratory values related to screening for infection that require immediate intervention as opposed to monitoring.
 - G. Describe a safe and effective stabilization/referral plan for the neonate experiencing or at risk for sepsis utilizing the current S.T.A.B.L.E. Program resources.
- XVIII. Plan and implement measures to protect neurosensory function and to evaluate the infant's response to care.
- A. Describe major differences in the neurologic function of the preterm, late preterm, term, and older infant.
 - B. Identify disorders outside the nervous system which alter function of the nervous system.
 - C. Describe and implement a comprehensive assessment plan which will provide for prevention, early identification, and prompt treatment of sensory neural disorders.

1. reflexes
 2. posture
 3. activity and movement
 4. level of consciousness
 5. rest and sleep
 6. comfort, irritability, pain
 7. vision
 8. hearing
- D. Identify and describe seizure activity and delineate a plan for safe administration of anticonvulsants.
- E. Briefly describe symptoms, stabilization techniques, and prognosis of:
1. microcephaly
 2. major chromosomal abnormalities (Trisomy 13-15, 18, 21)
 3. congenital and acquired hydrocephaly
 4. infection of the central nervous system (prenatal and postnatal)
 5. neural tube defects
 6. intracranial hemorrhage
 7. neurologic sequelae of drugs, hypoxic-ischemic circulation, acid-base imbalance, electrolyte imbalance, and metabolic disorders
 8. cerebral edema with or without inappropriate ADH
- F. Describe an education plan that includes parent recognition of appropriate sensory neural function, necessity for continuing medical assessment, and interventions appropriately used by parents.
- XIX. Assess and manage the infant with suspected neonatal abstinence syndrome (NAS).
- A. Identify the infant at risk for NAS.
 - B. Describe signs and symptoms of NAS.
 - C. Demonstrate use of appropriate NAS scoring system.
 - D. Describe non-pharmacologic and pharmacologic management of NAS.
 - E. Recognize the requirement to report cases of NAS to the Tennessee Department of Health.
- XX. Utilize knowledge of neonatal pharmacology to optimize desired drug actions and minimize side effects.
- XXI. Describe a management and education plan that promotes infant safety in the hospital and the community. One place where information can be located is the AAP “parenting corner” section on their Healthy Children website. The website can be accessed at www.HealthyChildren.org. Topics addressed in the “parenting corner” include, among others, the following:

- A. Routine discharge plans and follow-up care as determined by health care provider
 - B. Bathing and skin care
 - C. Conscientious hand washing / hand sanitizing and appropriate hygiene
 - D. Immunizations per current recommendations from the American Academy of Pediatrics. RSV prophylaxis should be considered.
 - E. Falls
 - F. Burns
 - G. Safe sleep
 - H. Emergency preparedness / disaster planning (examples are infant security, Code Pink, evacuation, etc.)
 - I. Infant restraint device / institutional policy regarding car seat tolerance testing
 - J. According to state statute (TCA), at least one infant parent or caregiver must receive information regarding infant CPR before discharge from the hospital. Tennessee Hospital Association member hospitals have been granted permission to refer caregivers to the website www.learncpr.org.
 - K. Information regarding Shaken Baby Syndrome and other forms of child abuse / neglect
 - L. Reasons for avoiding second hand smoke around infants and children
 - M. Reasons to contact the baby's primary care provider (respiratory distress, no stool in 24 hours, decreased urine output, refusal to feed, change in activity, abnormal temperature, etc.)
- XXII. Utilize culturally-appropriate parent-infant attachment concepts in dealing with families of sick newborns.
- A. Identify prenatal and postnatal factors which may influence parental attachment and caretaking.
 - B. Recognize and describe behaviors which indicate the status of parent-infant attachment, including the significance of these behaviors.
 - C. Recognize and describe the stages of emotional stress and the grief process. This includes both families dealing with an infant loss and those dealing with an infant requiring palliative care.
 - D. Describe how emotional stress and the grief process may influence family relationships.

- E. Plan and implement nursing measures which will appropriately facilitate and support completion of the grief process.
 - F. Describe how attitudes of “significant others” influence parental attachment.
 - G. Plan and implement nursing measures which will facilitate culturally-appropriate parent-infant interaction.
 - H. Identify and utilize community resources for various aspects of home care support after discharge.
- XXIII. Demonstrate an understanding of significant issues related to consultation and/or referral during the neonatal period.
- A. Describe the interactive roles of health care disciplines in providing care to neonates and their families.
 - B. Identify common indications for consultation regarding care and/or transport of the high- risk neonate utilizing the current edition of the *Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities* published by the Tennessee Perinatal Care System, Tennessee Department of Health, Division of Family Health and Wellness.
 - C. Describe the process for initiating consultation/referral with the appropriate referral center.
 - D. Outline stabilization measures commonly used either prior to or during transport utilizing the S.T.A.B.L.E. mnemonic.

**OBSTETRIC OBJECTIVES FOR
NURSES IN LEVEL III FACILITIES**

OBSTETRIC OBJECTIVES FOR NURSES IN LEVEL III FACILITIES

These objectives may be met by practicing nurses in a number of ways. Some of the material presented here will have been learned during basic nursing education, while other objectives will be covered during new employee orientation or in continuing education settings.

The nurse caring for obstetric patients in a Level III facility should be able to:

PRECONCEPTION

- I. Demonstrate an understanding of significant issues related to the preconception period.
 - A. Describe the anatomy and physiology of the non-pregnant reproductive system.
 - B. Describe the menstrual cycle.
 - C. Explain the process of conception, including fertilization and implantation.
 - D. Identify indications for preconception counseling, including both medical and genetic factors.
 - E. Describe therapeutic modalities commonly employed in the treatment of infertility.
 - F. Identify the psychosocial impact of a history of infertility on the couple experiencing a subsequent pregnancy.

PRENATAL

- II. Demonstrate an understanding of significant issues related to the prenatal period.
 - A. Describe maternal physiologic changes of pregnancy by both body system and trimester of pregnancy.
 - B. Identify alterations in laboratory values associated with both low and high-risk pregnancy.
 - C. Describe psychosocial adaptations made by the family to both normal and high-risk pregnancy.
 - D. Describe the effects of exposure to teratogens on the fetus at each stage of fetal growth and development.
 - E. Explain the benefits of breastfeeding for mother and baby.
 - F. Discuss the importance of good nutrition in pregnancy.
 - G. Explain the maternal and fetal effects of substance use/abuse during pregnancy.

- H. Identify maternal and/or fetal risk factors based on a review of the prenatal record, including the pregnancy history, laboratory data, and physical assessment.
- I. Identify indications for and the significance and interpretation of currently used and newly developing maternal-fetal assessment techniques. Examples are:
 - 1. non-invasive prenatal testing
 - 2. maternal assays using multiple marker screens
 - 3. doppler flow studies
 - 4. percutaneous umbilical blood sampling (PUBS)
- J. Describe indications for and the management of patients receiving currently used and newly developing fetal therapy techniques. Examples include:
 - 1. open procedure to repair neural tube defects
 - 2. needle procedures, such as intrauterine transfusion, bladder stent placement, thoracentesis, and skin biopsy
 - 3. amnioexchange for gastroschisis
- K. Explain the importance of screening for domestic violence in the pregnant woman.
- L. Identify components which should be included in comprehensive prenatal and childbirth education.
- N. Discuss the care of a woman who had no or limited prenatal care or for whom no records are available.
- N. Identify indications and resources for prenatal referral.

INTRAPARTAL

- III. Demonstrate an understanding of significant issues related to the intrapartal period.
 - A. Identify the risk status of mother and fetus based on a review of recent history, laboratory data, and a physical assessment, including labor evaluation and pelvic examination, if indicated.
 - B. Describe the stages and phases of labor.
 - C. Describe maternal physiologic and psychologic responses to labor.
 - D. Evaluate the fetal response to labor.
 - E. Evaluate and promote maternal and fetal well-being, based on assessment of fetal monitor tracings, utilizing the NICHD terminology currently recommended by ACOG and AWHONN.

- F. Demonstrate unit-based competency in interpretation and intervention regarding electronic fetal monitor tracings.
- G. Outline appropriate emotional and physical support for the laboring woman and significant others.
- H. Describe the response of the mother and fetus to commonly used analgesics and types of anesthesia.
- I. Identify indications, procedures, and protocols for cervical ripening and/or labor induction/augmentation.
- J. Identify, stabilize, and manage the patient with intrapartal complications and recognize indications for referral. Examples of complications include:
 - 1. premature labor
 - 2. premature rupture of membranes
 - 3. cardiovascular abnormalities
 - 4. endocrine abnormalities
 - 5. neurologic abnormalities
 - 6. renal abnormalities
 - 7. hepatic abnormalities
 - 8. pulmonary abnormalities
 - 9. hematologic abnormalities
 - 10. infectious diseases
 - 11. acute obstetric emergencies
 - 12. placental abnormalities (e.g., accreta, increta, percreta, and previa)
 - 13. trauma
 - 14. obesity (based on BMI)
- K. Describe nursing management of the surgical obstetric patient, both intraoperatively and postoperatively.
- L. Describe nursing management of the critically ill obstetric patient who requires the use of high-tech equipment and procedures. Examples are:
 - 1. electrocardiogram interpretation
 - 2. arterial blood gas interpretation
 - 3. mechanical ventilation
 - 4. arterial line placement
 - 5. hemodynamic monitoring
- M. Explain the role of the nurse in assisting with the spontaneous or operative vaginal delivery.
- N. Describe appropriate procedure for initial assessment and resuscitation of the newborn as specified by the most recent edition of the *Textbook of Neonatal Resuscitation* published by AHA and AAP.
- O. Identify the legal implications of perinatal nursing, including appropriate documentation.

- P. Identify indications and resources for intrapartal referral.

POSTPARTAL

- IV. Demonstrate an understanding of significant issues related to the postpartal period.
 - A. Identify the risk status of the postpartal woman based on a review of recent history, including a labor and delivery summary, laboratory data, and a physical assessment.
 - B. Describe maternal physiologic and psychologic adaptation to the postpartal period.
 - C. Identify risk factors, early symptoms, and interventions for postpartum hemorrhage.
 - D. Outline emotional and physical support necessary for the postpartal woman and her significant others.
 - E. Describe, plan, and implement nursing measures to facilitate parent-infant attachment.
 - F. Identify measures to promote infant safety, including safe sleep, during and after the hospital stay.
 - G. Describe nursing care for the breast and/or bottle feeding mother, including strategies to promote success.
 - H. Describe the risks and benefits of various methods of contraception.
 - I. Develop, implement, and document postpartal education, including maternal and infant care and family adaptation.
 - J. Recognize the stages of grief and support the family during the process.
 - 1. Identify normal and pathologic responses to grief.
 - 2. Describe techniques of intervention with families experiencing grief.
 - 3. Institute appropriate referrals as necessary.
 - K. Identify, stabilize, and manage the patient with postpartal complications and recognize indications for referral.

CONSULTATION/REFERRAL

- V. Demonstrate an understanding of significant issues related to consultation and/or referral during the perinatal period.

- A. Identify common indications for consultation regarding care and/or transport of the high- risk mother or fetus utilizing the current edition of the *Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities* published by the Tennessee Perinatal Care System, Tennessee Department of Health, Division of Family Health and Wellness.
- B. Describe the process of initiating consultation/referral with the Regional Perinatal Center.
- C. Outline stabilization measures commonly used either prior to or during transport.

**NEONATAL OBJECTIVES FOR
NURSES IN LEVEL III FACILITIES**

NEONATAL OBJECTIVES FOR NURSES IN LEVEL III FACILITIES

These objectives may be met by practicing nurses in a number of ways. Some of the material presented here will have been learned during basic nursing education, while other objectives will be covered during new employee orientation or in continuing education settings.

All neonatal nurses should maintain current NRP and S.T.A.B.L.E. provider status.

The nurse caring for neonatal patients in a Level III facility should be able to:

- I. Identify factors from an obstetric history which might cause fetal compromise and evaluate the neonate for physiologic distress.
 - A. Describe the physiologic changes in the mother which occur during labor.
 - B. Given patient situations, identify neonates at risk as a result of precipitous or prolonged labor.
 - C. Identify the most common examples of fetal malpresentation and describe neonatal problems which might result from each.
 - D. Given maternal histories, identify maternal problems which might result in a preterm birth.
 - E. Identify maternal, fetal, and iatrogenic problems which might result in fetal asphyxia.
 - F. Given a variety of fetal heart rate monitor patterns, identify fetal/neonatal sequelae which might result from each.
 - G. Describe appropriate antepartal and intrapartal fetal surveillance tests and interpret results.
 - H. Given a hypothetical situation, identify neonatal sequelae related to:
 1. placental abnormalities
 2. maternal hypertensive disorders
 3. maternal metabolic abnormalities (i.e., diabetes)
 4. maternal age
 5. maternal chemical dependency (prescribed vs abused)
 6. maternal social-sexual history
 7. preexisting maternal medical conditions
 8. maternal medications and anesthetics
 9. multiple gestation
 10. maternal smoking
 - I. Develop an appropriate neonatal plan of care based on an understanding of the maternal history.
- II. Discuss in detail fetal circulation and identify the physiologic changes that occur at birth.

- A. Using a diagram, trace blood through the entire fetal circulation and identify the sites of venous admixture that are unique to the fetus.
- B. Identify or describe the changes which occur at birth in the neonate's cardiovascular system and state the rationale for each change.
- C. State the role of the placenta in gas exchange.
- D. Describe maternal, fetal, and environmental factors which influence placental exchange.
- E. Explain the interrelationships of blood flow, pressure and resistance.
- F. List the effects of the following on resistance in all vascular beds:
 - 1. pH
 - 2. PO₂/SaO₂
 - 3. PCO₂
 - 4. Prostaglandins
 - 5. Inhaled nitric oxide (iNO)
 - 6. Indomethacin / Ibuprofen
 - 7. Blood volume secondary to timing of cord clamping

III. Manage the newborn's transition to extrauterine life.

- A. Manage early transition and resuscitation as specified in the most recent edition of the *Textbook of Neonatal Resuscitation* published by AHA and AAP.
- B. Given patient situations, develop a plan of care that would allow early recognition and long-term management of sequelae from asphyxia and cardiopulmonary resuscitation, including consultation and referral when indicated.
 - 1 Cord clamping 30-120 seconds after birth
 - 2 Head or total body cooling if \geq 36 weeks
- C. Develop a management plan for all neonates that would enhance transition from the fetal cardiopulmonary circuit to the neonatal cardiopulmonary circuit.

IV. Perform a comprehensive and systematic assessment of the neonate and take action based on findings.

- A. Identify factors that influence the homeostatic range for the following during neonatal life:
 - 1. temperature
 - 2. heart rate
 - 3. respiratory rate and pattern
 - 4. color
 - 5. oxygen saturation
 - 6. blood pressure

7. hematocrit/hemoglobin
 8. blood glucose
- B. When given a neonate to assess, identify normal physical characteristics and common variations related to:
- 1 body contour, proportions, and posture
 - 2 head (including occipital frontal circumference, names of fontanelles and sutures)
 - 3 face (including mouth and nose)
 - 4 eyes
 - 5 ears
 - 6 skin
 - 7 chest
 - 8 abdomen
 - 9 genitalia and rectum
 - 10 extremities
 - 11 vertebral column
 - 12 reflexes
- C. When given a neonate to assess:
- 1 identify, describe, and locate point of maximal impulse of the heart
 - 2 count and record apical heart rate and respiratory rate
 - 3 identify heart murmurs
 - 4 auscultate the lungs and describe breath sounds
 - 5 identify flaring of the nostrils, retractions, grunting, inspiratory stridor, apnea, and choanal atresia, and relate the significance of these findings to problems experienced by the neonate
 - 6 identify the presence, strength, and equality of all pulses
 - 7 describe abdominal girth and shape, stooling pattern, and voiding pattern
 - 8 describe skin turgor, texture, color, and perfusion
 - 9 describe level of consciousness, activity / tone, and comfort / pain
 - 10 evaluate central and peripheral blood pressure
 - 11 measure and record blood glucose
 - 12 perform a complete physical assessment, record findings, identify patient needs, and initiate appropriate action based upon findings
- D. Establish a plan for stabilization and appropriate management of all infants, including those who are critically ill utilizing the NRP and S.T.A.B.L.E. Program resources.
- E. Describe an education plan that includes infant assessment by the parent / caregiver at home.
- V. Appropriately utilize the neonate's gestational age and fetal growth pattern in managing care.
- A. Define the following terms:

1. early term, full term, and late term neonate
 2. preterm neonate
 3. late preterm neonate
 4. postterm neonate
 5. small for gestational age (symmetric and asymmetric)
 6. intrauterine growth restriction (IUGR) (symmetric and asymmetric)
 7. large for gestational age
 8. appropriate for gestational age
 9. low birth weight
 10. very low birth weight
 11. extremely low birth weight
- B. Define the stages of fetal cellular growth and identify developmental problems associated with interference in each stage.
- C. Identify infants at increased risk for growth and gestational age complications based upon maternal history.
- D. Determine the gestational age of a neonate by utilizing a standardized scoring system.
- E. Determine a neonate's growth classification by plotting the birth weight, head circumference, and length on an intrauterine growth chart and interpret significance.
- F. State the implications of abnormal intrauterine growth and of non-term birth.
- G. Given a variety of patient gestational ages and growth parameters, develop a plan of care which reflects consideration of these issues.
- VI. Apply knowledge of thermoregulation through assessment of the neonate's temperature status and maintenance of an optimal thermal environment.
- A. Define neutral thermal balance.
- B. List the physiologic characteristics in the neonate which influence heat loss and describe how each characteristic influences heat loss.
- C. List the modes of heat transfer in the neonate, give an example of each, and identify interventions to decrease heat transfer by each of the modes.
- D. When given a patient situation (i.e., surgery, special procedures, etc.), identify measures to promote a neutral thermal environment.
- E. Describe the physiologic processes by which the neonate attempts to maintain body temperature.
- F. List the physiologic problems which may result from hypo- and hyperthermia.
- G. Identify optimal skin, axillary, and core temperatures for both premature and term neonates.

- H. Compare and contrast methods for monitoring a neonate's temperature with regard to safety and accuracy.
 - I. Compare and contrast methods of providing external heat for the neonate, including:
 - 1. skin-to-skin care
 - 2. warm, draft free room (operating, delivery, transport, nursery, NICU)
 - 3. incubator
 - 4. radiant warmer
 - 5. servocontrol
 - 6. manual control
 - 7. heat packs and mattresses
 - 8. polyethylene wraps or bags
 - 9. appropriate use of humidity
 - J. Describe safe methods of increasing and decreasing a neonate's temperature.
 - K. Identify factors other than body temperature which may indicate the status of the neonate's thermal balance.
 - L. Utilize theoretical knowledge of thermoregulation to provide an optimal ambient temperature, relative humidity and wind velocity for the neonate.
 - M. Utilize all thermoregulation equipment safely.
 - N. Describe appropriate long-term thermal management of the neonate, including weaning from warmer to incubator or incubator to crib.
 - O. Utilize head/body cooling if indicated per institutional policy.
 - P. Describe an education plan that includes appropriate temperature assessment and management by the parents.
- VII. Manage the neonate's fluid and nutritional needs to promote optimal growth.
- A. Calculate the fluid and caloric needs of the neonate based upon weight, age, physiologic problems, and rate of growth. Anticipate and provide appropriate interventions.
 - B. Calculate the appropriate protein, fat, carbohydrate, mineral, and vitamin content for neonates of various gestational ages and weights. Anticipate and provide appropriate interventions.
 - C. Discuss the indications and contraindications for initiating or continuing feeding.
 - D. When total oral feeding is not an option, develop a plan of care to meet fluid, electrolyte, and nutritional needs, including the use of hyperalimentation and intralipid therapy.

- E. Describe the advantages, disadvantages, and potential complications of varying the concentration of commercial formulas.
 - F. Describe the appropriate use of human milk, supplements, and commercial formula to meet fluid, nutrient, mineral, and vitamin requirements of neonates.
 - G. Evaluate a neonate's postnatal growth using a postnatal growth chart and identify appropriate management responses.
 - H. Develop a plan to teach parents appropriate oral nutrient and fluid sources and indications that consultation is necessary to alter oral intake after discharge.
- VIII. Select the most appropriate technique for feeding the high-risk infant.
- A. List advantages and disadvantages of continuous gastric, intermittent gastric, transpyloric, gastrostomy, and breast / bottle feeding based on knowledge of the infant's physiologic status, gestational age, and weight.
 - B. Describe safe and effective procedures for feeding infants receiving continuous gastric, intermittent gastric, gastrostomy, breast and/or nipple feedings.
 - C. Recognize and report signs of feeding intolerance and differentiate care-related problems from actual changes in the infant's clinical status.
 - D. Describe the correlation of blood glucose levels to the neonate's feeding regimen.
 - E. List measures to decrease oxygen consumption, trauma, infection, air ingestion, vomiting, and aspiration in relationship to feeding techniques.
 - F. Describe methods for assisting the mother of a sick infant with feeding techniques.
- IX. Correctly administer intravenous fluids.
- A. Calculate the fluid needs of the neonate, based upon weight, age, and physiologic status.
 - B. Describe care-related causes of the following:
 - 1. overhydration
 - 2. underhydration
 - 3. infection at intravascular sites
 - 4. clotting of intravascular lines
 - 5. hemorrhage
 - 6. hypoglycemia
 - 7. hyperglycemia
 - 8. infiltration
 - 9. embolism
 - 10. thrombosis

- C. Describe nursing measures that will enhance the positive effects and minimize the side effects of the following:
 - 1. glucose and electrolyte solutions, including total parenteral nutrition (TPN), intralipid therapy, and colloids
 - 2. umbilical venous and arterial lines
 - 3. peripheral venous and arterial lines
 - 4. peripherally inserted central catheter (PICC lines)
 - 5. central venous lines (CVL)

- X. Anticipate and identify fluid and electrolyte imbalance in the sick neonate.
 - A. Define fluid and electrolyte loads for all neonates.
 - B. Describe the following mechanisms for control of fluid and electrolyte balance:
 - 1. diffusion
 - 2. osmosis
 - 3. filtration
 - 4. sodium and potassium pump
 - 5. ADH control
 - 6. rennin, angiotensin, aldosterone control
 - 7. atrial natriuretic peptide
 - C. Recognize clinical histories, major signs, symptoms, laboratory values, and clinical interventions for the following:
 - 1. hyponatremia
 - 2. hypernatremia
 - 3. hypochloremia
 - 4. hyperchloremia
 - 5. hypokalemia
 - 6. hyperkalemia
 - 7. fluid shifts
 - 8. overhydration
 - 9. dehydration
 - D. Given a clinical history, laboratory values, and physical assessment data, delineate an appropriate assessment and treatment plan.

- XI. Apply knowledge of acid-base balance in the management of the sick newborn.
 - A. Identify pathophysiologic changes which result from acidosis and alkalosis.
 - B. Define pH, acid, base, base excess, and buffer.
 - C. Describe how blood, respiratory, and renal buffers compensate for acid-base imbalance.

- D. Identify acceptable neonatal parameters for blood gas values (pH, PO₂, PCO₂, HCO₃, base excess, and pre / post oxygen saturation).
 - E. Compare and contrast the clinical significance of respiratory gas information obtained from the following sites: capillary, peripheral artery puncture, umbilical artery, transcutaneous probes, end tidal CO₂, pulse oximetry.
 - F. Identify abnormal blood gases that require a change in therapy from those that require continued assessment without a change in therapy.
 - G. Recognize blood gas reports that indicate the following with the assistance of the S.T.A.B.L.E. blood gas nomogram.:
 - 1. compensated and uncompensated metabolic acidosis
 - 2. compensated and uncompensated metabolic alkalosis
 - 3. compensated and uncompensated respiratory acidosis
 - 4. compensated and uncompensated respiratory alkalosis
 - 5. mixed metabolic and respiratory imbalances
 - H. Describe the etiology of acid-base imbalances in relation to gain or loss of fixed acid, gain or loss of base, gain or loss of carbon dioxide.
 - I. Describe the relationship of the following to acid-base balance (pH) and measures to optimize each factor.
 - 1. PO₂, PCO₂, base excess
 - 2. diffusion gradient/O₂ and CO₂ sources
 - 3. respiratory rate/drive
 - 4. functional residual capacity (FRC)/air trapping/atelectasis
 - 5. tidal volume/diffusing surface
 - 6. blood flow
 - 7. Hgb function
 - 8. nutrient supply / sources of acid and base
 - 9. infant and ambient temperature
 - 10. infant activity and sleep pattern
 - 11. urinary and GI losses
 - 12. mean airway pressure
 - 13. minute ventilation
 - J. Describe appropriate use of pharmacologic agents which alter acid-base balance.
- XII. Apply knowledge of respiratory physiology in the management of newborns with respiratory disorders.
- A. Demonstrate a working knowledge of the terms used to describe respiratory pathology, pulmonary function, and respiratory support.
 - B. List physiologic events which must occur at birth in order for the lungs to function postnatally and list factors responsible for each event.

- C. Describe physiologic factors which enhance or deter respiratory movement.
 - D. Describe physiologic factors which oppose air entry into the alveoli.
 - E. Describe how surfactant influences establishment of functional residual capacity (FRC), including factors which may limit or enhance surfactant production.
 - F. Describe factors which influence the following:
 - 1. closure of patent ductus arteriosus
 - 2. closure of foramen ovale
 - 3. pulmonary arteriolar dilation
 - 4. pulmonary vascular resistance
 - 5. cerebral blood flow
 - G. Describe medical and nursing measures which may enhance the establishment of respiration.
 - H. Describe physiologic factors in the premature which limit the establishment of normal respiration.
 - I. Describe the pathophysiologic changes in and etiology of neonatal respiratory disorders.
 - J. Describe specific observations, radiologic findings, and laboratory results which would assist in differentiating specific neonatal respiratory disorders.
 - K. Given specified neonatal respiratory patterns, identify the probable etiology, based on knowledge of gestational age, pathophysiology, and the environment.
 - L. Describe the mechanism of action, side effects, and appropriate administration of pharmacologic agents (i.e., surfactants) used in the treatment of neonatal respiratory disorders.
 - M. Describe nursing management of neonates with respiratory disorders requiring surgical intervention.
- XIII. Describe appropriate measures for managing neonatal respiratory support systems.
- A. Describe the indications for and the mechanisms of operation of various respiratory support systems.
 - B. Demonstrate a thorough working knowledge of the neonatal respiratory support equipment used in the facility.
 - 1. Describe clinical indications and state measures to diminish, identify, and treat the potential complications. Also describe the interrelationships of the ventilator settings listed:
 - a. modes of ventilation
 - volume ventilation

- time-cycled pressure-limited ventilation (TCPL)
 - controlled mandatory ventilation (CMV)
 - intermittent mandatory ventilation (IMV)
 - synchronized intermittent mandatory ventilation (SIMV)
 - assist-control ventilation (A-CV)
 - pressure support ventilation (PSV)
 - high frequency ventilation (HFV)
 - high frequency oscillatory ventilation (HFOV)
 - high frequency jet ventilation (HFJV)
 - inhaled nitric oxide (iNO)
 - high flow nasal cannula (HFNC)
- b. oxygen concentration (FiO_2)
 - c. continuous positive airway pressure (CPAP)/positive end expiratory pressure (PEEP)
 - d. ventilator rate
 - e. frequency
 - f. amplitude
 - g. inspiratory time
 - h. % inspiratory time
 - i. expiratory time
 - j. I/E ratio
 - k. peak inspiratory pressure (PIP)
 - l. mean airway pressure (MAP/Paw)

- C. Describe the possible complications which may be associated with respiratory support.
 - D. Develop a management plan that limits the complications of respiratory support.
 - E. Describe the etiology, specific signs and symptoms, and radiologic findings associated with neonatal respiratory disorders.
 - F. Describe safe methods of adjusting respiratory support based on the clinical condition of neonate, blood gases, oxygen saturation, and radiologic findings.
 - G. Describe the pharmacologic methods used in the treatment of respiratory disorders.
- XIV. Plan, provide, and evaluate the care of infants with cardiac disorders.
- A. Explain the embryogenesis of cardiac development.
 - B. Describe the cardiovascular pressure, resistance, and blood flow alterations resulting from cardiac disorders.
 - C. Describe common cyanotic and acyanotic heart defects in the newborn period.
 - D. Describe the physiologic problems associated with patent ductus arteriosus.

- E. Identify the data base which is necessary to differentiate heart disease from respiratory disease.
 - F. Describe the indications for, the mechanism of action, and the side effects of common medications used in the treatment of cardiopulmonary disease. (i.e., prostaglandins).
 - G. Recognize major rate and rhythm abnormalities.
 - F. Explain the rationale for critical congenital heart disease (CCHD) screening and perform appropriately.
- XV. Plan, provide, and evaluate the nursing care of newborns with hematologic disorders.
- A. Briefly describe hematopoiesis in the fetus / newborn.
 - B. Describe the characteristics which differentiate adult and fetal hemoglobin.
 - C. Describe normal neonatal coagulation.
 - D. Identify normal neonatal values for the following tests:
 - 1. hematocrit
 - 2. hemoglobin
 - 3. platelets
 - 4. bilirubin (direct, indirect, and total)
 - 5. reticulocyte count
 - 6. prothrombin time
 - 7. partial thromboplastin time
 - 8. fibrinogen
 - 9. Coombs (direct and indirect)
 - 10. circulating blood volume
 - 11. red cell morphology
 - 12. G6PD
 - E. Describe how the following may alter laboratory data:
 - 1. gestational age
 - 2. timing of cord clamping
 - 3. delivery technique
 - 4. blood volume
 - 5. transfusion
 - 6. exchange transfusion / partial volume exchange transfusion
 - 7. timing of sample
 - 8. sampling technique
 - F. Identify etiology, infants at risk, and management plan for:
 - 1. hemorrhage
 - 2. hemolytic disorders
 - 3. coagulation disorders

4. thrombocytopenia
 5. polycythemia / hyperviscosity syndrome
 6. acute and chronic anemia
- G. Describe the formation, transport, conjugation, and excretion of bilirubin.
 - H. Describe the pathophysiologic changes that may be responsible for intravascular hemolysis, extravascular hemolysis, and impaired hepatic function as related to hyperbilirubinemia.
 - I. Describe those factors that increase the risk of neurotoxicity due to hyperbilirubinemia.
 - J. Describe a nursing assessment plan that allows prompt recognition of abnormal bilirubin metabolism and a management plan that reduces the risk of neurotoxicity.
 - K. Describe a parent teaching plan that encourages prompt recognition and referral for jaundice in the community setting.
 - L. Recognize the components of and the rationale for newborn hemoglobinopathy screening in the state of Tennessee and perform appropriately.
- XVI. Plan, provide, and evaluate the nursing care of newborns with selected metabolic disorders.
- A. Describe the pattern of glucose metabolism in the newborn period.
 - B. Describe how the following alter serum glucose:
 1. gestational age
 2. placental glucose transport
 3. hormones
 4. glycogen storage and release
 5. glucose intake and metabolism
 6. protein and fat intake
 7. enteral and parenteral nutrition
 8. aerobic vs anaerobic metabolism
 9. thermal status
 10. medications that alter glucose metabolism
 - C. Identify infants at risk for abnormalities in glucose metabolism and describe glucose screening plans appropriate to the risk factors.
 - D. Describe management plans that maintain a safe serum glucose level and an appropriate growth pattern.
 - E. Identify infants at risk for abnormalities in calcium and magnesium metabolism.

- F. Identify abnormal serum calcium and magnesium levels from lab reports and differentiate those that require immediate intervention from those which should be further monitored.
 - G. Describe a safe and effective treatment plan for infants who exhibit abnormal calcium, magnesium and glucose metabolism.
 - H. Demonstrate awareness of rare inborn errors of metabolism.
 - G. List the components of and the rationale for newborn metabolic screening in the state of Tennessee and perform appropriately.
- XVII. Plan, provide, and evaluate the nursing care of newborns with gastrointestinal disorders.
- A. Characterize the functional limitations of gestational age on the gastrointestinal tract.
 - B. List clinical signs of gastrointestinal dysfunction.
 - C. Identify circumstances which will alter digestion, absorption, and motility.
 - D. When given a patient situation, differentiate between signs of upper and lower gastrointestinal obstructions.
 - E. When given a clinical situation, identify therapeutic measures that will alleviate or diminish gastrointestinal problems.
 - F. Describe signs of pathology which would indicate the need for:
 1. no feedings (NPO)
 2. stopping /discontinuing feedings
 3. gastric aspiration
 4. intermittent gastric/GI suction
 5. hematest on stools
 6. reducing substances test on stools
 7. enema or suppository
 8. changing of infant's position
 9. sterile protective covering of exposed organs
 10. abdominal girth measurement
 - G. Discuss the pathogenesis, medical and surgical management, and nursing care of neonatal gastrointestinal disorders.
 - H. Describe a teaching plan that would assist parents in notifying the physician appropriately of gastrointestinal dysfunction after discharge.
- XVIII. Identify common sources of perinatal infections, clinical indications of infections, and methods to prevent health care associated infections.
- A. Identify pathways of congenital and health care associated infections.

- B. Utilize maternal history, birth history, clinical presentation, and serial laboratory results as a basis for planning neonatal infectious disease screening and management.
 - C. Describe signs of localized and systemic congenital and health care associated infections in the neonate.
 - D. Describe how the neonate's immune system response predisposes to infection and affects laboratory values.
 - E. Differentiate those laboratory values and signs related to screening for infection that require immediate intervention from those that require further monitoring.
 - F. Describe a safe and effective management plan for the neonate at risk for or experiencing infection.
 - G. Describe a management plan that limits the spread of infection in a high-risk nursery.
 - 1. visitation policy
 - 2. gowning practices
 - 3. isolation
 - 4. cohorting
 - 5. handwashing / hand sanitizing policy for staff, parents, and visitors
 - 6. immunizations for staff members
 - 7. proper cleaning of the environment (patient care areas)
 - H. Describe a management plan that appropriately informs parents about immunizations, documents parental consent for immunizations, and provides immunizations at the appropriate time.
- XIX. Plan and implement measures to protect sensory neural function and to evaluate the infant's response to care.
- A. Describe the central nervous system control of neurologic function according to gestational and postnatal age.
 - B. Identify disorders which alter function of the nervous system.
 - C. Describe and implement a comprehensive assessment plan which will provide for prevention, early identification and prompt treatment of sensory neural disorders.
 - 1. reflexes
 - 2. posture
 - 3. activity and movement
 - 4. level of consciousness
 - 5. rest and sleep pattern
 - 6. comfort, irritability, pain
 - 7. vision
 - 8. hearing
 - 9. appropriate positioning using developmental aids

- D. Identify and describe seizure activity and delineate a plan for safe administration of prescribed anticonvulsants.
 - E. Identify the pathogenesis, recognition, prognosis, and patient management of:
 - 1 microcephaly
 - 2 major chromosomal abnormalities (Trisomy 13-15, 18, 21)
 - 3 congenital and acquired hydrocephaly
 - 4 infection of the central nervous system (prenatal and postnatal)
 - 5 neural tube defects
 - 6 intracranial/ intraventricular hemorrhage and periventricular leukomalacia
 - 7 neurologic sequelae of drugs, hypoxia, acid-base imbalance, electrolyte imbalance, metabolic disorders, and thermoregulation disorders
 - 8 cerebral edema
 - 9 hypoxic-ischemic encephalopathy (HIE)
 - F. Describe an education plan that includes parent recognition of appropriate sensory neural function for age, necessity for continuing medical and developmental assessment, and interventions appropriately used by parents.
- XX. Assess and manage the infant with suspected neonatal abstinence syndrome (NAS).
- A. Identify the infant at risk for NAS.
 - B. Describe signs and symptoms of NAS.
 - C. Demonstrate use of appropriate NAS scoring system.
 - D. Describe non-pharmacologic and pharmacologic management of NAS.
 - E. Recognize the requirement to report cases of NAS to the Tennessee Department of Health.
- XXI. Utilize knowledge of neonatal pharmacology to optimize desired drug actions and minimize side effects.
- XXII. Describe a management and education plan that promotes infant safety in the hospital and the community. One place where information can be located is the AAP “parenting corner” section on their Healthy Children website. The website can be accessed at www.HealthyChildren.org. Topics addressed in the “parenting corner” include, among others, the following:
- A. Discharge plans and follow-up care as determined by health care provider
 - B. Bathing and skin care
 - C. Conscientious hand washing / hand sanitizing and appropriate hygiene
 - D. Immunizations per current recommendations from the American Academy of Pediatrics. RSV prophylaxis should be considered.

- E. Falls
 - F. Burns
 - G. Safe sleep
 - H. Emergency preparedness / disaster planning (examples are infant security, Code Pink, evacuation, etc.)
 - I. Infant restraint device / institutional policy regarding car seat tolerance testing
 - J. According to state statute (TCA), at least one infant parent or caregiver must receive information regarding infant CPR before discharge from the hospital. Tennessee Hospital Association member hospitals have been granted permission to refer caregivers to the website www.learncpr.org.
 - K. Information regarding Shaken Baby Syndrome and other forms of child abuse / neglect
 - L. Reasons for avoiding second hand smoke around infants and children
 - M. Reasons to contact the baby's primary care provider (respiratory distress, no stool in 24 hours, decreased urine output, refusal to feed, change in activity, abnormal temperature, etc.)
- XXIII. Utilize culturally-appropriate parent-infant attachment concepts in dealing with families of sick newborns.
- A. Identify prenatal and postnatal factors which may influence parental attachment and caretaking.
 - B. Recognize and describe behaviors which indicate the status of parent-infant attachment, including the significance of these behaviors.
 - C. Recognize and describe the stages of emotional stress and the grief process. This includes both families dealing with an infant loss and those dealing with an infant receiving palliative care.
 - D. Describe how emotional stress and the grief process may influence family relationships.
 - E. Plan and implement nursing measures which will appropriately facilitate and support completion of the grief process.
 - F. Describe how attitudes of "significant others" influence parental attachment.
 - G. Plan and implement nursing measures which will facilitate culturally-appropriate parent-infant interaction.

- H. Identify and utilize community resources for various aspects of home care support after discharge.
- XXIV. Demonstrate an understanding of significant issues related to consultation and/or referral during the neonatal period.
- A. Describe the interactive roles of health care disciplines in providing care to neonates and their families.
 - B. Identify common indications for consultation regarding care and/or transport of the high- risk neonate utilizing the current edition of the *Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities* published by the Tennessee Perinatal Care System, Tennessee Department of Health, Division of Family Health and Wellness.
 - C. Describe the process for initiating consultation/referral with the appropriate referral center.
 - D. Outline stabilization measures commonly used either prior to or during transport utilizing the S.T.A.B.L.E. guidelines.

NEONATAL OBJECTIVES FOR NURSES IN LEVEL IV FACILITIES

NEONATAL OBJECTIVES FOR NURSES IN LEVEL IV FACILITIES

These objectives may be met by practicing nurses in a number of ways. Some of the material presented here will have been learned during basic nursing education, while other objectives will be covered during new employee orientation or in continuing education settings.

All neonatal nurses should maintain current NRP and S.T.A.B.L.E. provider status.

In addition to the following, the nurse working in a Level IV facility should be able to provide care for neonates with complex congenital or acquired cardiac conditions requiring surgical intervention and/or conditions requiring extracorporeal membrane oxygenation (ECMO).

The nurse caring for neonatal patients in a Level IV facility should be able to:

- I. Identify factors from an obstetric history which might cause fetal compromise and evaluate the neonate for physiologic distress.
 - A. Describe the physiologic changes in the mother which occur during labor.
 - B. Given patient situations, identify neonates at risk as a result of precipitous or prolonged labor.
 - C. Identify the most common examples of fetal malpresentation and describe neonatal problems which might result from each.
 - D. Given maternal histories, identify maternal problems which might result in a preterm birth.
 - E. Identify maternal, fetal, and iatrogenic problems which might result in fetal asphyxia.
 - F. Given a variety of fetal heart rate monitor patterns, identify fetal/neonatal sequelae which might result from each.
 - G. Describe appropriate antepartal and intrapartal fetal surveillance tests and interpret results.
 - H. Given a hypothetical situation, identify neonatal sequelae related to:
 1. placental abnormalities
 2. maternal hypertensive disorders
 3. maternal metabolic abnormalities (i.e., diabetes)
 4. maternal age
 5. maternal chemical dependency (prescribed vs abused)
 6. maternal social-sexual history
 7. preexisting maternal medical conditions
 8. maternal medications and anesthetics
 9. multiple gestation
 10. maternal smoking

- I. Develop an appropriate neonatal plan of care based on an understanding of the maternal history.
- II. Discuss in detail fetal circulation and identify the physiologic changes that occur at birth.
 - A. Using a diagram, trace blood through the entire fetal circulation and identify the sites of venous admixture that are unique to the fetus.
 - B. Identify or describe the changes which occur at birth in the neonate's cardiovascular system and state the rationale for each change.
 - C. State the role of the placenta in gas exchange.
 - D. Describe maternal, fetal, and environmental factors which influence placental exchange.
 - E. Explain the interrelationships of blood flow, pressure and resistance.
 - F. List the effects of the following on resistance in all vascular beds:
 1. pH
 2. PO₂/SaO₂
 3. PCO₂
 4. Prostaglandins
 5. Inhaled nitric oxide (iNO)
 6. Indomethacin / Ibuprofen
 7. Blood volume secondary to timing of cord clamping
- III. Manage the newborn's transition to extrauterine life.
 - A. Manage early transition and resuscitation as specified in the most recent edition of the *Textbook of Neonatal Resuscitation* published by AHA and AAP.
 - B. Given patient situations, develop a plan of care that would allow early recognition and long-term management of sequelae from asphyxia and cardiopulmonary resuscitation, including consultation and referral when indicated.
 1. Cord clamping 30-120 seconds after birth
 2. Head or total body cooling if \geq 36 weeks
 - C. Develop a management plan for all neonates that would enhance transition from the fetal cardiopulmonary circuit to the neonatal cardiopulmonary circuit.
- IV. Perform a comprehensive and systematic assessment of the neonate and take action based on findings.
 - A. Identify factors that influence the homeostatic range for the following during neonatal life:
 1. temperature
 2. heart rate

3. respiratory rate and pattern
 4. color
 5. oxygen saturation
 6. blood pressure
 7. hematocrit/hemoglobin
 8. blood glucose
- B. When given a neonate to assess, identify normal physical characteristics and common variations related to:
1. body contour, proportions, and posture
 2. head (including occipital frontal circumference, names of fontanelles and sutures)
 3. face (including mouth and nose)
 4. eyes
 5. ears
 6. skin
 7. chest
 8. abdomen
 9. genitalia and rectum
 10. extremities
 11. vertebral column
 12. reflexes
- C. When given a neonate to assess:
1. identify, describe, and locate point of maximal impulse of the heart
 2. count and record apical heart rate and respiratory rate
 3. identify heart murmurs
 4. auscultate the lungs and describe breath sounds
 5. identify flaring of the nostrils, retractions, grunting, inspiratory stridor, apnea, and choanal atresia, and relate the significance of these findings to problems experienced by the neonate
 6. identify the presence, strength, and equality of all pulses
 7. describe abdominal girth and shape, stooling pattern, and voiding pattern
 8. describe skin turgor, texture, color, and perfusion
 9. describe level of consciousness, activity / tone, and comfort / pain
 10. evaluate central and peripheral blood pressure
 11. measure and record blood glucose
 12. perform a complete physical assessment, record findings, identify patient needs, and initiate appropriate action based upon findings
- D. Establish a plan for stabilization and appropriate management of all infants, including those who are critically ill utilizing the NRP and S.T.A.B.L.E. Program resources.
- E. Describe an education plan that includes infant assessment by the parent / caregiver at home.
- V. Appropriately utilize the neonate's gestational age and fetal growth pattern in managing care.

- A. Define the following terms:
 1. early term, full term, and late term neonate
 2. preterm neonate
 3. late preterm neonate
 4. postterm neonate
 5. small for gestational age (symmetric and asymmetric)
 6. intrauterine growth restriction (IUGR) (symmetric and asymmetric)
 7. large for gestational age
 8. appropriate for gestational age
 9. low birth weight
 10. very low birth weight
 11. extremely low birth weight

- B. Define the stages of fetal cellular growth and identify developmental problems associated with interference in each stage.

- C. Identify infants at increased risk for growth and gestational age complications based upon maternal history.

- D. Determine the gestational age of a neonate by utilizing a standardized scoring system.

- E. Determine a neonate's growth classification by plotting the birth weight, head circumference, and length on an intrauterine growth chart and interpret significance.

- F. State the implications of abnormal intrauterine growth and of non-term birth.

- G. Given a variety of patient gestational ages and growth parameters, develop a plan of care which reflects consideration of these issues.

- VI. Apply knowledge of thermoregulation through assessment of the neonate's temperature status and maintenance of an optimal thermal environment.
 - A. Define neutral thermal balance.

 - B. List the physiologic characteristics in the neonate which influence heat loss and describe how each characteristic influences heat loss.

 - C. List the modes of heat transfer in the neonate, give an example of each, and identify interventions to decrease heat transfer by each of the modes.

 - D. When given a patient situation (i.e., surgery, special procedures, etc.), identify measures to promote a neutral thermal environment.

 - E. Describe the physiologic processes by which the neonate attempts to maintain body temperature.

 - F. List the physiologic problems which may result from hypo- and hyperthermia.

- G. Identify optimal skin, axillary, and core temperatures for both premature and term neonates.
 - H. Compare and contrast methods for monitoring a neonate's temperature with regard to safety and accuracy.
 - I. Compare and contrast methods of providing external heat for the neonate, including:
 - 1. skin-to-skin care
 - 2. warm, draft free room (operating, delivery, transport, nursery, NICU)
 - 3. incubator
 - 4. radiant warmer
 - 5. servocontrol
 - 6. manual control
 - 7. heat packs and mattresses
 - 8. polyethylene wraps or bags
 - 9. appropriate use of humidity
 - J. Describe safe methods of increasing and decreasing a neonate's temperature.
 - K. Identify factors other than body temperature which may indicate the status of the neonate's thermal balance.
 - L. Utilize theoretical knowledge of thermoregulation to provide an optimal ambient temperature, relative humidity and wind velocity for the neonate.
 - M. Utilize all thermoregulation equipment safely.
 - N. Describe appropriate long-term thermal management of the neonate, including weaning from warmer to incubator or incubator to crib.
 - O. Utilize head/body cooling if indicated per institutional policy.
 - P. Describe an education plan that includes appropriate temperature assessment and management by the parents.
- VII. Manage the neonate's fluid and nutritional needs to promote optimal growth.
- A. Calculate the fluid and caloric needs of the neonate based upon weight, age, physiologic problems, and rate of growth. Anticipate and provide appropriate interventions.
 - B. Calculate the appropriate protein, fat, carbohydrate, mineral, and vitamin content for neonates of various gestational ages and weights. Anticipate and provide appropriate interventions.
 - C. Discuss the indications and contraindications for initiating or continuing feeding.

- D. When total oral feeding is not an option, develop a plan of care to meet fluid, electrolyte, and nutritional needs, including the use of hyperalimentation and intralipid therapy.
 - E. Describe the advantages, disadvantages, and potential complications of varying the concentration of commercial formulas.
 - F. Describe the appropriate use of human milk, supplements, and commercial formula to meet fluid, nutrient, mineral, and vitamin requirements of neonates.
 - G. Evaluate a neonate's postnatal growth using a postnatal growth chart and identify appropriate management responses.
 - H. Develop a plan to teach parents appropriate oral nutrient and fluid sources and indications that consultation is necessary to alter oral intake after discharge.
- VIII. Select the most appropriate technique for feeding the high-risk infant.
- A. List advantages and disadvantages of continuous gastric, intermittent gastric, transpyloric, gastrostomy, and breast / bottle feeding based on knowledge of the infant's physiologic status, gestational age, and weight.
 - B. Describe safe and effective procedures for feeding infants receiving continuous gastric, intermittent gastric, gastrostomy, breast and/or nipple feedings.
 - C. Recognize and report signs of feeding intolerance and differentiate care-related problems from actual changes in the infant's clinical status.
 - D. Describe the correlation of blood glucose levels to the neonate's feeding regimen.
 - E. List measures to decrease oxygen consumption, trauma, infection, air ingestion, vomiting, and aspiration in relationship to feeding techniques.
 - F. Describe methods for assisting the mother of a sick infant with feeding techniques.
- IX. Correctly administer intravenous fluids.
- A. Calculate the fluid needs of the neonate, based upon weight, age, and physiologic status.
 - B. Describe care-related causes of the following:
 - 1. overhydration
 - 2. underhydration
 - 3. infection at intravascular sites
 - 4. clotting of intravascular lines
 - 5. hemorrhage
 - 6. hypoglycemia
 - 7. hyperglycemia

8. infiltration
9. embolism
10. thrombosis

C. Describe nursing measures that will enhance the positive effects and minimize the side effects of the following:

1. glucose and electrolyte solutions, including total parenteral nutrition (TPN), intralipid therapy, and colloids
2. umbilical venous and arterial lines
3. peripheral venous and arterial lines
4. peripherally inserted central catheter (PICC lines)
5. central venous lines (CVL)

X. Anticipate and identify fluid and electrolyte imbalance in the sick neonate.

A. Define fluid and electrolyte loads for all neonates.

B. Describe the following mechanisms for control of fluid and electrolyte balance:

1. diffusion
2. osmosis
3. filtration
4. sodium and potassium pump
5. ADH control
6. rennin, angiotensin, aldosterone control
7. atrial natriuretic peptide

C. Recognize clinical histories, major signs, symptoms, laboratory values, and clinical interventions for the following:

1. hyponatremia
2. hypernatremia
3. hypochloremia
4. hyperchloremia
5. hypokalemia
6. hyperkalemia
7. fluid shifts
8. overhydration
9. dehydration

D. Given a clinical history, laboratory values, and physical assessment data, delineate an appropriate assessment and treatment plan.

XI. Apply knowledge of acid-base balance in the management of the sick newborn.

A. Identify pathophysiologic changes which result from acidosis and alkalosis.

B. Define pH, acid, base, base excess, and buffer.

- C. Describe how blood, respiratory, and renal buffers compensate for acid-base imbalance.
 - D. Identify acceptable neonatal parameters for blood gas values (pH, PO₂, PCO₂, HCO₃, base excess, and pre / post oxygen saturation).
 - E. Compare and contrast the clinical significance of respiratory gas information obtained from the following sites: capillary, peripheral artery puncture, umbilical artery, transcutaneous probes, end tidal CO₂, pulse oximetry.
 - F. Identify abnormal blood gases that require a change in therapy from those that require continued assessment without a change in therapy.
 - G. Recognize blood gas reports that indicate the following with the assistance of the S.T.A.B.L.E. blood gas nomogram:
 - 1. compensated and uncompensated metabolic acidosis
 - 2. compensated and uncompensated metabolic alkalosis
 - 3. compensated and uncompensated respiratory acidosis
 - 4. compensated and uncompensated respiratory alkalosis
 - 5. mixed metabolic and respiratory imbalances
 - H. Describe the etiology of acid-base imbalances in relation to gain or loss of fixed acid, gain or loss of base, gain or loss of carbon dioxide.
 - I. Describe the relationship of the following to acid-base balance (pH) and measures to optimize each factor.
 - 1. PO₂, PCO₂, base excess
 - 2. diffusion gradient/O₂ and CO₂ sources
 - 3. respiratory rate/drive
 - 4. functional residual capacity (FRC)/air trapping/atelectasis
 - 5. tidal volume/diffusing surface
 - 6. blood flow
 - 7. Hgb function
 - 8. nutrient supply / sources of acid and base
 - 9. infant and ambient temperature
 - 10. infant activity and sleep pattern
 - 11. urinary and GI losses
 - 12. mean airway pressure
 - 13. minute ventilation
 - J. Describe appropriate use of pharmacologic agents which alter acid-base balance.
- XII. Apply knowledge of respiratory physiology in the management of newborns with respiratory disorders.
- A. Demonstrate a working knowledge of the terms used to describe respiratory pathology, pulmonary function, and respiratory support.

- B. List physiologic events which must occur at birth in order for the lungs to function postnatally and list factors responsible for each event.
 - C. Describe physiologic factors which enhance or deter respiratory movement.
 - D. Describe physiologic factors which oppose air entry into the alveoli.
 - E. Describe how surfactant influences establishment of functional residual capacity (FRC), including factors which may limit or enhance surfactant production.
 - F. Describe factors which influence the following:
 - 1. closure of patent ductus arteriosus
 - 2. closure of foramen ovale
 - 3. pulmonary arteriolar dilation
 - 4. pulmonary vascular resistance
 - 5. cerebral blood flow
 - G. Describe medical and nursing measures which may enhance the establishment of respiration.
 - H. Describe physiologic factors in the premature which limit the establishment of normal respiration.
 - I. Describe the pathophysiologic changes in and etiology of neonatal respiratory disorders.
 - J. Describe specific observations, radiologic findings, and laboratory results which would assist in differentiating specific neonatal respiratory disorders.
 - K. Given specified neonatal respiratory patterns, identify the probable etiology, based on knowledge of gestational age, pathophysiology, and the environment.
 - L. Describe the mechanism of action, side effects, and appropriate administration of pharmacologic agents (i.e., surfactants) used in the treatment of neonatal respiratory disorders.
 - M. Describe nursing management of neonates with respiratory disorders requiring surgical intervention.
- XIII. Describe appropriate measures for managing neonatal respiratory support systems.
- A. Describe the indications for and the mechanisms of operation of various respiratory support systems.
 - B. Demonstrate a thorough working knowledge of the neonatal respiratory support equipment used in the facility.
 - 1. Describe clinical indications and state measures to diminish, identify, and treat the potential complications. Also describe the interrelationships of the ventilator settings listed:

- a. modes of ventilation
 - volume ventilation
 - time-cycled pressure-limited ventilation (TCPL)
 - controlled mandatory ventilation (CMV)
 - intermittent mandatory ventilation (IMV)
 - synchronized intermittent mandatory ventilation (SIMV)
 - assist-control ventilation (A-CV)
 - pressure support ventilation (PSV)
 - high frequency ventilation (HFV)
 - high frequency oscillatory ventilation (HFOV)
 - high frequency jet ventilation (HFJV)
 - inhaled nitric oxide (iNO)
 - high flow nasal cannula (HFNC)
 - b. oxygen concentration (FiO_2)
 - c. continuous positive airway pressure (CPAP)/positive end expiratory pressure (PEEP)
 - d. ventilator rate
 - e. frequency
 - f. amplitude
 - g. inspiratory time
 - h. % inspiratory time
 - i. expiratory time
 - j. I/E ratio
 - k. peak inspiratory pressure (PIP)
 - l. mean airway pressure (MAP/Paw)
- C. Describe the possible complications which may be associated with respiratory support.
 - D. Develop a management plan that limits the complications of respiratory support.
 - E. Describe the etiology, specific signs and symptoms, and radiologic findings associated with neonatal respiratory disorders.
 - F. Describe safe methods of adjusting respiratory support based on the clinical condition of neonate, blood gases, oxygen saturation, and radiologic findings.
 - G. Describe the pharmacologic methods used in the treatment of respiratory disorders.
- XIV. Plan, provide, and evaluate the care of infants with cardiac disorders.
- A. Explain the embryogenesis of cardiac development.
 - B. Describe the cardiovascular pressure, resistance, and blood flow alterations resulting from cardiac disorders.
 - C. Describe common cyanotic and acyanotic heart defects in the newborn period.

- D. Describe the physiologic problems associated with patent ductus arteriosus.
 - E. Identify the data base which is necessary to differentiate heart disease from respiratory disease.
 - F. Describe the indications for, the mechanism of action, and the side effects of common medications used in the treatment of cardiopulmonary disease. (i.e., prostaglandins).
 - G. Recognize major rate and rhythm abnormalities.
 - H. Explain the rationale for critical congenital heart disease (CCHD) screening and perform appropriately.
- XV. Plan, provide, and evaluate the nursing care of newborns with hematologic disorders.
- A. Briefly describe hematopoiesis in the fetus / newborn.
 - B. Describe the characteristics which differentiate adult and fetal hemoglobin.
 - C. Describe normal neonatal coagulation.
 - D. Identify normal neonatal values for the following tests:
 - 1. hematocrit
 - 2. hemoglobin
 - 3. platelets
 - 4. bilirubin (direct, indirect, and total)
 - 5. reticulocyte count
 - 6. prothrombin time
 - 7. partial thromboplastin time
 - 8. fibrinogen
 - 9. Coombs (direct and indirect)
 - 10. circulating blood volume
 - 11. red cell morphology
 - 12. G6PD
 - E. Describe how the following may alter laboratory data:
 - 1. gestational age
 - 2. timing of cord clamping
 - 3. delivery technique
 - 4. blood volume
 - 5. transfusion
 - 6. exchange transfusion / partial volume exchange transfusion
 - 7. timing of sample
 - 8. sampling technique
 - F. Identify etiology, infants at risk, and management plan for:
 - 1. hemorrhage

2. hemolytic disorders
 3. coagulation disorders
 4. thrombocytopenia
 5. polycythemia / hyperviscosity syndrome
 6. acute and chronic anemia
- G. Describe the formation, transport, conjugation, and excretion of bilirubin.
- H. Describe the pathophysiologic changes that may be responsible for intravascular hemolysis, extravascular hemolysis, and impaired hepatic function as related to hyperbilirubinemia.
- I. Describe those factors that increase the risk of neurotoxicity due to hyperbilirubinemia.
- J. Describe a nursing assessment plan that allows prompt recognition of abnormal bilirubin metabolism and a management plan that reduces the risk of neurotoxicity.
- K. Describe a parent teaching plan that encourages prompt recognition and referral for jaundice in the community setting.
- L. Recognize the components of and the rationale for newborn hemoglobinopathy screening in the state of Tennessee and perform appropriately.
- XVI. Plan, provide, and evaluate the nursing care of newborns with selected metabolic disorders.
- A. Describe the pattern of glucose metabolism in the newborn period.
 - B. Describe how the following alter serum glucose:
 1. gestational age
 2. placental glucose transport
 3. hormones
 4. glycogen storage and release
 5. glucose intake and metabolism
 6. protein and fat intake
 7. enteral and parenteral nutrition
 8. aerobic vs anaerobic metabolism
 9. thermal status
 10. medications that alter glucose metabolism
 - C. Identify infants at risk for abnormalities in glucose metabolism and describe glucose screening plans appropriate to the risk factors.
 - D. Describe management plans that maintain a safe serum glucose level and an appropriate growth pattern.
 - E. Identify infants at risk for abnormalities in calcium and magnesium metabolism.

- F. Identify abnormal serum calcium and magnesium levels from lab reports and differentiate those that require immediate intervention from those which should be further monitored.
 - G. Describe a safe and effective treatment plan for infants who exhibit abnormal calcium, magnesium and glucose metabolism.
 - H. Demonstrate awareness of rare inborn errors of metabolism.
 - I. List the components of and the rationale for newborn metabolic screening in the state of Tennessee and perform appropriately.
- XVII. Plan, provide, and evaluate the nursing care of newborns with gastrointestinal disorders.
- A. Characterize the functional limitations of gestational age on the gastrointestinal tract.
 - B. List clinical signs of gastrointestinal dysfunction.
 - C. Identify circumstances which will alter digestion, absorption, and motility.
 - D. When given a patient situation, differentiate between signs of upper and lower gastrointestinal obstructions.
 - E. When given a clinical situation, identify therapeutic measures that will alleviate or diminish gastrointestinal problems.
 - F. Describe signs of pathology which would indicate the need for:
 - 1 no feedings (NPO)
 - 2 stopping /discontinuing feedings
 - 3 gastric aspiration
 - 4 intermittent gastric/GI suction
 - 5 hematest on stools
 - 6 reducing substances test on stools
 - 7 enema or suppository
 - 8 changing of infant's position
 - 9 sterile protective covering of exposed organs
 - 10 abdominal girth measurement
 - G. Discuss the pathogenesis, medical and surgical management, and nursing care of neonatal gastrointestinal disorders.
 - H. Describe a teaching plan that would assist parents in notifying the physician appropriately of gastrointestinal dysfunction after discharge.
- XVIII. Identify common sources of perinatal infections, clinical indications of infections, and methods to prevent health care associated infections.
- A. Identify pathways of congenital and health care associated infections.

- B. Utilize maternal history, birth history, clinical presentation, and serial laboratory results as a basis for planning neonatal infectious disease screening and management.
 - C. Describe signs of localized and systemic congenital and health care associated infections in the neonate.
 - D. Describe how the neonate's immune system response predisposes to infection and affects laboratory values.
 - E. Differentiate those laboratory values and signs related to screening for infection that require immediate intervention from those that require further monitoring.
 - F. Describe a safe and effective management plan for the neonate at risk for or experiencing infection.
 - G. Describe a management plan that limits the spread of infection in a high-risk nursery.
 - 1 visitation policy
 - 2 gowning practices
 - 3 isolation
 - 4 cohorting
 - 5 handwashing / hand sanitizing policy for staff, parents, and visitors
 - 6 immunizations for staff members
 - 7 proper cleaning of the environment (patient care areas)
 - H. Describe a management plan that appropriately informs parents about immunizations, documents parental consent for immunizations, and provides immunizations at the appropriate time.
- XIX. Plan and implement measures to protect sensory neural function and to evaluate the infant's response to care.
- A. Describe the central nervous system control of neurologic function according to gestational and postnatal age.
 - B. Identify disorders which alter function of the nervous system.
 - C. Describe and implement a comprehensive assessment plan which will provide for prevention, early identification and prompt treatment of sensory neural disorders.
 - 1 reflexes
 - 2 posture
 - 3 activity and movement
 - 4 level of consciousness
 - 5 rest and sleep pattern
 - 6 comfort, irritability, pain
 - 7 vision
 - 8 hearing
 - 9 appropriate positioning using developmental aids

- D. Identify and describe seizure activity and delineate a plan for safe administration of prescribed anticonvulsants.
 - E. Identify the pathogenesis, recognition, prognosis, and patient management of:
 - 1. microcephaly
 - 2. major chromosomal abnormalities (Trisomy 13-15, 18, 21)
 - 3. congenital and acquired hydrocephaly
 - 4. infection of the central nervous system (prenatal and postnatal)
 - 5. neural tube defects
 - 6. intracranial/ intraventricular hemorrhage and periventricular leukomalacia
 - 7. neurologic sequelae of drugs, hypoxia, acid-base imbalance, electrolyte imbalance, metabolic disorders, and thermoregulation disorders
 - 8. cerebral edema
 - 9. hypoxic-ischemic encephalopathy (HIE)
 - F. Describe an education plan that includes parent recognition of appropriate sensory neural function for age, necessity for continuing medical and developmental assessment, and interventions appropriately used by parents.
- XX. Assess and manage the infant with suspected neonatal abstinence syndrome (NAS).
- A. Identify the infant at risk for NAS.
 - B. Describe signs and symptoms of NAS.
 - C. Demonstrate use of appropriate NAS scoring system.
 - D. Describe non-pharmacologic and pharmacologic management of NAS.
 - E. Recognize the requirement to report cases of NAS to the Tennessee Department of Health.
- XXI. Utilize knowledge of neonatal pharmacology to optimize desired drug actions and minimize side effects.
- XXII. Describe a management and education plan that promotes infant safety in the hospital and the community. One place where information can be located is the AAP “parenting corner” section on their Healthy Children website. The website can be accessed at www.HealthyChildren.org. Topics addressed in the “parenting corner” include, among others, the following:
- A. Discharge plans and follow-up care as determined by health care provider
 - B. Bathing and skin care
 - C. Conscientious hand washing / hand sanitizing and appropriate hygiene

- D. Immunizations per current recommendations from the American Academy of Pediatrics. RSV prophylaxis should be considered.
 - E. Falls
 - F. Burns
 - G. Safe sleep
 - H. Emergency preparedness / disaster planning (examples are infant security, Code Pink, evacuation, etc.)
 - I. Infant restraint device / institutional policy regarding car seat tolerance testing
 - J. According to state statute (TCA), at least one infant parent or caregiver must receive information regarding infant CPR before discharge from the hospital. Tennessee Hospital Association member hospitals have been granted permission to refer caregivers to the website www.learncpr.org.
 - K. Information regarding Shaken Baby Syndrome and other forms of child abuse / neglect
 - L. Reasons for avoiding second hand smoke around infants and children
 - M. Reasons to contact the baby's primary care provider (respiratory distress, no stool in 24 hours, decreased urine output, refusal to feed, change in activity, abnormal temperature, etc.)
- XXIII. Utilize culturally-appropriate parent-infant attachment concepts in dealing with families of sick newborns.
- A. Identify prenatal and postnatal factors which may influence parental attachment and caretaking.
 - B. Recognize and describe behaviors which indicate the status of parent-infant attachment, including the significance of these behaviors.
 - C. Recognize and describe the stages of emotional stress and the grief process. This includes both families dealing with an infant loss and those dealing with an infant receiving palliative care.
 - D. Describe how emotional stress and the grief process may influence family relationships.
 - E. Plan and implement nursing measures which will appropriately facilitate and support completion of the grief process.
 - F. Describe how attitudes of "significant others" influence parental attachment.
 - G. Plan and implement nursing measures which will facilitate culturally-appropriate parent-infant interaction.

- H. Identify and utilize community resources for various aspects of home care support after discharge.
- XXIV. Demonstrate an understanding of significant issues related to consultation and/or referral during the neonatal period.
- A. Describe the interactive roles of health care disciplines in providing care to neonates and their families.
 - B. Identify common indications for consultation regarding care and/or transport of the high- risk neonate utilizing the current edition of the *Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities* published by the Tennessee Perinatal Care System, Tennessee Department of Health, Division of Family Health and Wellness.
 - C. Describe the process for initiating consultation/referral with the appropriate referral center.
 - D. Outline stabilization measures commonly used either prior to or during transport utilizing the S.T.A.B.L.E. Program guidelines.

EDUCATIONAL OBJECTIVES FOR NEONATAL TRANSPORT NURSES

EDUCATIONAL OBJECTIVES FOR NEONATAL TRANSPORT NURSES

The following educational objectives for transport nurses are in addition to the educational objectives for nurses working in a level I, II, III and IV facility.

The nurse caring for neonatal patients during transport should have experience in the care of critically ill neonatal patients in the inpatient setting, acute care setting or both, and should be able to meet the objectives listed for each of the following categories:

- I. Problems of Pregnancy, Fetal Development, Labor and Delivery
 - A. Obtain from a referring health care provider reports of all tests done to determine fetal gestational age and well-being.
 - B. Utilize data from the maternal/neonatal history as a basis for anticipating problems, planning, and implementing care during transport.
 - C. Provide for a receiving health care provider, maternal and neonatal data which give adequate history of problems resulting from pregnancy, labor, and delivery, as well as treatment provided.
- II. Resuscitation of the Neonate
 - A. Provide for a receiving health care provider an accurate record of necessary resuscitative procedures and the neonate's physiological responses.
 - B. Perform appropriate resuscitation if needed during transport.
- III. Physical Assessment of the Newborn
 - A. Collaborate with other transport team members in obtaining a thorough physical assessment prior to transport.
 - B. In consult with medical control physician (MCP), describe and initiate an assessment, monitoring, and intervention plan during transport that will address infant problems in a timely manner.
 - C. Provide for a receiving care provider a complete record of physical assessment, which includes information from the referring care providers as well as the transport staff.
- IV. Thermoregulation
 - A. Explain the effect of environmental factors; e.g., humidity, ambient temperature, and velocity of air flow on the thermal status of the neonate.
 - B. Describe safe methods of obtaining, maintaining, increasing, and/or decreasing a neonate's temperature in a transport situation.

- C. Provide a receiving care provider with a thorough history of the infant's thermoregulation problems, treatment of these problems, and infant responses to intervention prior to and during transport.
 - D. Provide appropriate head/body cooling measures when indicated.
- V. Nutritional Requirements of the Neonate
- A. Describe the effects of speed, acceleration, and deceleration on gastrointestinal motility and sphincter control.
 - B. Describe safe means of providing infant nutrition (IV or enteral) in a variety of transport situations.
 - C. Obtain from a referring care provider an accurate nutritional record for the receiving care provider.
 - D. Provide lactation support, including safe transport of human milk to the receiving center.
- VI. Intravascular Therapy
- A. Describe and utilize safe, efficient measures to initiate and maintain appropriate intravascular therapy during transport.
 - B. Prepare and administer fluid and blood products that may be required during transport.
 - C. Record for a receiving care provider an accurate summary of fluid and blood products infused prior to and during transport.
- VII. Medication Administration
- A. Describe indications and utilize knowledge of neonatal pharmacology to appropriately prepare, administer, and then monitor the medication effects on the neonate.
 - B. Provide for a receiving care provider an accurate record of medications used prior to and during transport and the neonate's responses to these medications.
- VIII. Fluid, Electrolyte, and Acid-Base Balance
- A. Describe the effects of marked changes in humidity, velocity, and pressure on insensible fluid loss and measures to limit these effects.
 - B. Obtain and record an accurate summary of fluid, electrolyte, and acid-base status prior to and during transport.
- IX. Respiratory Disorders of the Newborn

- A. Describe the effects of altering atmospheric pressure, altitude, temperature, and humidity on neonatal respiratory function and discuss nursing measures to minimize these effects.
 - B. Select and utilize respiratory measures, pharmacologic agents, intravenous orders, and infant positioning to assist in lessening or preventing the possible environmental factors listed above.
 - C. Obtain an accurate history of respiratory status and respiratory support provided prior to transport and develop, in consultation with the medical control physician (MCP), an ongoing record of assessment, evaluation, and respiratory support for the receiving center.
- X. Respiratory Support System
- A. Set up and correctly utilize respiratory support and monitoring equipment used during transport.
 - B. Describe the settings to be used to appropriately ventilate the patient when transferring from one mode or device to another including manual ventilation.
 - C. List indications for initiation or continuance of inhaled nitric oxide (INO) during transport.
 - D. Utilize a portable blood gas instrument to assist in providing appropriate oxygen and ventilation support during transport when indicated.
- XI. Hematologic Disorders of the Newborn
- A. Collaborate with referring care providers and transport team members to obtain reports and/or specimens for a hematologic database. Include information on the treatment of these disorders prior to and during transport.
 - B. Collaborate with the receiving center or referral center in obtaining blood or blood products, which may be required during transport to the receiving center.
 - C. Provide for a receiving care provider an accurate hematologic history, including treatment prior to and during transport.
- XII. Gastrointestinal Problems of the Newborn
- A. Identify the special techniques and measures required to provide the necessary care and limit the side effects of gastrointestinal obstructions and/or abdominal wall defects during transport.
 - B. Provide for a receiving care provider a history of gastrointestinal function, treatment, and neonatal response prior to and during transport.
- XIII. Perinatal Infection

- A. Collaborate with team members in collecting the different components of a septic work-up in a safe and timely manner.
- B. Develop and implement procedures, which will enhance prevention and management of infection in transport situations.
- C. Obtain and communicate a history which identifies a neonate's risk of infection.

XIV. Cardiac Disorders of the Neonate

- A. Design and implement a plan of care, in consultation with the medical control physician (MCP), that will provide maximum protection from hypoxic and/or circulatory damage for the infant who has cardiac disorders.
- B. Provide for a receiving care provider a thorough report of cardiovascular problems, treatment, and neonatal condition prior to and during transport.

XV. Parent-Infant Relationships

- A. Describe and utilize measures which will enhance a positive relationship between parents and health care personnel in the referring and receiving centers.
- B. Describe the potential effects of transport on the development of a positive parent-infant relationship.
- C. Describe and utilize measures that will minimize the negative effects of transport on parent-infant bonding.
- D. Provide for the receiving care provider a report of significant parent, neonate, and staff interactions as well as appropriate cultural and social histories.

XVI. Referring-Receiving Care Provider Relationships

- A. When given a report by the referring care provider, anticipate and rapidly request information necessary to provide continuous expert care.
- B. Collaborate with other nurses in the perinatal region in developing transport plans, which provide comprehensive, continuous, and expert care.
- C. Describe the general types of services available in Level I, II, III, and IV newborn facilities.
- D. Identify and communicate effectively the attributes and limitations of Level I, II, III, and IV newborn facilities in the region.
- E. Describe, utilize, and communicate to other health care providers appropriate procedures for initiating consultation, referral, and transport.
- F. Describe and prepare the hospital records required prior to transport.
- G. Identify and evaluate communication methods utilized in the transport region.

- H. Seek and accept constructive evaluation of the referral process from nurses in referring and receiving facilities.
 - I. Utilize quality improvement methods for evaluation and improvement of care in the referring hospital, transport service, and receiving hospital.
- XVII. Transport Safety (as required by state licensure)
- A. Describe those factors, which must be considered in the selection of a vehicle and professional personnel for transport.
 - B. Describe and utilize required effective techniques for securing transport equipment and compressed medical gas tanks in transport vehicles.
 - C. Determine adequacy of illumination in transport vehicles.
 - D. Provide continuous visibility of the infant, support equipment, and monitors during transport.
 - E. Determine that space available in the transport vehicle is adequate for safe emergency intervention during transport.
 - F. Describe briefly the effects of vibration and sound level on the infant in transit and develop a plan to diminish these effects.
 - G. Determine the adequacy of power sources to assure uninterrupted power availability during transport.
 - H. State the potential hazards of vehicle acceleration, deceleration, and speed on the transported infant and take appropriate measures to limit their occurrence, including an appropriate restraint system.
 - I. Determine and provide an adequate supply of oxygen and air required for transport.
 - J. Describe and utilize effective methods for testing equipment function prior to transport.
 - K. Identify and provide the life support and monitoring equipment and supplies necessary for transport.
 - L. Implement a plan which provides for replacement, cleaning, and maintenance of transport vehicle, equipment, and supplies.
 - M. Communicate an infant assessment which will assure adequate professional support and equipment upon the arrival of the transported infant at the receiving center.
 - N. Describe to others and utilize appropriate steps for stabilizing the infant prior to transport.

- O. Utilize appropriate communication methods to effectively obtain consultation from the medical control physician (MCP).
- P. Maintain records which can be readily utilized to evaluate the effectiveness of the transport system.
- Q. Assist in evaluation and implement measures to improve the transport process.