

TENNESSEE PERINATAL CARE SYSTEM

GUIDELINES FOR TRANSPORTATION

(Seventh Edition)



2020

Tennessee Department of Health
Division of Family Health and Wellness

Bill Lee
Governor

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Commissioner

**TENNESSEE PERINATAL CARE SYSTEM
GUIDELINES FOR TRANSPORTATION**

(Seventh Edition)

**Prepared by the
Workgroup on Perinatal Transport Guidelines Revision
and the
Perinatal Advisory Committee**

2020

This document may be accessed electronically at the following:
<https://www.tn.gov/content/tn/health/health-program-areas/mch/mch-prp.html>
(Scroll down then click on Publications)

PERINATAL REGIONALIZATION IN TENNESSEE

Background/History

Efforts to implement a regionalized approach to perinatal care in Tennessee date back to the 1970's, at which time many national studies, including the landmark National March of Dimes document entitled "Toward Improving the Outcome of Pregnancy", revealed that a coordinated system of health care, outreach, and professional education could improve perinatal outcomes and lower infant mortality.

In 1974, a "Neonatal Law" was passed ([T.C.A. § 68-1-801-804](#)) to establish the High-Risk Newborn Program at the four existing NICUs in Memphis, Nashville, Chattanooga and Knoxville. In 1977, the law appropriated state funds as well as expanded the program to include high-risk obstetrics and thereby created the Tennessee Perinatal Care System, establishing a Perinatal Center within each of the four (4) designated regions. A fifth Center was established in Johnson City in 1986.

Perinatal Regions

Each perinatal region is comprised of a group of contiguous counties. The perinatal regions and counties are listed on page 6 of this document. Each region contains one Perinatal Center, which has been so designated by the Commissioner of the Tennessee Department of Health and is capable of providing Level III or Level IV obstetric and neonatal care. The Regional Perinatal Centers are:

West Tennessee Regional Perinatal Center
Regional Medical Center at Regional One Health
Memphis, Tennessee

Middle Tennessee Regional Perinatal Center
Vanderbilt University Medical Center/Monroe Carrell, Jr. Children's Hospital at Vanderbilt
Nashville, Tennessee

Southeast Tennessee Regional Perinatal Center
Erlanger Health System/T.C. Thompson Children's Hospital at Erlanger
Chattanooga, Tennessee

East Tennessee Regional Perinatal Center
The University of Tennessee Medical Center at Knoxville
Knoxville, Tennessee

Northeast Tennessee Regional Perinatal Center
Johnson City Medical Center/Niswonger Children's Hospital
Johnson City, Tennessee

Purpose and Responsibilities of Tennessee's Regionalization System

The Perinatal Care System is a statewide infrastructure for the diagnosis and treatment of high-risk pregnant women, fetuses and neonates if no other appropriate facility is available to manage their significant condition(s), regardless of financial status. All activities are in compliance with

medical and operation standards and the guidelines as set out in the Tennessee Perinatal Center Care Systems *Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities*, latest edition; Tennessee Perinatal Care System *Guidelines for Transportation*, latest edition; Tennessee Perinatal Care System *Educational Objectives for Nurses Levels I, II, III, IV, Neonatal Transport Nurses*, latest edition; Tennessee Perinatal Care System *Educational Objective in Medicine for Perinatal Social Workers*, latest edition; and Tennessee Perinatal Care System *Guidelines on Equipment, Supplies and Training for Emergency Medical Services and Emergency Department Staff*, latest edition.

While the five (5) Regional Perinatal Centers operate within a designated hospital or university, the program is a standalone entity which provides:

- 24-hour consultation and referral for facilities and for health care providers within the respective perinatal region
- Professional education for providers (nurses, midwives, nurse practitioners, physicians, respiratory therapists, social workers, paramedics, etc.) within the region
- Maternal and neonatal transport
- Site visits, upon request, to provide consultation regarding physical facilities, staffing, and policies and procedures at hospitals within the region
- Post-discharge maternal follow-up and post-discharge neonatal follow-up
- Measuring and monitoring maternal and newborn outcomes for the region
- Maintain ongoing relationships with regional providers, prenatal facilities and hospitals

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 2020 (July 1, 2019 – June 30, 2020), Tennessee's Regional Perinatal Centers provided direct care for 5,077 high-risk neonates and 18,820 high-risk maternal patients.

All obstetric and neonatal-related activities within the Regional Perinatal Center should occur under the direction of a board-certified maternal fetal medicine specialist and a board-certified neonatologist, respectively. There should also, at a minimum, be one (1) obstetric and one (1) neonatal outreach educator/coordinator on-staff. It is also advisable to have an individual on staff to monitor expenditures and track contract services and deliverables. Staff of the Centers do not provide direct care; and therefore, should not be considered a part of a specific department within the direct services arm of the hospital/facility. The Regional Perinatal Center Co-directors are responsible for the staff hired to carry out the scope of services of the contract and for following all of the guidelines established for the Tennessee Perinatal Care System.

Perinatal Advisory Committee

The Perinatal Advisory Committee was established by statute (T.C.A. §68-1-803-804) and exists as a consultative body to advise the Department of Health in administration and implementation of the regionalization system across Tennessee. The Committee is comprised of twenty-one (21) members as designated in statute, including the obstetric and neonatal directors of the five Regional Perinatal Centers, private sector providers, hospital administrators, medical school representation, nurses working in perinatal medicine, and consumer and public health representatives. The committee is required to meet at least once annually. Committee members as well as invited experts are also instrumental in ensuring that the program's detailed Guidelines and other perinatal documents/guidelines/educational objectives remain current and are updated

every five years, a practice that has occurred since the first set of Guidelines was published in 1978.

Funding

The Division of TennCare oversees all contractual arrangements for this program, and the Tennessee Department of Health, Division of Family Health and Wellness, is responsible for the provision of technical assistance, the coordination of programmatic activities, and convening the Perinatal Advisory Committee. Each designated hospital/university accepts funds on behalf of the Regional Perinatal Center. The Centers are supported by funds from TennCare, Tennessee's Medicaid Plan with the Centers for Medicare & Medicaid Services, and state appropriations. Specific state appropriations were made available in 2016 to expand outreach education, and each Center was provided additional funds strictly for this purpose as outlined by the contract.

Resources

The Perinatal Regionalization Program has a variety of resources available, including copies of the latest editions of the Guidelines, a Perinatal Regionalization Fact Sheet, and a highlight video which may be accessed by visiting the website: <https://www.tn.gov/health/health-program-areas/mch/mch-prp.html>.

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TENNESSEE PERINATAL CARE SYSTEM

GUIDELINES FOR TRANSPORTATION

PREFACE

This manual is a revision of the *Guidelines for Transportation* in the State of Tennessee that was originally published in September 1979. These guidelines are written in response to the recommendation of the Perinatal Advisory Committee and are developed to accomplish improvement in the overall quality of maternal-neonatal transportation in the state. Prepared by the *Transportation Guidelines* Revision Work Group, and adopted by its parent committee, the Perinatal Advisory Committee, this manual has been carefully considered by representatives from a broad spectrum of the health care delivery disciplines from throughout the state. This manual provides specific guidelines regarding procedures, staffing patterns, and equipment for the transport of high-risk mothers and infants. It is recommended that physicians, nurses, respiratory therapists, emergency medical personnel, and other health care providers involved with such transportation make reasonable efforts to attain the guidelines described herein.

Transports should not be initiated unless the patient can be safely moved by trained personnel with appropriate treatment. Patients should be cared for and transported by the most qualified team available.

In order to insure the contemporary pertinence of these guidelines, the Perinatal Advisory Committee has limited its approval to a period that is no longer than five years from the date of approval by the Commissioner of the Department of Health. A complete review will thus be mandatory at that time or sooner if deemed appropriate.

INTRODUCTION

The transport of pregnant women and infants between hospitals is recognized as an essential component of regionalized perinatal care. National experience suggests that perinatal outcome for high-risk infants transported before delivery (maternal transport) is improved over that for high-risk infants transported after birth (neonatal transport). Tennessee experience also supports this. The Perinatal Advisory Committee, therefore, strongly urges that maternal transport to an appropriate referral center be considered, especially in those pregnancies in which there is a high probability of neonatal transport following delivery (Resolution passed by the Perinatal Advisory Committee on March 31, 1982).

Safe transport of the perinatal patient requires skilled personnel, appropriate equipment, and effective communication between the hospital facilities of the region. The purpose of this manual is to present specific guidelines to physicians, nurses, respiratory therapists, emergency medical personnel, and other health care providers involved with maternal-neonatal transport, so that such a transfer may be conducted in an optimal manner.

This manual is divided into six main sections: Freestanding Birth Centers, Level I Facilities, Level II Facilities, Level III Facilities, Level IV Facilities, and Transport Team. The maternal transport discussion precedes the infant discussion. The content below describes the section content as applicable; refer to the table of contents for specific pages.

1. Indications for Consultation and/or Transport
The circumstances in which patients are transported vary according to the level of care of the facilities in each region. The indications highlighted in this subsection are designed to assist the health care providers in seeking consultation and/or transfer. These indications remain guidelines and will vary with individual patient needs and institutional capabilities.
2. Referral Process
The transfer of care of a mother and/or infant from one care facility to another requires effective communication between facilities and a clear understanding of the responsibilities of the parties involved. The guidelines highlighted in this subsection are designed to clarify the roles of both referring and receiving facilities.
3. Transport Personnel
The level of expertise of the transport personnel needed to provide optimal transfer of pregnant women and infants is variable and largely dependent on the complexity of care demanded by the individual patient. However, in order to eliminate any possibility of encountering a situation in which the demands of the transported patient exceed the care level that can be adequately provided, it is desirable to define certain minimal requirements. The guidelines highlighted in this subsection are designed to assist the health care providers in selecting appropriate transport personnel.
4. Transport Modality
The choice of transport modality is largely determined by the distance between hospitals, weather, condition of the patient, and equipment available in the vehicle to support the patient during transfer. The guidelines highlighted in this subsection are designed to assist the health care providers in selecting the appropriate transport modality.
5. Transport Equipment
A safe perinatal transport entails availability of adequate equipment for monitoring,

resuscitation, and support of mother and / or infant. In addition to the equipment in the transport vehicle, essential supplies should be portable and continuously available during the transport. The equipment needs highlighted in this subsection are designed to assist the health care providers in selecting appropriate transport equipment.

6. Referral Documentation

An essential component of communication between care facilities is clear documentation and transfer of medical information. The guidelines highlighted in this subsection are designed to clarify the responsibilities of both referring and receiving facilities with respect to medical documentation.

7. Evaluation of Referral Process

The success of a regionalized perinatal care system depends on an ongoing evaluation of various aspects of the program including transport of the perinatal patient. This subsection highlights the need for evaluation of the referral process.

8. Return Transport

Optimal utilization of a regionalized perinatal care system entails early planning and return transport of patients from the referring centers to the original or local hospitals for further care. This manual ends with a section on return transport in which various aspects of this activity are summarized.

REGIONAL PERINATAL CENTERS

There are five perinatal regions in Tennessee: Northeast, East, Southeast, Middle and West. Each region is comprised of a group of contiguous counties. The perinatal regions and counties are listed on page 143 of this document. Each region contains one Regional Perinatal Center, which has been so designated by the Commissioner of the Tennessee Department of Health, and is capable of providing Level III or Level IV obstetric and neonatal care. The Regional Perinatal Centers are:

Northeast Tennessee Regional Perinatal Center

Johnson City Medical Center Hospital
Johnson City, Tennessee

Perinatal Center office: (423) 431-6640

Obstetric Education/Training Requests: Patti Jacobs, RN-C, BSN

Phone: (423) 431-5352 E-mail: patti.jacobs@balladhealth.org

Neonatal Education/Training Requests: Vicki Davis, RN, BSN

Phone: (423) 431-5646 E-mail: vicki.davis@balladhealth.org

L&D: (423) 431-6436

Referrals: 1-800-365-5262

Neonatal Consult/Transport: (423) 952-3720

General Hospital Operator: (423) 431-6111

East Tennessee Regional Perinatal Center

The University of Tennessee Medical Center at Knoxville
Knoxville, Tennessee

Obstetric Education/Training Requests: Lauren Lake, APRN, FNP-C

Phone: (865) 305-9300 E-mail: llake@utmck.edu

Neonatal Education/Training Requests: Nicole Watson, RN, BSN, CLC

Phone: (865) 305-9300 E-mail: nwatson@utmck.edu

L&D: (865) 305-9830

Maternal Referrals: 1-800-422-9301 or 865-305-9300

Neonatal Consult/Transport: 1-800-732-7295 or (865) 305-9834

NICU: (865) 305-9834

General Hospital Operator: (865) 305-9000

Southeast Tennessee Regional Perinatal Center

Erlanger Health System/T.C. Thompson Children's Hospital at Erlanger
Chattanooga, Tennessee

Obstetric Education/Training Requests: Jennifer Shelton, RNC-OB, MSN
Phone: (423) 778-3547 E-mail: jennifer.shelton@erlanger.org

Neonatal Education/Training Requests: Jill Rimmer, RNC, NIC
Phone: (423) 778-5096 E-mail: elizabeth.rimmer@erlanger.org

L&D: (423) 778-7956

OB Consults / Referrals: (423) 778-8100 or 1-866-4HI-RISK

Neonatal Consult/Transport: (423) 778-6438

NICU: (423) 778-6438

General Hospital Operator (Erlanger): (423) 778-7000

General Hospital Operator (Children's Hospital): (423) 778-6011

Middle Tennessee Regional Perinatal Center

Vanderbilt University Medical Center/Monroe Carell, Jr. Children's Hospital at Vanderbilt
Nashville, Tennessee

Obstetric Education/Training Requests: Susan Drummond, RN, MSN, C-EFM
Phone: (615) 343-9930 E-mail: susan.drummond@vumc.org

Neonatal Education/Training Requests: Mary Lee Lemley RNC, MSN
Phone: (615) 343-8686 Email: mary.lemley@vumc.org

L&D: (615) 322-2555

OB Consults/Referrals: 1-888-636-8863 (1-888-MFM-VUMC)

Neonatal Consult / Transport: 1-855-322-9111

NICU: (615) 322-0963

General Hospital Operator (Vanderbilt): (615) 322-5000

General Hospital Operator (Children's Hospital): (615) 936-1000

West Tennessee Regional Perinatal Center

Regional Medical Center at Regional One Health
Memphis, Tennessee

Obstetric Education/Training Requests: Kitty Cashion, RN-BC, MSN
Phone: (901) 448-4794 Email: mcashion@uthsc.edu

Neonatal Education/Training Requests: Nancy Ruch, RN, MSN, NNP
Phone: (901) 448-6717 Email: nruch@uthsc.edu

L&D: (901) 545-7345

OB Inpatient Transport: (901) 545-8181

Neonatal Consult/Transport: (901) 545-7366

NICU: (901) 545-7366

General Hospital Operator: (901) 545-7100

FREESTANDING BIRTH CENTERS

MATERNAL TRANSPORT

Freestanding Birth Centers

These facilities are licensed and may be accredited by the Commission for the Accreditation of Birth Centers (<https://www.birthcenteraccreditation.org/>) to provide peripartum care for low risk pregnant women whose fetuses are in vertex presentation at term, anticipating an uncomplicated singleton birth. All high-risk mothers and infants, including those with underlying disease processes, must be promptly identified for consultation and/or referral for more specialized care. Birthing centers located within a hospital are governed by facility guidelines.

All freestanding birthing centers must have the capacity and equipment to provide uncomplicated maternal care and a readiness at all times to initiate emergency procedures to meet the unexpected needs of the woman and infant within the center, and to facilitate transport to an acute care setting when necessary (*Standards for Birth Centers*, American Association for Birth Centers [<https://www.birthcenters.org/page/Standards>]).

Freestanding birthing centers should call for a consult with a higher level facility or 911 for emergent transfers.

INDICATIONS FOR CONSULTATION AND/OR TRANSPORT

I. ANTEPARTUM

A. Maternal History

1. previous preterm delivery (<37 weeks) or low-birth weight infant (<2500 gm)
2. previous infant >4000 gm at term or any large-for-gestational age infant
3. previous stillbirth, neonatal loss
4. previous C-section/uterine scar
5. history of shoulder dystocia
6. suspected cervical insufficiency
7. diagnosed abnormality of the genital tract
8. infant with known or suspected genetic disorder
9. severe emotional problems associated with previous pregnancy or delivery
10. age < 17 or advanced maternal age (≥ 35 years of age at delivery)
11. Body Mass Index (BMI) < 18 or > 40
12. suspected maternal skeletal dysplasia

B. Medical/Surgical Conditions

1. diabetes mellitus/endocrine disorder
2. autoimmune disorder
3. cardiac disease
4. hypertension
5. pulmonary disease
6. renal disease
7. hematologic disorder
8. neurologic disorder
9. musculoskeletal disorder
10. infection
11. nutritional disorder
12. inborn errors of metabolism (e.g., phenylalanine hydroxylase (PAH) deficiency [formerly called phenylketonuria (PKU)])
13. substance use
14. malignancy
15. psychiatric disorder
16. trauma
17. prior bariatric surgery

C. Obstetric Complications

1. glucose intolerance
2. urinary tract infection resistant to treatment
3. current hepatitis B, hepatitis C, HIV, or syphilis infection
4. positive fetal fibronectin test
5. suspected ectopic pregnancy
6. suspected missed abortion
7. hyperemesis
8. exposure to teratogen
9. isoimmunization
10. persistent anemia
11. vaginal bleeding
12. preeclampsia/eclampsia
13. suspected polyhydramnios or oligohydramnios
14. preterm cervical dilatation without uterine activity
15. preterm rupture of membranes with or without uterine activity
16. evidence of amnionitis or sepsis at any time
17. inappropriate fetal growth for gestational age
18. multiple gestation
19. post-term gestation (>42 weeks)
20. fetal demise
21. known or suspected fetal anomaly
22. abnormal maternal serum / genetic screen
23. placental abnormalities
24. abnormal fetal lie

II. INTRAPARTUM

- A. cervical dilatation with uterine contractions at < 37 weeks
- B. evidence of amnionitis or sepsis at any time
- C. abnormal bleeding
- D. preeclampsia/eclampsia
- E. multiple gestation
- F. PROM > 24 hours
- G. abnormal fetal presentation
- H. any severe medical / surgical condition

III. POSTPARTUM

- A. preeclampsia/eclampsia
- B. sepsis
- C. hemorrhage
- D. thromboembolic disease
- E. cardiopulmonary dysfunction
- F. if neonate needs transport to higher level of care mother should accompany if possible, to avoid separation
- G. infant nutrition concerns/breastfeeding difficulty

MATERNAL REFERRAL PROCESS

Maternal transport is initiated by the health care provider responsible for the patient's medical care. There must be an established agreement with a receiving hospital with which hospital policies and procedures confirm the ready availability of properly prepared transport systems.

I. INPATIENT TRANSPORT

A. Referring Center Responsibilities:

1. The decision by the referring care provider (physician, certified nurse midwife, nurse practitioner) to request consultation is the first step in the referral process.
2. Telephone consultation with the receiving care provider is necessary to initiate the referral process and to prepare the receiving provider. This consultation may aid the referring care provider in developing a treatment plan for stabilizing the patient before and during transport.
3. Personnel of the referring and receiving facilities must follow the COBRA/EMTALA guidelines (42USC 1395dd. Section 1867 of the Social Security Act. Also known as Section 9121 of the Consolidated Omnibus Budget Reconciliation Act of 1985. See Appendix III.). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com. Regional Perinatal Centers shall not refuse to accept an appropriate transfer of an individual who requires such specialized care if the hospital has the capability and bed availability to treat the individual. All transfers should be based on medical need.
4. If the transport is done by the birthing center, the referring care provider and birthing center retain responsibility until the transport team arrives with the patient at the receiving hospital. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)
5. A ground ambulance is preferred for the majority of maternal transports. If an alternate mode of transportation is being considered, the referring care provider should discuss this alternative with the receiving care provider at the time of consultation.
6. The medical record/EMR should be organized as the patient is prepared for transport and sent with the patient or to the receiving facility in a timely manner.
7. The composition of the transport team should be a joint decision between the referring and receiving care providers based on the condition of the mother and/or fetus/infant.
8. To avoid unnecessary delays in the emergency room or admitting office, all referrals should be directly admitted to the receiving obstetric unit.

B. Receiving Center Responsibilities:

1. The receiving care provider is responsible for the decision to accept the referring care provider's request for transport and make preparations at the receiving center. If unable to accept the transport, assistance in locating appropriate care should be provided to the referring care provider.
2. Personnel of the referring and receiving facilities must follow the COBRA/EMTALA guidelines (42USC 1395dd. Section 1867 of the Social Security Act; also known as Section 9121 of the Consolidated Omnibus Budget Reconciliation Act of 1985. See Appendix III.). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com. Regional Perinatal Centers shall not refuse to accept an appropriate transfer of an individual who requires such specialized care if the hospital has the capability and bed availability to treat the individual. All transfers should be based on medical need.
3. If the transport team is sent by the receiving hospital, the receiving physician or designee assumes responsibility for patient care from the time the patient leaves the referring birthing center. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)
4. The transport team should relay to the receiving facility any changes in patient status or estimated times of arrival that occur during transport.
5. Every patient accepted by the receiving center should be seen by a care provider within 30 minutes of arrival.
6. Communication with the referring care provider should occur following admission to the receiving facility.
7. A summary of care of both mother and/or infant should be sent to the referring and follow-up care providers.

MATERNAL TRANSPORT PERSONNEL

- I. The composition of the transport team should be decided jointly by the referring and receiving care providers based on the condition of the mother and/or fetus.
- II. The transport team members should be selected from appropriately trained, licensed health care providers. Educational requirements for EMS personnel have been revised as the national EMS educational standards. They are available on the website, <https://www.ems.gov/pdf/811077a.pdf>.
- III. Transport team members should have the collective expertise sufficient to provide the following, if necessary:
 - A. Monitoring of vital signs, uterine contractions, deep tendon reflexes, and fetal heart rate
 - B. Monitoring the administration of intravenous infusions and usage of tocolytic, antihypertensive, anticonvulsant, and other appropriate medications
 - C. Care for a wide variety of emergency conditions including delivery and neonatal resuscitation
- IV. Transport team members should be oriented to the transport vehicle and usage of transport equipment. All transport team members should follow state and national standards. (See the most recent edition of *AAP Guidelines for Transportation*.)
- V. In instances such as advanced labor, unstable maternal condition, or severe illness, it may become necessary for the referring care provider or designee to accompany the patient during transport, if transport is still recommended by the receiving physician. (See Appendix III re EMTALA). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com.

MATERNAL TRANSPORT MODALITY

- I. Selection of the transport modality should be a joint decision by the referring and receiving care providers based on the condition of the mother and fetus.
- II. Maternal transport can be accomplished by private vehicle, ambulance, rotary wing aircraft (RWA), or fixed wing aircraft (FWA). The ambulance (land and air) must be licensed by the Office of Emergency Medical Services of the Tennessee Department of Health.
- III. An Advanced Life Support (ALS) ambulance is required for maternal transport. The description of an ALS ambulance is defined by the Tennessee Department of Health and may be located in the latest edition of the *Tennessee Emergency Medical Services Statutes and Rules*, located at <https://www.tn.gov/health/health-program-areas/health-professional-boards/ems-board/ems-board/general-information.html> (click on Rules and Regulations).

MATERNAL TRANSPORT EQUIPMENT

- I. The referring health care provider should be aware of the availability of Advanced Life Support (ALS) ambulances in the area. The required equipment and supplies for maternal and neonatal care in an ALS ambulance are defined by the Tennessee Department of Health (See Appendix V).
- II. Organization and maintenance of additional transport equipment is the responsibility of the transport team.
- III. **Additional equipment and supplies** that may be necessary should be provided by the transporting team. These include:
 - A. **EQUIPMENT**
 1. Infusion pump
 - B. **SUPPLIES**
 1. Obstetrical Emergency Kit (standard on an ALS ambulance)
 2. Add 2 extra cord clamps if necessary so there are a total of 4 cord clamps available
- IV. **Additional medications** (or therapeutic equivalents) that may be necessary should be provided by the transport team or referring facility after communication among providers. Such medications, including but not limited to those listed below, may be given when ordered by the referring care provider.
 - A. **MEDICATIONS (Not routinely available on an ALS Ambulance)**
 1. *Antenatal Corticosteroids*

Indicated for pregnancies at <34 weeks gestation.

 - Betamethasone for injection – 12 mg IM is usual dose
 2. *Eclampsia (seizures) Medications*

Option 1 – Magnesium sulfate

 - a. If patient is **not currently seizing**, administer magnesium sulfate – 6 g bolus IV over 30 minutes, then 2 g/hr IV. The 2 g/hr **MUST be on a pump and not free flow.**
 - b. If patient is **actively seizing**, administer magnesium sulfate – 6 g bolus IV over 5 minutes, then 2 g/hr IV. The 2 g/hr IV **MUST be on a pump and not free flow.** Additional dose of 2 g IV over 5 to 10 minutes for persistent seizures (repeat x 1 only). First choice medication.

(Calcium gluconate – 1 g IV to reverse magnesium overdose)
(i.e., profound respiratory depression/compromise)

Option 2 – Diazepam (Valium) – 2-10 mg IV
Option 3 – Midazolam (Versed) – 5 mg SLOW IV push
 3. *Oxytocics for postpartum hemorrhage*

Indicated for prevention of postpartum hemorrhage Give **after every delivery:**

- Oxytocin (Pitocin) – 10 units per ampule/vial IM if no IV access or 30-40 units in 1,000 ml of lactated ringers to be given free flow.

Indicated only **for true postpartum hemorrhage:**

Option 1 – Methergine – 0.2 mg IM x 1 dose only. **Do not give** if BP >160 systolic or >110 diastolic

Option 2 – Misoprostol (Cytotec) – 400 mcg buccal and 400 mcg rectal. Give both simultaneously.

4. *Tocolytics for preterm labor*

Indicated for suspected or confirmed preterm labor:

Option 1 – Nifedipine (Procardia) – 10 mg PO x 1 dose only.

Option 2 – Magnesium sulfate – 6 g bolus IV over 30 minutes, then 2 g/hr IV. The 2 g/hr **MUST be on a pump and not free flow.**

Option 3 – Terbutaline sulfate (Brethine) for injection (0.25 mg subcutaneously) x 1 dose only. Contraindicated if maternal heart rate is >120 beats/minute.

5. *Antihypertensives**

Indicated for BP \geq 160 systolic or \geq 110 diastolic

Hold if BP is \leq 140 systolic or \leq 90 diastolic

Option 1 – Initial first line management with **Labetalol** (Trandate) IV if pressure remains elevated for 15 minutes or more:

- Labetalol – 20 mg IV over 2 minutes.
- Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 40 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 80 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Hydralazine – 10 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

Option 2 – Initial first line management with **Hydralazine** (Apresoline) IV if pressure remains elevated for 15 minutes or more:

- Hydralazine – 5-10 mg IV over 2 minutes.
- Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Hydralazine – 10 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 20 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

Option 3 – Initial first line management with **Immediate-Release Oral Nifedipine** if pressure remains elevated for 15 minutes or more:

- Immediate-release Nifedipine – 10 mg PO.
- Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Immediate-release Nifedipine – 20 mg PO. If BP is below threshold, continue close monitoring.
 - Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
- Labetalol – 20 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

*Emergent therapy for acute-onset, severe hypertension during pregnancy and the postpartum period. ACOG Committee Opinion No. 767. American College of Obstetricians and Gynecologists. Obstet Gynecol 2019; 133:e174-180.

MATERNAL REFERRAL DOCUMENTATION

Records are essential for continuing care of the patient and evaluation of the referral process. Both the referring and receiving centers have responsibilities to provide adequate documentation of clinical data.

When possible, it is recommended that all communication between the referring and receiving centers and/or transport team be made via a mode (telephone or radio) where conversations can be recorded.

I. REFERRING CENTER RESPONSIBILITIES

- A. The following documents/EMR should be available to the receiving center for the transported patient:
 - 1. Available medical and prenatal records, including the EMTALA form should be provided to the receiving center
- B. The referring center should maintain a record regarding disposition of transported mothers.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. Develop and maintain a record of care during transport

III. RECEIVING CENTER RESPONSIBILITIES

- A. Maintain a record regarding the disposition of the transported patient
- B. Send a summary of care of both mother and/or infant to the referring and follow-up care providers

EVALUATION OF MATERNAL REFERRAL PROCESS

- I. Interhospital care of the high-risk perinatal patient requires the cooperation and coordination of many skilled health care personnel. Outreach education efforts should include discussions of the regional referral process and can be used to reinforce cooperation and coordination.
- II. Outreach education related to transport should focus on the following objectives:
 - A. Informing perinatal care and EMS providers in the region of specialized resources available through the perinatal network
 - B. Assisting perinatal care providers in developing their abilities to identify high-risk perinatal patients, anticipate complications, and stabilize those patients before transport
 - C. Continuing quality improvement through ongoing education of perinatal providers and EMS personnel
- III. Planning of the perinatal referral process requires participation of those who will use the service and those who will provide it. Criteria considered in planning and evaluating the referral process are:
 - A. Availability
 - B. Accessibility
 - C. Responsiveness
 - D. Effectiveness
 - E. Safety
- IV. Referring facilities should periodically review their maternal referrals with or without the assistance of the receiving center.

NEONATAL TRANSPORT

Freestanding Birth Centers

These facilities are licensed and may be accredited by The Commission for Accreditation of Birth Centers to provide peripartum care for low risk pregnant women whose fetuses are in vertex presentation at term, anticipating an uncomplicated singleton birth. All high-risk mothers and infants, including those with underlying disease processes, must be promptly identified for consultation and/or referral for more specialized care. Birthing centers located within a hospital are governed by facility guidelines.

All freestanding birthing centers must have the capacity and equipment to provide uncomplicated maternal care and a readiness at all times to initiate emergency procedures to meet the unexpected needs of the woman and infant within the center, and to facilitate transport to an acute care setting when necessary (*Standards for Birth Centers*, American Association of Birth Centers [<https://www.birthcenters.org/page/Standards>]).

Freestanding birthing centers should call for a consult with a higher level facility or to request neonatal transport for non-emergent transfers and 911 for emergent transfers.

INDICATIONS FOR NEONATAL CONSULTATION AND/OR TRANSPORT

- I. Neonatal conditions requiring or potentially requiring more than routine care as prescribed for normal infants as published in the most recent edition of *Guidelines for Perinatal Care* (American Academy of Pediatrics and American College of Obstetricians and Gynecologists) will require consult/transfer to a higher level facility.

NEONATAL REFERRAL PROCESS

Neonatal transport is initiated by the health care provider (physician, certified nurse midwife, nurse practitioner, physician assistant) responsible for the patient's medical care. Guidelines for the referral process are outlined below.

I. REFERRING CENTER RESPONSIBILITIES

- A. The referring health care provider's decision to request consultation is the first step in the referral process.
- B. Telephone consultation with the receiving care provider is necessary to initiate the referral process and to prepare the receiving center. This consultation may aid the referring health care provider in developing a treatment plan for stabilizing the patient before transport.
- C. A discussion between the referring health care provider and receiving care provider regarding the infant will result in one of three possible dispositions:
 - Required neonatal care can be provided at the referring center. The receiving care provider under these circumstances has only a consultative role.
 - The infant requires further observation, investigation, or other preparation before possible transport. Continued contact between the providers is necessary.
 - Transport of the infant is necessary. Condition and potential disposition of the infant will be discussed with the family by the referring health care provider, and upon agreement, referral will be made. The optimal time, mode of transfer, transport personnel, and additional information regarding the infant should be discussed. The process of stabilization of the infant at the referring center should be reviewed and documented.
- D. Responsibility for the infant:
 - During the preparation for transport by the referring facility, the referring physician and hospital are responsible for the patient unless there have been other prior agreements.
 - If the infant is transported by the referring center, the referring health care provider is responsible for the patient until arrival at the receiving center.
 - If the infant is transported by the receiving center, the referring health care provider shares joint responsibility for the patient with the receiving facility until the departure of the transport team.
 - Transport services should work with the referring hospital to clearly delineate the primary medical responsibility for the patient when the patient is still within the referring hospital but is being cared for by the transport team. (See the most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and *Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients*, published by American Academy of Pediatrics.)
 - If the transport is aborted by the referring facility due to clinical improvement, patient responsibility is retained by the referral facility. Any care provided by the transport team should be documented and the documentation provided to the referral facility.

- If the transport is aborted secondary to patient demise, any care provided by the transport team should be documented and the documentation provided to the referring facility.
- E. Obtain the newborn screen prior to departure from the referring facility.
 - F. The maternal and neonatal medical records should be organized as the patient is prepared for transport and sent with the patient. Electronic medical records, when available, should be provided to the receiving facility in a timely manner.
 - G. Consent forms to authorize transfer must be obtained.
 - H. Parents should be encouraged to see and touch the infant.
 - I. Appropriate maternal/neonatal identification should be in place before transport.
 - J. If a delay in transport occurs, a repeat telephone or radio call should be made for further assessment and advice.
 - K. All referrals should be directly admitted to the receiving unit to avoid unnecessary delays in the emergency department.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. The transport team should communicate their estimated time of arrival to the referring facility and if a delay in response to the referring facility is anticipated, a telephone or radio call should be made.
- B. On arrival of the transport team, assessment and further stabilization of the infant should be done in collaboration with the referring staff.
- C. After neonatal stabilization, the transport team responsibilities before departure include:
 - Verify proper identification of the infant
 - Ensure that the newborn screen has been obtained
 - Discuss the infant's condition, possible course, and therapeutic intervention that has been undertaken or is anticipated with the parents
 - Encourage parents to see and touch the infant
 - Provide written information about the receiving center and resources
 - Develop a lactation plan for successful breastfeeding
 - Complete medical necessity and consent forms to authorize transfer, treatment, and admission to the receiving hospital
 - Communicate with the medical control physician regarding the infant's history, current status, and planned management during transport
- D. Enroute to the receiving facility, communicate any change in patient status and estimated time of arrival to the receiving facility and the medical control physician.
- E. Telephone the parents shortly following admission of the infant.

III. RECEIVING CENTER RESPONSIBILITIES

- A. The receiving care provider is responsible for the decision to accept the referring health care provider's request for transport and make preparations at the receiving center. If unable to accept the transport, assistance in locating appropriate care should be provided to the referring health care provider.
- B. Responsibility for the infant:
 - During the preparation for transport by the referring facility, the referring physician and hospital are responsible for the patient unless there have been other prior agreements. Transport services should work with the referring hospital to clearly delineate the primary medical responsibility for the patient when the patient is still within the referring hospital but is being cared for by the transport team. (See the most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and *Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients*, published by American Academy of Pediatrics.)
 - If the infant is transported by the referring center, the referring health care provider is responsible for the patient until arrival at the receiving center.
 - If the infant is transported by the receiving center the referring health care provider shares joint responsibility for the patient with the receiving facility until the departure of the transport team.
 - If the infant is transported by a third party neonatal transport team, under the direction of their medical control physician, the transport team and the receiving facility share joint responsibility after departure from the referring facility and until arrival at the receiving facility.
 - If the transport is aborted by the referring facility due to clinical improvement, patient responsibility is retained by the referring facility. Any care provided by the transport team should be documented and the documentation provided to the referring facility.
 - If the transport is aborted secondary to patient demise, any care provided by the transport team should be documented and the documentation provided to the referring facility.
- C. Within 72 hours of admission, communication with the referring care provider regarding events during transport and since admission should occur.
- D. Periodic communication with appropriate health care providers from the referring facility should be maintained.
- E. Consideration should be given to returning the care of the patient to the referring health care provider or primary care physician when practical and medically appropriate.
- F. Upon discharge of the infant, a discharge summary should be sent to the referring perinatal health care providers and the infant's follow-up health care provider.

NEONATAL TRANSPORT PERSONNEL, MODALITY AND EQUIPMENT

- I. The referring health care provider should be aware of the availability of Advanced Life Support (ALS) ambulances in the area. The required equipment and supplies for maternal and neonatal care in an ALS ambulance are defined by the Tennessee Department of Health (See Appendix V).
- II. Organization and maintenance of additional transport equipment is the responsibility of the transport team.
- III. Refer to pages 116-117 for **transport personnel and modality guidance**.
- IV. **Additional equipment, supplies and medication** that should be provided by the transport team or referring facility after communication among providers are listed on pages 118-121.

NEONATAL REFERRAL DOCUMENTATION

Records are essential for continuing care of the patient and evaluation of the referral process. Both referring and receiving center personnel have responsibilities to provide adequate documentation of clinical data.

When possible, it is recommended that all communication between the referring and receiving centers and/or transport team be made via a mode (telephone or radio) where conversations can be recorded.

I. REFERRING CENTER RESPONSIBILITIES

- A. The following documents/EMR should be promptly provided to the receiving facility:
 - 1. Available maternal prenatal and maternal medical record
 - 2. Current neonatal medical record, including medical imaging studies
 - 3. Record of care during transport, if the referring facility is transporting the patient

- B. The referring center should maintain a record regarding disposition of transferred infants.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. Develop and maintain a record of care during transport

III. RECEIVING CENTER RESPONSIBILITIES

- A. Maintain a record regarding the disposition of the transported infant
- B. Send a summary of care to the referring perinatal health care providers

EVALUATION OF NEONATAL REFERRAL PROCESS

- I. Interhospital care of the high-risk infant requires the cooperation and coordination of many skilled health care personnel. Outreach education efforts should include discussions of the regional referral process and can be used to reinforce cooperation and coordination.
- II. Outreach education related to transport should focus on the following objectives:
 - A. Informing perinatal care and EMS providers in the region of specialized resources available to them through the perinatal network.
 - B. Assisting neonatal care providers in developing their abilities to identify high-risk neonatal patients, anticipate complications, and stabilize those patients before transport.
- III. To promote continuous quality improvement, efforts should include ongoing education of neonatal providers and EMS personnel (See Appendix I). Educational requirements for EMS personnel have been revised as the national EMS educational standards. They are available on the website <https://www.ems.gov/pdf/811077a.pdf>.
- IV. Planning of the neonatal referral process requires participation of those who will use the service and those who will provide it. Criteria considered in planning and evaluating the referral process are:
 - A. Availability
 - B. Accessibility
 - C. Responsiveness
 - D. Effectiveness
 - E. Safety
- V. Referring facilities should periodically review their neonatal referrals, with or without the assistance of the receiving center.

LEVEL I FACILITIES

MATERNAL TRANSPORT

Level I

Level I units provide basic care for maternal and neonatal patients who are at low to moderate risk. All high-risk mothers and infants must be promptly identified for consultation and/or referral for more specialized care. In addition, Level I units can care for preterm infants at 35 to 37 weeks' gestation who are physiologically stable and can stabilize infants who are less than 35 weeks of gestation or who are ill until they can be transferred to a facility where the appropriate level of neonatal care is provided. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)

Maternal patients with underlying disease processes should be referred for consultation and/or co-management in order to reduce the risk of long-term complications.

Planned deliveries at gestational ages less than 35 weeks should be referred to a Level II, III, or IV facility. Although it is not always possible to prenatally anticipate the need for pediatric subspecialty services, when antenatal ultrasound and/or genetic testing has identified a fetus with congenital anomalies, prenatal referral to an appropriate subspecialty provider or fetal assessment clinic to provide families with prognostic information and facilitate a coordinated plan for delivery in a facility with the needed services is recommended.

When transfer is deemed safe for the mother and fetus, transfer of mothers to a Level II, III, or IV unit with the specialized expertise required by the fetus after birth is recommended. The elective delivery of an infant in a hospital without the required pediatric subspecialty services, thus requiring a planned neonatal transport, should be avoided.

INDICATIONS FOR MATERNAL CONSULTATION AND/OR TRANSPORT

The following list of indications for consultation and/or transport is broad for the care of pregnant patients; however, the potential need for maternal consultation and/or transport is based on the obstetric provider's best clinical judgment.

I. ANTEPARTUM

A. Maternal History

1. previous preterm delivery (<37 weeks) or low-birth weight infant (<2500 gm)
2. previous infant >4000 gm at term or any large-for-gestational age infant
3. previous stillbirth, neonatal loss
4. suspected cervical insufficiency
5. diagnosed abnormality of the genital tract
6. infant with known or suspected genetic disorder
7. severe emotional problems associated with previous pregnancy or delivery
8. previous uterine scar or C-section
9. age < 17 or advanced maternal age (≥ 35 years of age at delivery)
10. Body Mass Index (BMI) < 18 or > 40
11. suspected maternal skeletal dysplasia

B. Medical/Surgical Conditions

1. diabetes mellitus/endocrine disorder
2. autoimmune disorder
3. cardiac disease
4. hypertension
5. pulmonary disease
6. renal disease
7. hematologic disorder
8. neurologic disorder
9. musculoskeletal disorder
10. infection
11. nutritional disorder
12. inborn errors of metabolism (e.g., phenylalanine hydroxylase (PAH) deficiency [formerly called phenylketonuria (PKU)])
13. substance use
14. malignancy
15. psychiatric disorder
16. trauma
17. prior bariatric surgery

C. Obstetric Complications

1. glucose intolerance
2. urinary tract infection resistant to treatment
3. current hepatitis B, hepatitis C, HIV, or syphilis infection
4. positive fetal fibronectin test
5. suspected ectopic pregnancy
6. suspected missed abortion
7. hyperemesis
8. exposure to teratogen
9. isoimmunization
10. persistent anemia
11. vaginal bleeding
12. preeclampsia/eclampsia
13. suspected polyhydramnios or oligohydramnios
14. preterm cervical dilatation without uterine activity
15. preterm rupture of membranes with or without uterine activity
16. evidence of amnionitis or sepsis at any time
17. inappropriate fetal growth for gestational age
18. multiple gestation
19. post-term gestation (>42 weeks)
20. fetal demise
21. known or suspected fetal anomaly
22. abnormal maternal serum / genetic screen
23. placental abnormalities

II. INTRAPARTUM

- A. cervical dilatation with uterine contractions at < 35 weeks
- B. evidence of amnionitis or sepsis at any time
- C. abnormal bleeding
- D. preeclampsia/eclampsia
- E. multiple gestation (preterm or with complications)
- F. any severe medical / surgical condition

III. POSTPARTUM

- A. preeclampsia/eclampsia
- B. sepsis
- C. hemorrhage
- D. thromboembolic disease
- E. cardiopulmonary dysfunction
- F. if neonate needs transport to higher level of care mother should accompany if possible, to avoid separation

MATERNAL REFERRAL PROCESS

Maternal transport is initiated by the health care provider responsible for the patient's medical care. Maternal referral may lead to admission of the patient to the receiving hospital (inpatient transport) or to outpatient evaluation and management (outpatient transport). The guidelines for the referral process are outlined below.

I. INPATIENT TRANSPORT

A. Referring Center Responsibilities:

1. The decision by the referring care provider (physician, certified nurse midwife, nurse practitioner, physician assistant) to request consultation is the first step in the referral process.
2. Telephone consultation with the receiving care provider is necessary to initiate the referral process and to prepare the receiving provider. This consultation may aid the referring care provider in developing a treatment plan for stabilizing the patient before and during transport.
3. Personnel of the referring and receiving facilities must follow the COBRA/EMTALA guidelines (42USC 1395dd, Section 1867 of the Social Security Act. Also known as Section 9121 of the Consolidated Omnibus Budget Reconciliation Act of 1985. See Appendix III.). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com. Regional Perinatal Centers shall not refuse to accept an appropriate transfer of an individual who requires such specialized care if the hospital has the capability and bed availability to treat the individual. All transfers should be based on medical need.
4. If the transport is done by the referring hospital, the referring care provider and hospital retain responsibility until the transport team arrives with the patient at the receiving hospital. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)
5. A ground ambulance is preferred for the majority of maternal transports. If an alternate mode of transportation is being considered, the referring care provider should discuss this alternative with the receiving care provider at the time of consultation.
6. The medical record/EMR should be organized as the patient is prepared for transport and sent with the patient or to the receiving facility in a timely manner.
7. The composition of the transport team should be a joint decision between the referring and receiving care providers based on the condition of the mother and/or fetus.
8. To avoid unnecessary delays in the emergency room or admitting office, all referrals should be directly admitted to the receiving obstetric unit.

B. Receiving Center Responsibilities:

1. The receiving care provider is responsible for the decision to accept the referring care provider's request for transport and make preparations at the receiving center. If unable to accept the transport, assistance in locating appropriate care should be provided to the referring care provider.
2. Personnel of the referring and receiving facilities must follow the COBRA/EMTALA guidelines (42USC 1395dd. Section 1867 of the Social Security Act; also known as Section 9121 of the Consolidated Omnibus Budget Reconciliation Act of 1985. See Appendix III.). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com. Regional Perinatal Centers shall not refuse to accept an appropriate transfer of an individual who requires such specialized care if the hospital has the capability and bed availability to treat the individual. All transfers should be based on medical need.
3. If the transport team is sent by the receiving hospital, the receiving physician or designee assumes responsibility for patient care from the time the patient leaves the referring hospital. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)
4. The transport team should relay to the receiving facility any changes in patient status or estimated times of arrival that occur during transport.
5. Every patient accepted by the receiving center should be seen by a care provider within 30 minutes of arrival.
6. Communication with the referring care provider should occur following admission to the receiving facility, and if the patient is discharged undelivered.
7. If the patient is discharged undelivered, communication should occur to the referring provider prior to the time of discharge.
8. A summary of care of both mother and/or infant should be sent to the referring and follow-up care providers.

II. OUTPATIENT REFERRAL

A. Referring Center Responsibilities:

1. Outpatient referral could begin with a phone call, but must be followed by a written request for consultation / co-management from the referring care provider or designee to the receiving care provider or designee.
2. An appointment for evaluation at the receiving center should be arranged.

B. Receiving Center Responsibilities:

1. The referring care provider can be contacted by telephone, but must receive written communication after the evaluation has been completed.
2. Whenever possible, patients should continue under the care of the referring care provider.

MATERNAL TRANSPORT PERSONNEL

- I. The composition of the transport team should be decided jointly by the referring and receiving care providers based on the condition of the mother and/or fetus.
- II. The transport team members should be selected from appropriately trained, licensed health care providers. Educational requirements for EMS personnel have been revised as the national EMS educational standards. They are available on the website: <https://www.ems.gov/pdf/811077a.pdf>.
- III. Transport team members should have the collective expertise sufficient to provide the following, if necessary:
 - A. Monitoring of vital signs, uterine contractions, deep tendon reflexes, and fetal heart rate
 - B. Monitoring the administration of intravenous infusions and usage of tocolytic, antihypertensive, anticonvulsant, and other appropriate medications
 - C. Care for a wide variety of emergency conditions including delivery and neonatal resuscitation
- IV. Transport team members should be oriented to the transport vehicle and usage of transport equipment. All transport team members should follow state and national standards. (See the most recent edition of American Academy of Pediatrics *Guidelines for Transportation*.)
- V. In instances such as advanced labor, unstable maternal condition, or severe illness, it may become necessary for the referring care provider or designee to accompany the patient during transport, if transport is still recommended by the receiving physician. (See Appendix III re EMTALA). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com.

MATERNAL TRANSPORT MODALITY

- I. Selection of the transport modality should be a joint decision by the referring and receiving care providers based on the condition of the mother and fetus.
- II. Maternal transport can be accomplished by ambulance, rotary wing aircraft (RWA), or fixed wing aircraft (FWA). The ambulance (land and air) must be licensed by the Office of Emergency Medical Services of the Tennessee Department of Health.
- III. An Advanced Life Support (ALS) ambulance is required for maternal transport. The description of an ALS ambulance is defined by the Tennessee Department of Health and may be located in the latest edition of the *Tennessee Emergency Medical Services Statutes and Rules*, located at <https://www.tn.gov/health/health-program-areas/health-professional-boards/ems-board/ems-board/general-information.html> (click on Rules and Regulations).

MATERNAL TRANSPORT EQUIPMENT

- I. The referring health care provider should be aware of the availability of Advanced Life Support (ALS) ambulances in the area. The required equipment and supplies for maternal and neonatal care in an ALS ambulance are defined by the Tennessee Department of Health (See Appendix V).
- II. Organization and maintenance of additional transport equipment is the responsibility of the transport team.
- III. **Additional equipment and supplies** that may be necessary should be provided by the transporting team. These include:
 - A. **EQUIPMENT**
 1. Infusion pump
 - B. **SUPPLIES**
 1. Obstetrical Emergency Kit (standard on an ALS ambulance)
 2. Add 2 extra cord clamps if necessary so there are a total of 4 cord clamps available
- IV. **Additional medications** (or therapeutic equivalents) that may be necessary should be provided by the transport team or referring facility after communication among providers. Such medications, including but not limited to those listed below, may be given when ordered by the referring care provider.
 - A. **MEDICATIONS (Not routinely available on an ALS Ambulance)**
 1. *Antenatal Corticosteroids*

Indicated for pregnancies at <34 weeks gestation.

 - Betamethasone for injection – 12 mg IM is usual dose
 2. *Eclampsia (seizures) Medications*

Option 1 – Magnesium sulfate

 - a. If patient is **not currently seizing**, administer magnesium sulfate – 6 g bolus IV over 30 minutes, then 2 g/hr IV. The 2 g/hr **MUST be on a pump and not free flow.**
 - b. If patient is **actively seizing**, administer magnesium sulfate – 6 g bolus IV over 5 minutes, then 2 g/hr IV. The 2 g/hr IV **MUST be on a pump and not free flow.** Additional dose of 2 g IV over 5 to 10 minutes for persistent seizures (repeat x 1 only). First choice medication.

(Calcium gluconate – 1 g IV to reverse magnesium overdose)
(i.e., profound respiratory depression/compromise)

Option 2 – Diazepam (Valium) – 2-10 mg IV
Option 3 – Midazolam (Versed) – 5 mg SLOW IV push
 3. *Oxytocics for postpartum hemorrhage*

Indicated for prevention of postpartum hemorrhage Give **after every delivery:**

- Oxytocin (Pitocin) – 10 units per ampule/vial IM if no IV access or 30-40 units in 1,000 ml of lactated ringers to be given free flow.

Indicated only **for true postpartum hemorrhage:**

Option 1 – Methergine – 0.2 mg IM x 1 dose only. **Do not give** if BP >160 systolic or >110 diastolic

Option 2 – Misoprostol (Cytotec) – 400 mcg buccal and 400 mcg rectal. Give both simultaneously.

4. *Tocolytics for preterm labor*

Indicated for suspected or confirmed preterm labor:

Option 1 – Nifedipine (Procardia) – 10 mg PO x 1 dose only.

Option 2 – Magnesium sulfate – 6 g bolus IV over 30 minutes, then 2 g/hr IV. The 2 g/hr **MUST be on a pump and not free flow.**

Option 3 – Terbutaline sulfate (Brethine) for injection (0.25 mg subcutaneously) x 1 dose only. Contraindicated if maternal heart rate is >120 beats/minute.

5. *Antihypertensives**

Indicated for BP \geq 160 systolic or \geq 110 diastolic

Hold if BP is \leq 140 systolic or \leq 90 diastolic

Option 1 – Initial first line management with **Labetalol** (Trandate) IV if pressure remains elevated for 15 minutes or more:

- Labetalol – 20 mg IV over 2 minutes.
- Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 40 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 80 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Hydralazine – 10 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

Option 2 – Initial first line management with **Hydralazine** (Apresoline) IV if pressure remains elevated for 15 minutes or more:

- Hydralazine – 5-10 mg IV over 2 minutes.
- Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Hydralazine – 10 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 20 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

Option 3 – Initial first line management with **Immediate-Release Oral Nifedipine** if pressure remains elevated for 15 minutes or more:

- Immediate-release Nifedipine – 10 mg PO.
- Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Immediate-release Nifedipine – 20 mg PO. If BP is below threshold, continue close monitoring.
 - Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
- Labetalol – 20 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

*Emergent therapy for acute-onset, severe hypertension during pregnancy and the postpartum period. ACOG Committee Opinion No. 767. American College of Obstetricians and Gynecologists. Obstet Gynecol 2019; 133:e174-180.

MATERNAL REFERRAL DOCUMENTATION

Records are essential for continuing care of the patient and evaluation of the referral process. Both the referring and receiving centers have responsibilities to provide adequate documentation of clinical data.

When possible, it is recommended that all communication between the referring and receiving centers and/or transport team be made via a mode (telephone or radio) where conversations can be recorded.

I. REFERRING CENTER RESPONSIBILITIES

- A. The following documents/EMR should be available to the receiving center for the transported patient:
 - 1. Available medical and prenatal record, including the EMTALA form
- B. The referring center should maintain a record regarding disposition of transported mothers.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. Develop and maintain a record of care during transport

III. RECEIVING CENTER RESPONSIBILITIES

- A. Maintain a record regarding the disposition of the transported patient
- B. Send a summary of care of both mother and/or infant to the referring and follow-up care providers

EVALUATION OF MATERNAL REFERRAL PROCESS

- I. Interhospital care of the high-risk perinatal patient requires the cooperation and coordination of many skilled health care personnel. Outreach education efforts should include discussions of the regional referral process and can be used to reinforce cooperation and coordination.
- II. Outreach education related to transport should focus on the following objectives:
 - A. Informing perinatal care and EMS providers in the region of specialized resources available through the perinatal network
 - B. Assisting perinatal care providers in developing their abilities to identify high-risk perinatal patients, anticipate complications, and stabilize those patients before transport
 - C. Continuing quality improvement through ongoing education of perinatal providers and EMS personnel
- III. Planning of the perinatal referral process requires participation of those who will use the service and those who will provide it. Criteria considered in planning and evaluating the referral process are:
 - A. Availability
 - B. Accessibility
 - C. Responsiveness
 - D. Effectiveness
 - E. Safety
- IV. Referring facilities should periodically review their maternal referrals with or without the assistance of the receiving center.

NEONATAL TRANSPORT

Level I

Level I units provide basic care for maternal and neonatal patients who are at low to moderate risk. All high-risk mothers and infants must be promptly identified for consultation and/or referral for more specialized care. In addition, Level I units can care for preterm infants at 35 to 37 weeks' gestation who are physiologically stable and can stabilize infants who are less than 35 weeks of gestation or who are ill until they can be transferred to a facility where the appropriate level of neonatal care is provided. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)

Planned deliveries at gestational ages less than 35 weeks should be referred to a Level II, III, or IV facility. Although it is not always possible to prenatally anticipate the need for pediatric subspecialty services, when antenatal ultrasound and/or genetic testing has identified a fetus with congenital anomalies, prenatal referral to an appropriate subspecialty provider or fetal assessment clinic to provide families with prognostic information and facilitate a coordinated plan for delivery in a facility with the needed services is recommended.

When transfer is deemed safe for the mother and fetus, transfer of mothers to a Level II, III, or IV unit with the specialized expertise required by the fetus after birth is recommended. The elective delivery of an infant in a hospital without the required pediatric subspecialty services, thus requiring a planned neonatal transport, should be avoided.

INDICATIONS FOR NEONATAL CONSULTATION AND/OR TRANSPORT

- I. Requirement for more than routine care as prescribed for normal infants as published in the most recent edition of *Guidelines for Perinatal Care* (American Academy of Pediatrics and American College of Obstetricians and Gynecologists)
- II. Gestational age <35 weeks
- III. Apgar score <3 at 1 minute, <5 at 5 minutes, and/or <7 at 10 minutes
- IV. Need for oxygen therapy after initial resuscitation
- V. Abnormal respirations with or without need for supplemental oxygen
- VI. Requirement for continuous intravenous therapy >24 hours
- VII. Suspected sepsis
- VIII. Suspected congenital heart disease
- IX. Neurologic disorder
- X. Gastrointestinal disorder
- XI. Genitourinary disorder
- XII. Hematologic disorder
- XIII. Musculoskeletal disorder
- XIV. Endocrine or metabolic disorder
- XV. Congenital malformation or suspected genetic disorder requiring further evaluation

NEONATAL REFERRAL PROCESS

Neonatal transport is initiated by the health care provider (physician, certified nurse midwife, nurse practitioner, physician assistant) responsible for the patient's medical care. Guidelines for the referral process are outlined below.

I. REFERRING CENTER RESPONSIBILITIES

- A. The referring health care provider's decision to request consultation is the first step in the referral process.
- B. Telephone consultation with the receiving care provider is necessary to initiate the referral process and to prepare the receiving center. This consultation may aid the referring health care provider in developing a treatment plan for stabilizing the patient before transport.
- C. A discussion between the referring health care provider and receiving care provider regarding the infant will result in one of three possible dispositions:
 - Required neonatal care can be provided at the referring center. The receiving care provider under these circumstances has only a consultative role.
 - The infant requires further observation, investigation, or other preparation before possible transport. Continued contact between the providers is necessary.
 - Transport of the infant is necessary. Condition and potential disposition of the infant will be discussed with the family by the referring health care provider, and referral will be made upon family agreement. The optimal time, mode of transfer, transport personnel, and additional information regarding the infant should be discussed. The process of stabilization of the infant at the referring center should be reviewed and documented.
- D. Responsibility for the infant:
 - During the preparation for transport by the referring facility, the referring physician and hospital are responsible for the patient unless there have been other prior agreements.
 - If the infant is transported by the referring center, the referring health care provider is responsible for the patient until arrival at the receiving center.
 - If the infant is transported by the receiving center, the referring health care provider shares joint responsibility for the patient with the receiving facility until the departure of the transport team.
 - Transport services should work with the referring hospital to clearly delineate the primary medical responsibility for the patient when the patient is still within the referring hospital but is being cared for by the transport team. (See the most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and *Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients*, published by American Academy of Pediatrics.)
 - If the transport is aborted by the referring facility due to clinical improvement, patient responsibility is retained by the referring facility. Any care provided by the transport team should be documented and the documentation provided to the referring facility.

- If the transport is aborted secondary to patient demise, any care provided by the transport team should be documented and the documentation provided to the referral facility.
- E. Obtain the newborn screen prior to departure from the referring facility.
 - F. The maternal and neonatal medical records should be organized as the patient is prepared for transport and sent with the patient. Electronic medical records, when available, should be provided to the receiving facility in a timely manner.
 - G. Consent forms to authorize transfer must be obtained.
 - H. Parents should be encouraged to see and touch the infant.
 - I. Appropriate maternal/neonatal identification should be in place before transport.
 - J. If a delay in transport occurs, a repeat telephone or radio call should be made for further assessment and advice.
 - K. All referrals should be directly admitted to the receiving unit to avoid unnecessary delays in the emergency department.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. The transport team should communicate their estimated time of arrival to the referring facility and if a delay in response to the referring facility is anticipated, a telephone or radio call should be made.
- B. On arrival of the transport team, assessment and further stabilization of the infant should be done in collaboration with the referring staff.
- C. After neonatal stabilization, the transport team responsibilities before departure include:
 - Verify proper identification of the infant
 - Ensure that the newborn screen has been obtained
 - Discuss the infant's condition, possible course, and therapeutic intervention that has been undertaken or is anticipated with the parents
 - Encourage parents to see and touch the infant
 - Provide written information about the receiving center and resources
 - Develop a lactation plan for successful breastfeeding
 - Complete medical necessity and consent forms to authorize transfer, treatment, and admission to the receiving hospital
 - Communicate with the medical control physician regarding the infant's history, current status, and planned management during transport
- D. Enroute to the receiving facility, communicate any change in patient status and estimated time of arrival to the receiving facility and the medical control physician.
- E. Telephone the parents shortly following admission of the infant.

III. RECEIVING CENTER RESPONSIBILITIES

- A. The receiving care provider is responsible for the decision to accept the referring health care provider's request for transport and make preparations at the receiving center. If unable to accept the transport, assistance in locating appropriate care should be provided to the referring health care provider.
- B. Responsibility for the infant:
- During the preparation for transport by the referring facility, the referring physician and hospital are responsible for the patient unless there have been other prior agreements. Transport services should work with the referring hospital to clearly delineate the primary medical responsibility for the patient when the patient is still within the referring hospital but is being cared for by the transport team. (See the most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and *Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients*, American Academy of Pediatrics.)
 - If the infant is transported by the referring center, the referring health care provider is responsible for the patient until arrival at the receiving center.
 - If the infant is transported by the receiving center the referring health care provider shares joint responsibility for the patient with the receiving facility until the departure of the transport team.
 - If the infant is transported by a third party neonatal transport team, under the direction of their medical control physician, the transport team and the receiving facility share joint responsibility after departure from the referring facility and until arrival at the receiving facility.
 - If the transport is aborted by the referring facility due to clinical improvement, patient responsibility is retained by the referring facility. Any care provided by the transport team should be documented and the documentation provided to the referring facility.
 - If the transport is aborted secondary to patient demise, any care provided by the transport team should be documented and the documentation provided to the referring facility.
- C. Within 72 hours of admission, communication with the referring care provider regarding events during transport and since admission should occur.
- D. Periodic communication with appropriate health care providers from the referring facility should be maintained.
- E. Consideration should be given to returning the care of the patient to the referring health care provider or primary care physician when practical and medically appropriate.
- F. Upon discharge of the infant, a discharge summary should be sent to the referring perinatal health care providers and the infant's follow-up health care provider.

NEONATAL TRANSPORT PERSONNEL, MODALITY AND EQUIPMENT

- I. The referring health care provider should be aware of the availability of Advanced Life Support (ALS) ambulances in the area. The required equipment and supplies for maternal and neonatal care in an ALS ambulance are defined by the Tennessee Department of Health (See Appendix V).
- II. Organization and maintenance of additional transport equipment is the responsibility of the transport team.
- III. Refer to pages 116-117 for **transport personnel and modality guidance**.
- IV. **Additional equipment, supplies and medication** that should be provided by the transport team or referring facility after communication among providers are listed on pages 118-121.

NEONATAL REFERRAL DOCUMENTATION

Records are essential for continuing care of the patient and evaluation of the referral process. Both referring and receiving center personnel have responsibilities to provide adequate documentation of clinical data.

When possible, it is recommended that all communication between the referring and receiving centers and/or transport team be made via a mode (telephone or radio) where conversations can be recorded.

I. REFERRING CENTER RESPONSIBILITIES

- A. The following documents/EMR should be promptly provided to the receiving facility:
 - 1. Available maternal prenatal and maternal medical record
 - 2. Current neonatal medical record, including medical imaging studies
 - 3. Record of care during transport, if the referring facility is transporting the patient

- B. The referring center should maintain a record regarding disposition of transferred infants.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. Develop and maintain a record of care during transport

III. RECEIVING CENTER RESPONSIBILITIES

- A. Maintain a record regarding the disposition of the transported infant
- B. Send a summary of care to the referring perinatal health care providers

EVALUATION OF NEONATAL REFERRAL PROCESS

- I. Interhospital care of the high-risk infant requires the cooperation and coordination of many skilled health care personnel. Outreach education efforts should include discussions of the regional referral process and can be used to reinforce cooperation and coordination.
- II. Outreach education related to transport should focus on the following objectives:
 - A. Informing perinatal care and EMS providers in the region of specialized resources available to them through the perinatal network.
 - B. Assisting neonatal care providers in developing their abilities to identify high-risk neonatal patients, anticipate complications, and stabilize those patients before transport.
- III. To promote continuous quality improvement, efforts should include ongoing education of neonatal providers and EMS personnel (See Appendix I). Educational requirements for EMS personnel have been revised as the national EMS educational standards. They are available on the website <https://www.ems.gov/pdf/811077a.pdf>.
- IV. Planning of the neonatal referral process requires participation of those who will use the service and those who will provide it. Criteria considered in planning and evaluating the referral process are:
 - A. Availability
 - B. Accessibility
 - C. Responsiveness
 - D. Effectiveness
 - E. Safety
- V. Referring facilities should periodically review their neonatal referrals, with or without the assistance of the receiving center.

RETURN TRANSPORT

- I. Return transports occur to take patients back to their original or local hospital for further care when the problems that required initial transport have been resolved. Return transports have the following benefits:
- Facilitate family centered care, including visits and infant/family bonding
 - Restore family/community support network
 - Promote successful breastfeeding
 - Assist with discharge planning
 - Allow capacity for higher acuity infants in Level III and IV centers when the infant's acuity no longer meets criteria for Level III or IV care

II. NEONATAL RETURN TRANSPORT

- A. The hospital to which the infant is returned and the timing of the return transport are largely determined by individual patient care needs, the anticipated length of stay and receiving institutional capabilities.
- B. A telephone consultation with the receiving health care provider is necessary to initiate the return transport process and to prepare the receiving hospital. This consultation may aid the health care provider and nursing staff in developing a treatment plan. In the event the infant is returned to a hospital other than the original referring hospital, the original referring health care provider must be notified.
- C. The mode of transport, composition of the transport team, and equipment needs should be based on the condition of the infant and other factors such as distance and weather conditions.
- D. The physician directing the return transport is responsible for the patient during transport.
- E. Medical necessity and consent forms to authorize transfer, treatment, and admission to the receiving center must be obtained.
- F. The parents should be encouraged to visit and become familiar with the receiving center nursery prior to the return transport.
- G. The transport team should communicate with receiving center personnel regarding the estimated time of arrival.
- H. On admission of the infant to the receiving center, the transport team should communicate with receiving center personnel regarding the infant's history, events during transport, and current status.
- I. A comprehensive medical record, including imaging studies, should be made available to the receiving facility at the time of admission.
- J. Periodic communication between referring and receiving hospitals should be maintained.

LEVEL II FACILITIES

MATERNAL TRANSPORT

Level II

Level II obstetric units have the capability to provide a broad range of maternal-fetal services for normal patients and for those with moderate to high risk obstetric illnesses or complications. These units provide planned delivery services for women whose infants are expected to be >32 completed weeks of gestation and have a birthweight of at least 1500 grams. Additionally, a need for immediate pediatric subspecialty care for these infants should not be anticipated. Level II obstetric units also provide emergency care for unplanned births of younger, smaller, or sicker babies before transfer to a facility at which neonatal intensive care is provided.

Maternal patients with underlying disease processes should be referred for consultation and / or co-management in order to reduce the risk of long-term complications.

Planned deliveries at gestational ages < 32 weeks should be referred to a Level III or IV facility. Although it is not always possible to prenatally anticipate the need for pediatric subspecialty services, when antenatal ultrasound and/or genetic testing has identified a fetus with congenital anomalies, prenatal referral to an appropriate subspecialty provider or fetal assessment clinic to provide families with prognostic information and facilitate a coordinated plan for delivery in a facility with the needed services is recommended.

When transfer is deemed safe for the mother and fetus, transfer of mothers to a Level III or IV unit with the specialized expertise required by the fetus after birth is recommended. The elective delivery of an infant in a hospital without the required pediatric subspecialty services, thus requiring a planned neonatal transport, should be avoided.

INDICATIONS FOR MATERNAL CONSULTATION AND/OR TRANSPORT

The following list of indications for consultation and/or transport is broad for the care of pregnant patients; however, the potential need for maternal consultation and/or transport is based on the obstetric provider's best clinical judgment.

I. ANTEPARTUM

A. Maternal History

1. previous preterm delivery (<32 weeks) or very low birthweight infant (<1500 gm)
2. previous infant >4000 gm at term or any large-for-gestational age infant
3. previous stillbirth, neonatal loss
4. suspected cervical insufficiency
5. diagnosed abnormality of the genital tract
6. infant with known or suspected genetic disorder
7. severe emotional problems associated with previous pregnancy or delivery
8. previous vertical or classical uterine incision
9. age < 17 or advanced maternal age (≥ 35 years of age at delivery)
10. Body Mass Index (BMI) < 18 or > 40
11. suspected maternal skeletal dysplasia

B. Medical/Surgical Conditions

1. diabetes mellitus/endocrine disorder
2. autoimmune disorder
3. cardiac disease
4. hypertension
5. pulmonary disease
6. renal disease
7. hematologic disorder
8. neurologic disorder
9. musculoskeletal disorder
10. infection
11. nutritional disorder
12. inborn errors of metabolism (e.g., phenylalanine hydroxylase (PAH) deficiency [formerly called phenylketonuria (PKU)])
13. substance use
14. malignancy
15. psychiatric disorder
16. trauma
17. prior bariatric surgery

C. Obstetric Complications

1. glucose intolerance
2. urinary tract infection resistant to treatment
3. current hepatitis B, hepatitis C, HIV, or syphilis infection
4. positive fetal fibronectin test
5. exposure to teratogen
6. isoimmunization
7. persistent anemia
8. vaginal bleeding
9. preterm cervical dilatation without uterine activity
10. preterm prelabor rupture of membranes
11. inappropriate fetal growth for gestational age
12. multiple gestation
13. known or suspected fetal anomaly
14. abnormal maternal serum / genetic screen
15. placental abnormalities

II. INTRAPARTUM

- A. cervical dilatation with uterine contractions at < 32 weeks
- B. evidence of amnionitis or sepsis at any time
- C. abnormal bleeding
- D. preeclampsia/eclampsia
- E. multiple gestation (pre-term or with complications)
- F. any severe medical / surgical condition

III. POSTPARTUM

- A. preeclampsia/eclampsia
- B. sepsis
- C. hemorrhage
- D. thromboembolic disease
- E. cardiopulmonary dysfunction
- F. if the neonate needs transport to a higher level of care mother should accompany if possible, to avoid separation

MATERNAL REFERRAL PROCESS

Maternal transport is initiated by the health care provider responsible for the patient's medical care. Maternal referral may lead to admission of the patient to the receiving hospital (inpatient transport) or to outpatient evaluation and management (outpatient transport). The guidelines for the referral process are outlined below.

I. INPATIENT TRANSPORT

A. Referring Center Responsibilities:

1. The decision by the referring care provider (physician, certified nurse midwife, nurse practitioner, physician assistant) to request consultation is the first step in the referral process.
2. Telephone consultation with the receiving care provider is necessary to initiate the referral process and to prepare the receiving provider. This consultation may aid the referring care provider in developing a treatment plan for stabilizing the patient before and during transport.
3. Personnel of the referring and receiving facilities must follow the COBRA/EMTALA guidelines (42USC 1395dd. Section 1867 of the Social Security Act. Also known as Section 9121 of the Consolidated Omnibus Budget Reconciliation Act of 1985. See Appendix III.). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com. Regional Perinatal Centers shall not refuse to accept an appropriate transfer of an individual who requires such specialized care if the hospital has the capability and bed availability to treat the individual. All transfers should be based on medical need.
4. If the transport is done by the referring hospital, the referring care provider and hospital retain responsibility until the transport team arrives with the patient at the receiving hospital. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)
5. A ground ambulance is preferred for the majority of maternal transports. If an alternate mode of transportation is being considered, the referring care provider should discuss this alternative with the receiving care provider at the time of consultation.
6. The medical record/EMR should be organized as the patient is prepared for transport and sent with the patient or to the receiving facility in a timely manner.
7. The composition of the transport team should be a joint decision between the referring and receiving care providers based on the condition of the mother and/or infant.
8. To avoid unnecessary delays in the emergency room or admitting office, all referrals should be directly admitted to the receiving obstetric unit.

B. Receiving Center Responsibilities:

1. The receiving care provider is responsible for the decision to accept the referring care provider's request for transport and make preparations at the receiving center. If unable to accept the transport, assistance in locating

- appropriate care should be provided to the referring care provider.
2. Personnel of the referring and receiving facilities must follow the COBRA/EMTALA guidelines (42USC 1395dd. Section 1867 of the Social Security Act. Also known as Section 9121 of the Consolidated Omnibus Budget Reconciliation Act of 1985. See Appendix III). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com. Regional Perinatal Centers shall not refuse to accept an appropriate transfer of an individual who requires such specialized care if the hospital has the capability and bed availability to treat the individual. All transfers should be based on medical need.
 3. If the transport team is sent by the receiving hospital, the receiving physician or designee assumes responsibility for patient care from the time the patient leaves the referring hospital. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)
 4. The transport team should relay to the receiving facility any changes in patient status or estimated times of arrival that occur during transport.
 5. Every patient accepted by the receiving center should be seen by a care provider within 30 minutes of arrival.
 6. Communication with the referring care provider should occur following admission to the receiving facility, and if the patient is discharged undelivered.
 7. If the patient is discharged undelivered, communication should occur to the referring provider prior to the time of discharge.
 8. A summary of care of both mother and/or infant should be sent to the referring and follow-up care providers.

II. OUTPATIENT REFERRAL

A. Referring Center Responsibilities:

1. Outpatient referral could begin with a phone call but must be followed by a written request for consultation / co-management from the referring care provider or designee to the receiving care provider or designee.
2. An appointment for evaluation at the receiving center should be arranged.

B. Receiving Center Responsibilities:

1. The referring care provider can be contacted by telephone, but must receive written communication after the evaluation has been completed.
2. Whenever possible, patients should continue under the care of the referring care provider.

MATERNAL TRANSPORT PERSONNEL

- I. The composition of the transport team should be decided jointly by the referring and receiving care providers based on the condition of the mother and/or fetus.
- II. The transport team members should be selected from appropriately trained, licensed health care providers. Educational requirements for EMS personnel have been revised as the national EMS educational standards. They are available on the website, <https://www.ems.gov/pdf/811077a.pdf>.
- III. Transport team members should have the collective expertise sufficient to provide the following, if necessary:
 - A. Monitoring of vital signs, uterine contractions, deep tendon reflexes, and fetal heart rate
 - B. Monitoring the administration of intravenous infusions and usage of tocolytic, antihypertensive, anticonvulsant, and other appropriate medications
 - C. Care for a wide variety of emergency conditions including delivery and neonatal resuscitation
- IV. Transport team members should be oriented to the transport vehicle and usage of transport equipment. All transport team members should follow state and national standards.
- V. In instances such as advanced labor, unstable maternal condition, or severe illness, it may become necessary for the referring care provider or designee to accompany the patient during transport, if transport is still recommended by the receiving physician. (See Appendix III re EMTALA). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com.

MATERNAL TRANSPORT MODALITY

- I. Selection of the transport modality should be a joint decision by the referring and receiving care providers based on the condition of the mother and fetus.
- II. Maternal transport can be accomplished by ambulance, rotary wing aircraft (RWA), or fixed wing aircraft (FWA). The ambulance (land and air) must be licensed by the Office of Emergency Medical Services of the Tennessee Department of Health.
- III. An Advanced Life Support (ALS) ambulance is required for maternal transport. The description of an ALS ambulance is defined by the Tennessee Department of Health and may be located in the latest edition of the *Tennessee Emergency Medical Services Statutes and Rules*, located at <https://www.tn.gov/health/health-program-areas/health-professional-boards/ems-board/ems-board/general-information.html> (Click on Rules and Regulations).

MATERNAL TRANSPORT EQUIPMENT

- I. The referring health care provider should be aware of the availability of Advanced Life Support (ALS) ambulances in the area. The required equipment and supplies for maternal and neonatal care in an ALS ambulance are defined by the Tennessee Department of Health (See Appendix V).
- II. Organization and maintenance of additional transport equipment is the responsibility of the transport team.
- III. **Additional equipment and supplies** that may be necessary should be provided by the transporting team. These include:
 - A. **EQUIPMENT**
 1. Infusion pump
 - B. **SUPPLIES**
 1. Obstetrical Emergency Kit (standard on an ALS ambulance)
 2. Add 2 extra cord clamps if necessary so there are a total of 4 cord clamps available
- IV. **Additional medications** (or therapeutic equivalents) that may be necessary should be provided by the transport team or referring facility after communication among providers. Such medications, including but not limited to those listed below, may be given when ordered by the referring care provider.
 - A. **MEDICATIONS (Not routinely available on an ALS Ambulance)**
 1. *Antenatal Corticosteroids*

Indicated for pregnancies at <34 weeks gestation.

 - Betamethasone for injection – 12 mg IM is usual dose
 2. *Eclampsia (seizures) Medications*

Option 1 – Magnesium sulfate

 - a. If patient is **not currently seizing**, administer magnesium sulfate – 6 g bolus IV over 30 minutes, then 2 g/hr IV. The 2 g/hr **MUST be on a pump and not free flow.**
 - b. If patient is **actively seizing**, administer magnesium sulfate – 6 g bolus IV over 5 minutes, then 2 g/hr IV. The 2 g/hr IV **MUST be on a pump and not free flow.** Additional dose of 2 g IV over 5 to 10 minutes for persistent seizures (repeat x 1 only). First choice medication.

(Calcium gluconate – 1 g IV to reverse magnesium overdose)
(i.e., profound respiratory depression/compromise)

Option 2 – Diazepam (Valium) – 2-10 mg IV
Option 3 – Midazolam (Versed) – 5 mg SLOW IV push
 3. *Oxytocics for postpartum hemorrhage*

Indicated for prevention of postpartum hemorrhage Give **after every delivery:**

- Oxytocin (Pitocin) – 10 units per ampule/vial IM if no IV access or 30-40 units in 1,000 ml of lactated ringers to be given free flow.

Indicated only **for true postpartum hemorrhage:**

Option 1 – Methergine – 0.2 mg IM x 1 dose only. **Do not give** if BP >160 systolic or >110 diastolic

Option 2 – Misoprostol (Cytotec) – 400 mcg buccal and 400 mcg rectal. Give both simultaneously.

4. *Tocolytics for preterm labor*

Indicated for suspected or confirmed preterm labor:

Option 1 – Nifedipine (Procardia) – 10 mg PO x 1 dose only.

Option 2 – Magnesium sulfate – 6 g bolus IV over 30 minutes, then 2 g/hr IV. The 2 g/hr **MUST be on a pump and not free flow.**

Option 3 – Terbutaline sulfate (Brethine) for injection (0.25 mg subcutaneously) x 1 dose only. Contraindicated if maternal heart rate is >120 beats/minute.

5. *Antihypertensives**

Indicated for BP \geq 160 systolic or \geq 110 diastolic

Hold if BP is \leq 140 systolic or \leq 90 diastolic

Option 1 – Initial first line management with **Labetalol** (Trandate) IV if pressure remains elevated for 15 minutes or more:

- Labetalol – 20 mg IV over 2 minutes.
- Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 40 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 80 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Hydralazine – 10 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

Option 2 – Initial first line management with **Hydralazine** (Apresoline) IV if pressure remains elevated for 15 minutes or more:

- Hydralazine – 5-10 mg IV over 2 minutes.
- Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Hydralazine – 10 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 20 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

Option 3 – Initial first line management with **Immediate-Release Oral Nifedipine** if pressure remains elevated for 15 minutes or more:

- Immediate-release Nifedipine – 10 mg PO.
- Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Immediate-release Nifedipine – 20 mg PO. If BP is below threshold, continue close monitoring.
 - Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
- Labetalol – 20 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

*Emergent therapy for acute-onset, severe hypertension during pregnancy and the postpartum period. ACOG Committee Opinion No. 767. American College of Obstetricians and Gynecologists. Obstet Gynecol 2019; 133:e174-180.

MATERNAL REFERRAL DOCUMENTATION

Records are essential for continuing care of the patient and evaluation of the referral process. Both the referring and receiving centers have responsibilities to provide adequate documentation of clinical data.

When possible, it is recommended that all communication between the referring and receiving centers and/or transport team be made via a mode (telephone or radio) where conversations can be recorded.

I. REFERRING CENTER RESPONSIBILITIES

- A. The following documents/EMR should be available to the receiving center for the transported patient:
 - 1. Available medical and prenatal records, including the EMTALA form
- B. The referring center should maintain a record regarding disposition of transported mothers.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. Develop and maintain a record of care during transport

III. RECEIVING CENTER RESPONSIBILITIES

- A. Maintain a record regarding the disposition of the transported patient
- B. Send a summary of care of both mother and/or infant to the referring and follow-up care providers

EVALUATION OF MATERNAL REFERRAL PROCESS

- I. Interhospital care of the high-risk perinatal patient requires the cooperation and coordination of many skilled health care personnel. Outreach education efforts should include discussions of the regional referral process and can be used to reinforce cooperation and coordination.
- II. Outreach education related to transport should focus on the following objectives:
 - A. Informing perinatal care and EMS providers in the region of specialized resources available through the perinatal network
 - B. Assisting perinatal care providers in developing their abilities to identify high-risk perinatal patients, anticipate complications, and stabilize those patients before transport
 - C. Continuing quality improvement through ongoing education of perinatal providers and EMS personnel
- III. Planning of the perinatal referral process requires participation of those who will use the service and those who will provide it. Criteria considered in planning and evaluating the referral process are:
 - A. Availability
 - B. Accessibility
 - C. Responsiveness
 - D. Effectiveness
 - E. Safety
- IV. Referring facilities should periodically review their maternal referrals with or without the assistance of the receiving center.

NEONATAL TRANSPORT

Level II

Level II nurseries provide specialty neonatal services. They provide care for stable or moderately ill infants born at >32 weeks gestation and weighing ≥ 1500 grams who have problems that are expected to resolve rapidly and are not anticipated to need subspecialty services on an urgent basis. These units also resuscitate and stabilize preterm and/or ill infants before transfer to a facility at which neonatal intensive care is provided. Level II nurseries provide mechanical ventilation for brief (<24 hours) duration and provide continuous positive airway pressure until the infant's condition improves or the infant can be transferred to a higher-level facility. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.) In addition, Level II units provide care for infants who are convalescing after intensive care. Personnel experienced in dealing with perinatal issues, discharge planning and education, follow-up referral, home care planning, and bereavement support should be available to intermediate and intensive care unit staff members and families.

When antenatal ultrasound and/or genetic testing has identified a fetus with congenital anomalies, prenatal referral to an appropriate subspecialty provider or fetal assessment clinic to provide families with prognostic information and facilitate a coordinated plan for delivery in a facility with the needed services is encouraged.

When transport is deemed safe for the mother and fetus, transfer of mothers to a Level III or Level IV unit with the specialized services required by the fetus after birth is encouraged. The elective delivery of an infant in a hospital without the required pediatric subspecialty services resulting in a planned neonatal transport should be avoided.

The obstetric co-director is board certified in that specialty. The pediatric co-director is board certified in neonatal-perinatal medicine.

INDICATIONS FOR NEONATAL CONSULTATION AND/OR TRANSPORT

- I. Gestational age \leq 32 weeks
- II. Birth weight <1500 grams
- III. Severity of illness requiring a level of care that exceeds the capacity of the Level II facility

NEONATAL REFERRAL PROCESS

Neonatal transport is initiated by the health care provider (physician, certified nurse midwife, nurse practitioner, physician assistant) responsible for the patient's medical care. Guidelines for the referral process are outlined below.

I. REFERRING CENTER RESPONSIBILITIES

- A. The referring health care provider's decision to request consultation is the first step in the referral process.
- B. Telephone consultation with the receiving care provider is necessary to initiate the referral process and to prepare the receiving center. This consultation may aid the referring health care provider in developing a treatment plan for stabilizing the patient before transport.
- C. A discussion between the referring health care provider and receiving care provider regarding the infant will result in one of three possible dispositions:
 - Required neonatal care can be provided at the referring center. The receiving care provider under these circumstances has only a consultative role.
 - The infant requires further observation, investigation, or other preparation before possible transport. Continued contact between the providers is necessary.
 - Transport of the infant is necessary. Condition and potential disposition of the infant will be discussed with the family by the referring health care provider, and referral made upon family agreement. The optimal time, mode of transfer, transport personnel, and additional information regarding the infant should be discussed. The process of stabilization of the infant at the referring center should be reviewed and documented.
- D. Responsibility for the infant:
 - During the preparation for transport by the referring facility, the referring physician and hospital are responsible for the patient unless there have been other prior agreements.
 - If the infant is transported by the referring center, the referring health care provider is responsible for the patient until arrival at the receiving center.
 - If the infant is transported by the receiving center, the referring health care provider shares joint responsibility for the patient with the receiving facility until the departure of the transport team.
 - Transport services should work with the referring hospital to clearly delineate the primary medical responsibility for the patient when the patient is still within the referring hospital but is being cared for by the transport team. (See the most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and *Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients*, American Academy of Pediatrics.)
 - If the transport is aborted by the referring facility due to clinical improvement, patient responsibility is retained by the referring facility. Any care provided by the transport team should be documented and the documentation provided to the referring facility.

- If the transport is aborted secondary to patient demise, any care provided by the transport team should be documented and the documentation provided to the referring facility.
- E. Obtain the newborn screen prior to departure from the referring facility.
 - F. The maternal and neonatal medical records should be organized as the patient is prepared for transport and sent with the patient. Electronic medical records, when available, should be provided to the receiving facility in a timely manner.
 - G. Consent forms to authorize transfer must be obtained.
 - H. Parents should be encouraged to see and touch the infant.
 - I. Appropriate maternal/neonatal identification should be in place before transport.
 - J. If a delay in transport occurs, a repeat telephone or radio call should be made for further assessment and advice.
 - K. All referrals should be directly admitted to the receiving unit to avoid unnecessary delays in the emergency department.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. The transport team should communicate their estimated time of arrival to the referring facility and if a delay in response to the referring facility is anticipated, a telephone or radio call should be made.
- B. On arrival of the transport team, assessment and further stabilization of the infant should be done in collaboration with the referring staff.
- C. After neonatal stabilization, the transport team responsibilities before departure, include:
 - Verify proper identification of the infant
 - Ensure that the newborn screen has been obtained
 - Discuss the infant's condition, possible course, and therapeutic intervention that has been undertaken or is anticipated with the parents
 - Encourage parents to see and touch the infant
 - Provide written information about the receiving center and resources
 - Develop a lactation plan for successful breastfeeding
 - Complete medical necessity and consent forms to authorize transfer, treatment, and admission to the receiving hospital
 - Communicate with the medical control physician regarding the infant's history, current status, and planned management during transport
- D. Enroute to the receiving facility, communicate any change in patient status and estimated time of arrival to the receiving facility and the medical control physician.
- E. Telephone the parents shortly following admission of the infant.

III. RECEIVING CENTER RESPONSIBILITIES

- A. The receiving care provider is responsible for the decision to accept the referring health care provider's request for transport and make preparations at the receiving center. If unable to accept the transport, assistance in locating appropriate care should be provided to the referring health care provider.
- B. Responsibility for the infant:
 - During the preparation for transport by the referring facility, the referring physician and hospital are responsible for the patient unless there have been other prior agreements. Transport services should work with the referring hospital to clearly delineate the primary medical responsibility for the patient when the patient is still within the referring hospital but is being cared for by the transport team. (See the most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and *Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients*, American Academy of Pediatrics.)
 - If the infant is transported by the referring center, the referring health care provider is responsible for the patient until arrival at the receiving center.
 - If the infant is transported by the receiving center, the referring health care provider shares joint responsibility for the patient with the receiving facility until the departure of the transport team.
 - If the infant is transported by a third party neonatal transport team, under the direction of their medical control physician, the transport team and the receiving facility share joint responsibility after departure from the referring facility and until arrival at the receiving facility.
 - If the transport is aborted by the referring facility due to clinical improvement, patient responsibility is retained by the referring facility. Any care provided by the transport team should be documented and the documentation provided to the referring facility.
 - If the transport is aborted secondary to patient demise, any care provided by the transport team should be documented and the documentation provided to the referring facility.
- C. Within 72 hours of admission, communication with the referring care provider regarding events during transport and since admission should occur.
- D. Periodic communication with appropriate health care providers from the referring facility should be maintained.
- E. Consideration should be given to returning the care of the patient to the referring health care provider or primary care physician when practical and medically appropriate.
- F. Upon discharge of the infant, a discharge summary should be sent to the referring perinatal health care providers and the infant's follow-up health care provider.

NEONATAL TRANSPORT PERSONNEL, MODALITY & EQUIPMENT

- I. The referring health care provider should be aware of the availability of Advanced Life Support (ALS) ambulances in the area. The required equipment and supplies for maternal and neonatal care in an ALS ambulance are defined by the Tennessee Department of Health (See Appendix V).
- II. Organization and maintenance of additional transport equipment is the responsibility of the transport team.
- III. Refer to pages 116-117 for **transport personnel and modality guidance**.
- IV. **Additional equipment, supplies and medication** that should be provided by the transport team or referring facility after communication among providers are listed on pages 118-121.

NEONATAL REFERRAL DOCUMENTATION

Records are essential for continuing care of the patient and evaluation of the referral process. Both referring and receiving center personnel have responsibilities to provide adequate documentation of clinical data.

When possible, it is recommended that all communication between the referring and receiving and/or transport team be made via a mode (telephone or radio) where conversations can be recorded.

I. REFERRING CENTER RESPONSIBILITIES

- A. The following documents/EMR should be promptly provided to the receiving facility:
 - 1. Available maternal medical and prenatal records
 - 2. Current neonatal medical record, including medical imaging studies
 - 3. Record of care during transport, if the referring facility is transporting the patient

- B. The referring center should maintain a record regarding disposition of transported infants.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. Develop and maintain a record of care during transport

III. RECEIVING CENTER RESPONSIBILITIES

- A. Maintain a record regarding the disposition of the transported infant
- B. Send a summary of care to the referring perinatal health care providers

EVALUATION OF NEONATAL REFERRAL PROCESS

- I. Interhospital care of the high-risk infant requires the cooperation and coordination of many skilled persons. Outreach education efforts should include discussions of the regional referral process and can be used to reinforce cooperation and coordination.
- II. Outreach education related to transport should focus on the following objectives:
 - A. Informing perinatal care and EMS providers in the region of specialized resources available to them through the perinatal network.
 - B. Assisting neonatal care providers in developing their abilities to identify high-risk neonatal patients, anticipate complications, and stabilize those patients before transport.
- III. To promote continuous quality improvement, efforts should include ongoing education of neonatal providers and EMS personnel (See Appendix I). Educational requirements for EMS personnel have been revised as the national EMS educational standards. They are available on the website <https://www.ems.gov/pdf/811077a.pdf>.
- IV. Planning of the neonatal referral process requires participation of those who will use the service and those who will provide it. Criteria considered in planning and evaluating the referral process are:
 - A. Availability
 - B. Accessibility
 - C. Responsiveness
 - D. Effectiveness
 - E. Safety
- V. Referring facilities should periodically review their neonatal referrals, with or without the assistance of the receiving center.

RETURN TRANSPORT

- I. Return transports occur to take patients back to their original or local hospital for further care when the problems that required initial transport have been resolved. Return transports have the following benefits:
- Facilitate family centered care, including visits and infant/family bonding
 - Restore family/community support network
 - Promote successful breastfeeding
 - Assist with discharge planning
 - Allow capacity for higher acuity infants in Level III and IV centers when the infant's acuity no longer meets criteria for Level III or IV care

II. NEONATAL RETURN TRANSPORT

- A. The hospital to which the infant is returned and the timing of the return transport are largely determined by individual patient care needs, the anticipated length of stay and receiving institutional capabilities.
- B. A telephone consultation with the receiving health care provider is necessary to initiate the return transport process and to prepare the receiving hospital. This consultation may aid the health care provider and nursing staff in developing a treatment plan. In the event the infant is returned to a hospital other than the original referring hospital, the original referring health care provider must be notified.
- C. The mode of transport, composition of the transport team, and equipment needs should be based on the condition of the infant and other factors such as distance and weather conditions.
- D. The physician directing the return transport is responsible for the patient during transport.
- E. Medical necessity and consent forms to authorize transfer, treatment, and admission to the receiving center must be obtained.
- F. The parents should be encouraged to visit and become familiar with the receiving center nursery prior to the return transport.
- G. The transport team should communicate with receiving center personnel regarding the estimated time of arrival.
- H. On admission of the infant to the receiving center, the transport team should communicate with receiving center personnel regarding the infant's history, events during transport, and current status.
- I. A comprehensive medical record, including imaging studies, should be made available to the receiving facility at the time of admission.
- J. Periodic communication between referring and receiving hospitals should be maintained.

LEVEL III FACILITIES

MATERNAL TRANSPORT

Level III

Level III obstetric units provide subspecialty care. They have the capabilities of Level II units. In addition, they provide care for more complex maternal medical conditions, obstetric complications, and fetal conditions.

Maternal patients with underlying disease processes should be referred for consultation and / or co-management in order to reduce the risk of long-term complications. Patients who may need critical care services should be assessed for possible transport based on available hospital capabilities.

Although it is not always possible to prenatally anticipate the need for pediatric subspecialty services, when antenatal ultrasound and/or genetic testing has identified a fetus with congenital anomalies, prenatal referral to an appropriate subspecialty provider or fetal assessment clinic to provide families with prognostic information and facilitate a coordinated plan for delivery in a facility with the needed services is encouraged.

The elective and/or planned delivery of a fetus with a condition(s) that require immediate neonatal transport should be avoided.

The Level III facility is responsible for delivery of a formal ongoing program of education in obstetrics and neonatal-perinatal medicine for its staff.

In Level III and IV maternal care facilities, the director of obstetric services, the director of the neonatal intensive care unit, and the director of the maternal-fetal medicine service should co-direct the perinatal medical service.

REGIONAL PERINATAL CENTERS

Each of Tennessee's five Regional Perinatal Centers (Northeast Tennessee Regional Perinatal Center in Johnson City; East Tennessee Regional Perinatal Center in Knoxville; Southeast Regional Perinatal Center in Chattanooga; Middle Tennessee Regional Perinatal Center in Nashville; and West Tennessee Regional Perinatal Center in Memphis) is capable of providing Level III or Level IV obstetric and neonatal care.

In addition, each Regional Perinatal Center must provide the services of consultation/referral, professional education, maternal-fetal and neonatal transport, site visits upon request, post-neonatal follow-up, and data collection.

INDICATIONS FOR MATERNAL CONSULTATION AND/OR TRANSPORT

Indications for consultation and/or transport are broad for the care of pregnant patients; however, the potential need for maternal consultation and/or transport is based on the obstetric provider's best clinical judgement.

- I. Maternal or fetal conditions requiring or potentially requiring specific medical or surgical services unavailable at the Level III facility. This may require consult / transfer to a Level IV in state or an out of state facility.

MATERNAL REFERRAL PROCESS

Maternal transport is initiated by the health care provider responsible for the patient's medical care. Maternal referral may lead to admission of the patient to the receiving hospital (inpatient transport) or to outpatient evaluation and management (outpatient transport). The guidelines for the referral process are outlined below.

I. INPATIENT TRANSPORT

A. Referring Center Responsibilities:

1. The decision by the referring care provider (physician, certified nurse midwife, nurse practitioner, physician assistant) to request consultation is the first step in the referral process.
2. Telephone consultation with the receiving care provider is necessary to initiate the referral process and to prepare the receiving provider. This consultation may aid the referring care provider in developing a treatment plan for stabilizing the patient before and during transport.
3. Personnel of the referring and receiving facilities must follow the COBRA/EMTALA guidelines (42USC 1395dd. Section 1867 of the Social Security Act. Also known as Section 9121 of the Consolidated Omnibus Budget Reconciliation Act of 1985. See Appendix III.). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com. Regional Perinatal Centers shall not refuse to accept an appropriate transfer of an individual who requires such specialized care if the hospital has the capability and bed availability to treat the individual. All transfers should be based on medical need.
4. If the transport is done by the referring hospital, the referring care provider and hospital retain responsibility until the transport team arrives with the patient at the receiving hospital. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)
5. A ground ambulance is preferred for the majority of maternal transports. If an alternate mode of transportation is being considered, the referring care provider should discuss this alternative with the receiving care provider at the time of consultation.
6. The medical record/EMR should be organized as the patient is prepared for transport and sent with the patient or to the receiving facility in a timely manner.
7. The composition of the transport team should be a joint decision between the referring and receiving care providers based on the condition of the mother and/or fetus.
8. To avoid unnecessary delays in the emergency room or admitting office, all referrals should be directly admitted to the receiving obstetric unit.

B. Receiving Center Responsibilities:

1. The receiving care provider is responsible for the decision to accept the referring care provider's request for transport and make preparations at the receiving center. If unable to accept the transport, assistance in locating appropriate care should be provided to the referring care provider.
2. Personnel of the referring and receiving facilities must follow the COBRA/EMTALA guidelines (42USC 1395dd. Section 1867 of the Social Security Act; also known as Section 9121 of the Consolidated Omnibus Budget Reconciliation Act of 1985. See Appendix III.). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com. Regional Perinatal Centers shall not refuse to accept an appropriate transfer of an individual who requires such specialized care if the hospital has the capability and bed availability to treat the individual. All transfers should be based on medical need.
3. If the transport team is sent by the receiving hospital, the receiving physician or designee assumes responsibility for patient care from the time the patient leaves the referring hospital. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)
4. The transport team should relay to the receiving facility any changes in patient status or estimated times of arrival that occur during transport.
5. Every patient accepted by the receiving center should be seen by a care provider within 30 minutes of arrival.
6. Communication with the referring care provider should occur following admission to the receiving facility, and if the patient is discharged undelivered.
7. If the patient is discharged undelivered, communication should occur with the referring provider prior to the time of discharge.
8. A summary of care of both mother and/or infant should be sent to the referring and follow-up care providers.

II. OUTPATIENT REFERRAL

A. Referring Center Responsibilities:

1. Outpatient referral could begin with a phone call but must be followed by a written request for consultation / co-management from the referring care provider or designee to the receiving care provider or designee.
2. An appointment for evaluation at the receiving center should be arranged.

B. Receiving Center Responsibilities:

1. The referring care provider can be contacted by telephone, but must receive written communication after the evaluation has been completed.
2. Whenever possible, patients should continue under the care of the referring care provider.

MATERNAL TRANSPORT PERSONNEL

- I. The composition of the transport team should be decided jointly by the referring and receiving care providers based on the condition of the mother and/or fetus.
- II. The transport team members should be selected from appropriately trained, licensed health care providers. Educational requirements for EMS personnel have been revised as the national EMS educational standards. They are available on the website, <https://www.ems.gov/pdf/811077a.pdf>.
- III. Transport team members should have the collective expertise sufficient to provide the following, if necessary:
 - A. Monitoring of vital signs, uterine contractions, deep tendon reflexes, and fetal heart rate
 - B. Monitoring the administration of intravenous infusions and usage of tocolytic, antihypertensive, anticonvulsant, and other appropriate medications
 - C. Care for a wide variety of emergency conditions including delivery and neonatal resuscitation
- IV. Transport team members should be oriented to the transport vehicle and usage of transport equipment. All transport team members should follow state and national standards.
- V. In instances such as advanced labor, unstable maternal condition, or severe illness, it may become necessary for the referring care provider or designee to accompany the patient during transport, if transport is still recommended by the receiving physician. (See Appendix III re EMTALA). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com.

MATERNAL TRANSPORT MODALITY

- I. Selection of the transport modality should be a joint decision by the referring care provider and receiving care provider based on the condition of the mother and fetus.
- II. Maternal transport can be accomplished by ambulance, rotary wing aircraft (RWA), or fixed wing aircraft (FWA). The ambulance (land and air) must be licensed by the Office of Emergency Medical Services of the Tennessee Department of Health.
- III. An Advanced Life Support (ALS) ambulance is required for maternal transport. The description of an ALS ambulance is defined by the Tennessee Department of Health and may be located in the latest edition of the *Tennessee Emergency Medical Services Statutes and Rules*, located at <https://www.tn.gov/health/health-program-areas/health-professional-boards/ems-board/ems-board/general-information.html> (click on Rules and Regulations).

MATERNAL TRANSPORT EQUIPMENT

- I. The referring health care provider should be aware of the availability of Advanced Life Support (ALS) ambulances in the area. The required equipment and supplies for maternal and neonatal care in an ALS ambulance are defined by the Tennessee Department of Health (See Appendix V).
- II. Organization and maintenance of additional transport equipment is the responsibility of the transport team.
- III. **Additional equipment and supplies** that may be necessary should be provided by the transporting team. These include:
 - A. **EQUIPMENT**
 1. Infusion pump
 - B. **SUPPLIES**
 1. Obstetrical Emergency Kit (standard on an ALS ambulance)
 2. Add 2 extra cord clamps if necessary so there are a total of 4 cord clamps available
- IV. **Additional medications** (or therapeutic equivalents) that may be necessary should be provided by the transport team or referring facility after communication among providers. Such medications, including but not limited to those listed below, may be given when ordered by the referring care provider.
 - A. **MEDICATIONS (Not routinely available on an ALS Ambulance)**
 1. *Antenatal Corticosteroids*

Indicated for pregnancies at <34 weeks gestation.

 - Betamethasone for injection – 12 mg IM is usual dose
 2. *Eclampsia (seizures) Medications*

Option 1 – Magnesium sulfate

 - a. If patient is **not currently seizing**, administer magnesium sulfate – 6 g bolus IV over 30 minutes, then 2 g/hr IV. The 2 g/hr **MUST be on a pump and not free flow.**
 - b. If patient is **actively seizing**, administer magnesium sulfate – 6 g bolus IV over 5 minutes, then 2 g/hr IV. The 2 g/hr IV **MUST be on a pump and not free flow.** Additional dose of 2 g IV over 5 to 10 minutes for persistent seizures (repeat x 1 only). First choice medication.

(Calcium gluconate – 1 g IV to reverse magnesium overdose)
(i.e., profound respiratory depression/compromise)

Option 2 – Diazepam (Valium) – 2-10 mg IV
Option 3 – Midazolam (Versed) – 5 mg SLOW IV push
 3. *Oxytocics for postpartum hemorrhage*

Indicated for prevention of postpartum hemorrhage Give **after every delivery:**

- Oxytocin (Pitocin) – 10 units per ampule/vial IM if no IV access *or* 30-40 units in 1,000 ml of lactated ringers to be given free flow.

Indicated only **for true postpartum hemorrhage:**

Option 1 – Methergine – 0.2 mg IM x 1 dose only. **Do not give** if BP >160 systolic or >110 diastolic

Option 2 – Misoprostol (Cytotec) – 400 mcg buccal and 400 mcg rectal. Give both simultaneously.

4. *Tocolytics for preterm labor*

Indicated for suspected or confirmed preterm labor:

Option 1 – Nifedipine (Procardia) – 10 mg PO x 1 dose only.

Option 2 – Magnesium sulfate – 6 g bolus IV over 30 minutes, then 2 g/hr IV. The 2 g/hr **MUST be on a pump and not free flow.**

Option 3 – Terbutaline sulfate (Brethine) for injection (0.25 mg subcutaneously) x 1 dose only. Contraindicated if maternal heart rate is >120 beats/minute.

5. *Antihypertensives**

Indicated for BP \geq 160 systolic or \geq 110 diastolic

Hold if BP is \leq 140 systolic or \leq 90 diastolic

Option 1 – Initial first line management with **Labetalol** (Trandate) IV if pressure remains elevated for 15 minutes or more:

- Labetalol – 20 mg IV over 2 minutes.
- Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 40 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 80 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Hydralazine – 10 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

Option 2 – Initial first line management with **Hydralazine** (Apresoline) IV if pressure remains elevated for 15 minutes or more:

- Hydralazine – 5-10 mg IV over 2 minutes.
- Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Hydralazine – 10 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 20 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

Option 3 – Initial first line management with **Immediate-Release Oral Nifedipine** if pressure remains elevated for 15 minutes or more:

- Immediate-release Nifedipine – 10 mg PO.
- Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Immediate-release Nifedipine – 20 mg PO. If BP is below threshold, continue close monitoring.
 - Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
- Labetalol – 20 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

*Emergent therapy for acute-onset, severe hypertension during pregnancy and the postpartum period. ACOG Committee Opinion No. 767. American College of Obstetricians and Gynecologists. Obstet Gynecol 2019; 133:e174-180.

MATERNAL REFERRAL DOCUMENTATION

Records are essential for continuing care of the patient and evaluation of the referral process. Both the referring and receiving centers have responsibilities to provide adequate documentation of clinical data.

When possible, it is recommended that all communication between the referring and receiving centers and/or transport team be made via a mode (telephone or radio) where conversations can be recorded.

I. REFERRING CENTER RESPONSIBILITIES

- A. The following documents/EMR should be provided to the receiving center for the transported patient:
 - 1. Available medical and prenatal records, including the EMTALA form
- B. The referring center should maintain a record regarding disposition of transported mothers.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. Develop and maintain a record of care during transport

III. RECEIVING CENTER RESPONSIBILITIES

- A. Maintain a record regarding the disposition of the transported patient
- B. Send a summary of care of both mother and/or infant to the referring and follow-up care providers

EVALUATION OF MATERNAL REFERRAL PROCESS

- I. Interhospital care of the high-risk perinatal patient requires the cooperation and coordination of many skilled health care personnel. Outreach education efforts should include discussions of the regional referral process and can be used to reinforce cooperation and coordination.
- II. Outreach education related to transport should focus on the following objectives:
 - A. Informing perinatal care and EMS providers in the region of specialized resources available through the perinatal network
 - B. Assisting perinatal care providers in developing their abilities to identify high-risk perinatal patients, anticipate complications, and stabilize those patients before transport
 - C. Continuing quality improvement through ongoing education of perinatal providers and EMS personnel
- III. Planning of the perinatal referral process requires participation of those who will use the service and those who will provide it. Criteria considered in planning and evaluating the referral process are:
 - A. Availability
 - B. Accessibility
 - C. Responsiveness
 - D. Effectiveness
 - E. Safety
- IV. Referring facilities should periodically review their maternal referrals with or without the assistance of the receiving center.

NEONATAL TRANSPORT

Level III

Level III nurseries provide care for infants who are born at <32 weeks of gestation or weigh <1500 grams at birth or have complex medical or surgical conditions, regardless of gestational age. Level III units have continuously available personnel and equipment to provide life support for as long as needed. They can provide ongoing assisted ventilation for periods longer than 24 hours, which may include conventional ventilation, high-frequency ventilation, and inhaled nitric oxide. A broad range of pediatric medical subspecialists and pediatric surgical specialists should be readily accessible on site or by prearranged consultative agreements. Facilities should have advanced respiratory support and physiologic monitoring equipment, laboratory and imaging facilities, nutrition and pharmacy support with pediatric expertise, social services, and pastoral care. (See the most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and the *Tennessee Perinatal Care System Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities*.)

Although it is not always possible to prenatally anticipate the need for pediatric subspecialty services, when antenatal ultrasound and/or genetic testing has identified a fetus with congenital anomalies, prenatal referral to an appropriate subspecialty provider or fetal assessment clinic to provide families with prognostic information and facilitate a coordinated plan for delivery in a facility with the needed services is recommended.

The Level III unit, if it so chooses, is responsible for providing equipment and qualified staff to transport sick infants from other referring hospitals.

The Level III facility is responsible for delivery of a formal ongoing program of education in obstetrics and neonatal-perinatal medicine for its staff.

In Level III and IV maternal care facilities, the director of obstetric services, the director of the neonatal intensive care unit, and the director of the maternal-fetal medicine service should co-direct the perinatal medical service.

REGIONAL PERINATAL CENTERS

Each of Tennessee's five Regional Perinatal Centers (Northeast Tennessee Regional Perinatal Center in Johnson City; East Tennessee Regional Perinatal Center in Knoxville; Southeast Tennessee Regional Perinatal Center in Chattanooga; Middle Tennessee Regional Perinatal Center in Nashville; and West Tennessee Regional Perinatal Center in Memphis) is capable of providing Level III or Level IV obstetric and neonatal care.

In addition, each Regional Perinatal Center must provide the services of consultation/referral; professional education; maternal-fetal and neonatal transport; site visits upon request; post-neonatal follow-up; and data collection.

INDICATIONS FOR NEONATAL CONSULTATION AND/OR TRANSPORT

- I. Neonatal conditions requiring or potentially requiring specific medical or surgical services unavailable at the Level III facility. This may require consult / transfer to a Level IV in state or an out of state facility.

NEONATAL REFERRAL PROCESS

Neonatal transport is initiated by the health care provider (physician, certified nurse midwife, nurse practitioner, physician assistant) responsible for the patient's medical care. Guidelines for the referral process are outlined below.

I. REFERRING CENTER RESPONSIBILITIES

- A. The referring health care provider's decision to request consultation is the first step in the referral process.
- B. Telephone consultation with the receiving care provider is necessary to initiate the referral process and to prepare the receiving center. This consultation may aid the referring health care provider in developing a treatment plan for stabilizing the patient before transport.
- C. A discussion between the referring health care provider and receiving care provider regarding the infant will result in one of three possible dispositions:
 1. Required neonatal care can be provided at the referring center. The receiving care provider under these circumstances has only a consultative role.
 2. The infant requires further observation, investigation, or other preparation before possible transport. Continued contact between the providers is necessary.
 3. Transport of the infant is necessary. Condition and potential disposition of the infant will be discussed with the family by the referring health care provider, and referral will be made upon family agreement. The optimal time, mode of transfer, transport personnel, and additional information regarding the infant should be discussed. The process of stabilization of the infant at the referring center should be reviewed and documented.
- D. Responsibility for the infant:
 - During the preparation for transport by the referring facility, the referring physician and hospital are responsible for the patient unless there have been other prior agreements.
 - If the infant is transported by the referring center, the referring health care provider is responsible for the patient until arrival at the receiving center.
 - If the infant is transported by the receiving center, the referring health care provider shares joint responsibility for the patient with the receiving facility until the departure of the transport team.
 - Transport services should work with the referring hospital to clearly delineate the primary medical responsibility for the patient when the patient is still within the referring hospital but is being cared for by the transport team. (See the most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and *Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients*, American Academy of Pediatrics.)
 - If the transport is aborted by the referring facility due to clinical improvement, patient responsibility is retained by the referral facility. Any

- care provided by the transport team should be documented and the documentation provided to the referring facility.
 - If the transport is aborted secondary to patient demise, any care provided by the transport team should be documented and the documentation provided to the referring facility.
- E. Obtain the newborn screen prior to departure from the referring facility.
- F. The maternal and neonatal medical records should be organized as the patient is prepared for transport and sent with the patient. Electronic medical records, when available, should be provided to the receiving facility in a timely manner.
- G. Consent forms to authorize transfer must be obtained.
- H. Parents should be encouraged to see and touch the infant.
- I. Appropriate maternal/neonatal identification should be in place before transport.
- J. If a delay in transport occurs, a repeat telephone or radio call should be made for further assessment and advice.
- K. All referrals should be directly admitted to the receiving unit to avoid unnecessary delays in the emergency department.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. The transport team should communicate their estimated time of arrival to the referring facility and if a delay in response to the referring facility is anticipated, a telephone or radio call should be made.
- B. On arrival of the transport team, assessment and further stabilization of the infant should be done in collaboration with the referring staff.
- C. After neonatal stabilization, the transport team responsibilities before departure, include:
 - Verify proper identification of the infant
 - ensure that the newborn screen has been obtained
 - Discuss the infant's condition, possible course, and therapeutic intervention that has been undertaken or is anticipated with the parents
 - Encourage parents to see and touch the infant
 - Provide written information about the receiving center and resources
 - Develop a lactation plan for successful breastfeeding
 - Complete medical necessity and consent forms to authorize transfer, treatment, and admission to the receiving hospital
 - Communicate with the medical control physician regarding the infant's history, current status, and planned management during transport
- D. Enroute to the receiving facility, communicate any change in patient status and estimated time of arrival to the receiving facility and the medical control physician.
- E. Telephone the parents shortly following admission of the infant.

III. RECEIVING CENTER RESPONSIBILITIES

- A. The receiving care provider is responsible for the decision to accept the referring health care provider's request for transport and make preparations at the receiving center. If unable to accept the transport, assistance in locating appropriate care should be provided to the referring health care provider.
- B. Responsibility for the infant:
 - During the preparation for transport by the referring facility, the referring physician and hospital are responsible for the patient unless there have been other prior agreements. Transport services should work with the referring hospital to clearly delineate the primary medical responsibility for the patient when the patient is still within the referring hospital but is being cared for by the transport team. (See most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and *Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients*, American Academy of Pediatrics.)
 - If the infant is transported by the referring center, the referring health care provider is responsible for the patient until arrival at the receiving center.
 - If the infant is transported by the receiving center the referring health care provider shares joint responsibility for the patient with the receiving facility until the departure of the transport team.
 - If the infant is transported by a third party neonatal transport team, under the direction of their medical control physician, the transport team and the receiving facility share joint responsibility after departure from the referring facility and until arrival at the receiving facility.
 - If the transport is aborted by the referring facility due to clinical improvement, patient responsibility is retained by the referring facility. Any care provided by the transport team should be documented and the documentation provided to the referring facility.
 - If the transport is aborted secondary to patient demise, any care provided by the transport team should be documented and the documentation provided to the referring facility.
- C. Within 72 hours of admission, communication with the referring care provider regarding events during transport and since admission should occur.
- D. Periodic communication with appropriate health care providers from the referring facility should be maintained.
- E. Consideration should be given to returning the care of the patient to the referring health care provider or primary care physician when practical and medically appropriate.
- F. Upon discharge of the infant, a discharge summary should be sent to the referring perinatal health care providers and the infant's follow-up health care provider.

NEONATAL TRANSPORT PERSONNEL, MODALITY AND EQUIPMENT

- I. The referring health care provider should be aware of the availability of Advanced Life Support (ALS) ambulances in the area. The required equipment and supplies for maternal and neonatal care in an ALS ambulance are defined by the Tennessee Department of Health (See Appendix V).
- II. Organization and maintenance of additional transport equipment is the responsibility of the transport team.
- III. Refer to pages 116-117 for **transport personnel and modality guidance**.
- IV. **Additional equipment, supplies and medication** that should be provided by the transport team or referring facility after communication among providers is listed on pages 118-121.

NEONATAL REFERRAL DOCUMENTATION

Records are essential for continuing care of the patient and evaluation of the referral process. Both referring and receiving center personnel have responsibilities to provide adequate documentation of clinical data.

When possible, it is recommended that all communication between the referring and receiving centers and/or transport team be made via a mode (telephone or radio) where conversations can be recorded.

I. REFERRING CENTER RESPONSIBILITIES

- A. The following documents/EMR should be promptly provided to the receiving facility:
 - 1. Available maternal medical and prenatal records
 - 2. Current neonatal medical record, including medical imaging studies
 - 3. Record of care during transport, if the referring facility is transporting the patient
- B. The referring center should maintain a record regarding disposition of transported infants.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. Develop and maintain a record of care during transport

III. RECEIVING CENTER RESPONSIBILITIES

- A. Maintain a record regarding the disposition of the transported infant
- B. Send a summary of care to the referring perinatal health care providers

EVALUATION OF NEONATAL REFERRAL PROCESS

- I. Interhospital care of the high-risk infant requires the cooperation and coordination of many skilled persons. Outreach education efforts should include discussions of the regional referral process and can be used to reinforce cooperation and coordination.
- II. Outreach education related to transport should focus on the following objectives:
 - A. Informing perinatal care and EMS providers in the region of specialized resources available to them through the perinatal network.
 - B. Assisting neonatal care providers in developing their abilities to identify high-risk neonatal patients, anticipate complications, and stabilize those patients before transport.
- III. To promote continuous quality improvement, efforts should include ongoing education of neonatal providers and EMS personnel (See Appendix I). Educational requirements for EMS personnel have been revised as the national EMS educational standards. They are available on the website <https://www.ems.gov/pdf/811077a.pdf>.
- IV. Planning of the neonatal referral process requires participation of those who will use the service and those who will provide it. Criteria considered in planning and evaluating the referral process are:
 - A. Availability
 - B. Accessibility
 - C. Responsiveness
 - D. Effectiveness
 - E. Safety
- V. Referring facilities should periodically review their neonatal referrals, with or without the assistance of the receiving center.

RETURN TRANSPORT

- I. Return transports occur to take patients back to their original or local hospital for further care when the problems that required initial transport have been resolved. Return transports have the following benefits:
- Facilitate family centered care, including visits and infant/family bonding
 - Restore family/community support network
 - Promote successful breastfeeding
 - Assist with discharge planning
 - Allow capacity for higher acuity infants in Level III and IV centers when the infant's acuity no longer meets criteria for Level III or IV care

II. NEONATAL RETURN TRANSPORT

- A. The hospital to which the infant is returned and the timing of the return transport are largely determined by individual patient care needs, the anticipated length of stay and receiving institutional capabilities.
- B. A telephone consultation with the receiving health care provider is necessary to initiate the return transport process and to prepare the receiving hospital. This consultation may aid the health care provider and nursing staff in developing a treatment plan. In the event the infant is returned to a hospital other than the original referring hospital, the original referring health care provider must be notified.
- C. The mode of transport, composition of the transport team, and equipment needs should be based on the condition of the infant and other factors such as distance and weather conditions.
- D. The physician directing the return transport is responsible for the patient during transport.
- E. Medical necessity and consent forms to authorize transfer, treatment, and admission to the receiving center must be obtained.
- F. The parents should be encouraged to visit and become familiar with the receiving center nursery prior to the return transport.
- G. The transport team should communicate with receiving center personnel regarding the estimated time of arrival.
- H. On admission of the infant to the receiving center, the transport team should communicate with receiving center personnel regarding the infant's history, events during transport, and current status.
- I. A comprehensive medical record, including imaging studies, should be made available to the receiving facility at the time of admission.
- J. Periodic communication between referring and receiving hospitals should be maintained.

LEVEL IV FACILITIES

MATERNAL TRANSPORT

Level IV

Level IV facilities include the capabilities of Level I, Level II, and Level III facilities with additional capabilities and considerable experience in the care of the most complex and critically ill pregnant women throughout antepartum, intrapartum, and postpartum care. Although Level III and Level IV may seem to overlap, a Level IV facility is distinct from a Level III facility in the approach to the care of pregnant women and women in the postpartum period with complex and critical illnesses. In addition to having ICU care onsite for obstetric patients, a Level IV facility must have evidence of a maternal-fetal medicine care team that has the experience to assume responsibility for pregnant women and women in the postpartum period who are in critical condition or have complex medical conditions.

The elective and/or planned delivery of a fetus with a condition(s) that require immediate neonatal transport should be avoided.

In Level III and IV maternal care facilities, the director of obstetric services, the director of the neonatal intensive care unit, and the director of the maternal-fetal medicine service should co-direct the perinatal medical service.

The Level IV facility is responsible for delivery of a formal ongoing program of education in obstetrics and neonatal-perinatal medicine for its staff.

INDICATIONS FOR MATERNAL CONSULTATION AND/OR TRANSPORT

- I. Maternal or fetal conditions requiring or potentially requiring specific medical or surgical services unavailable at the Level IV facility. This may require consult / transfer to an out of state facility.

MATERNAL REFERRAL PROCESS

Maternal transport is initiated by the health care provider responsible for the patient's medical care. Maternal referral may lead to admission of the patient to the receiving hospital (inpatient transport) or to outpatient evaluation and management (outpatient transport). The guidelines for the referral process are outlined below.

I. INPATIENT TRANSPORT

A. Referring Center Responsibilities:

1. The decision by the referring care provider (physician, certified nurse midwife, nurse practitioner, physician assistant) to request consultation is the first step in the referral process.
2. Telephone consultation with the receiving care provider is necessary to initiate the referral process and to prepare the receiving provider. This consultation may aid the care provider in developing a treatment plan for stabilizing the patient before and during transport.
3. Personnel of the referring and receiving facilities must follow the COBRA/EMTALA guidelines (42USC 1395dd. Section 1867 of the Social Security Act. Also known as Section 9121 of the Consolidated Omnibus Budget Reconciliation Act of 1985. See Appendix III.). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com. Regional Perinatal Centers shall not refuse to accept an appropriate transfer of an individual who requires such specialized care if the hospital has the capability and bed availability to treat the individual. All transfers should be based on medical need.
4. If the transport is done by the referring hospital, the referring care provider and hospital retain responsibility until the transport team arrives with the patient at the receiving hospital. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)
5. A ground ambulance is preferred for the majority of maternal transports. If an alternate mode of transportation is being considered, the referring care provider should discuss this alternative with the receiving care provider at the time of consultation.
6. The medical record/EMR should be organized as the patient is prepared for transport and sent with the patient or to the receiving facility in a timely manner.
7. The composition of the transport team should be a joint decision between the referring and receiving care providers based on the condition of the mother and/or infant.
8. To avoid unnecessary delays in the emergency room or admitting office, all referrals should be directly admitted to the receiving obstetric unit.

B. Receiving Center Responsibilities:

1. The receiving care provider is responsible for the decision to accept the referring care provider's request for transport and make preparations at the receiving center. If unable to accept the transport, assistance should be provided to the referring care provider in locating appropriate care.

2. Personnel of the referring and receiving facilities must follow the COBRA/EMTALA guidelines (42USC 1395dd. Section 1867 of the Social Security Act. Also known as Section 9121 of the Consolidated Omnibus Budget Reconciliation Act of 1985. See Appendix III). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com. Regional Perinatal Centers shall not refuse to accept an appropriate transfer of an individual who requires such specialized care if the hospital has the capability and bed availability to treat the individual. All transfers should be based on medical need.
3. If the transport team is sent by the receiving hospital, the receiving physician or designee assumes responsibility for patient care from the time the patient leaves the referring hospital. (See the most recent edition, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.)
4. The transport team should relay to the receiving facility any changes in patient status or estimated times of arrival that occur during transport.
5. Every patient accepted by the receiving center should be seen by a care provider within 30 minutes of arrival.
6. Communication with the referring care provider should occur following admission to the receiving facility, and if the patient is discharged undelivered.
7. If the patient is discharged undelivered, communication should occur with the referring provider prior to the time of discharge.
8. A summary of care of both mother and/or infant should be sent to the referring and follow-up care providers.

II. OUTPATIENT REFERRAL

A. Referring Center Responsibilities:

1. Outpatient referral could begin with a phone call but must be followed by a written request for consultation / co-management from the referring care provider or designee to the receiving care provider or designee.
2. An appointment for evaluation at the receiving center should be arranged.

B. Receiving Center Responsibilities:

1. The referring care provider can be contacted by telephone, but must receive written communication after the evaluation has been completed.
2. Whenever possible, patients should continue under the care of the referring care provider.

MATERNAL TRANSPORT PERSONNEL

- I. The composition of the transport team should be decided jointly by the referring and receiving care providers based on the condition of the mother and/or fetus.
- II. The transport team members should be selected from appropriately trained, licensed health care providers. Educational requirements for EMS personnel have been revised as the national EMS educational standards. They are available on the website, <https://www.ems.gov/pdf/811077a.pdf>.
- III. Transport team members should have the collective expertise sufficient to provide the following, if necessary:
 - A. Monitoring of vital signs, uterine contractions, deep tendon reflexes, and fetal heart rate
 - B. Monitoring the administration of intravenous infusions and usage of tocolytic, antihypertensive, anticonvulsant, and other appropriate medications
 - C. Care for a wide variety of emergency conditions including delivery and neonatal resuscitation
- IV. Transport team members should be oriented to the transport vehicle and usage of transport equipment. All transport team members should follow state and national standards.
- V. In instances such as advanced labor, unstable maternal condition, or severe illness, it may become necessary for the referring care provider or designee to accompany the patient during transport, if transport is still recommended by the receiving physician (See Appendix III re EMTALA). There are a variety of sources for accessing the COBRA/EMTALA Statute in its entirety. One resource is www.medlaw.com.

MATERNAL TRANSPORT MODALITY

- I. Selection of the transport modality should be a joint decision by the referring care provider and receiving care provider based on the condition of the mother and fetus.
- II. Maternal transport can be accomplished by ambulance, rotary wing aircraft (RWA), or fixed wing aircraft (FWA). The ambulance (land and air) must be licensed by the Office of Emergency Medical Services of the Tennessee Department of Health.
- III. An Advanced Life Support (ALS) ambulance is required for maternal transport. The description of an ALS ambulance is defined by the Tennessee Department of Health and may be located in the latest edition of the *Tennessee Emergency Medical Services Statutes and Rules*, located at <https://www.tn.gov/health/health-program-areas/health-professional-boards/ems-board/ems-board/general-information.html> (click on Rules and Regulations).

MATERNAL TRANSPORT EQUIPMENT

- I. The referring health care provider should be aware of the availability of Advanced Life Support (ALS) ambulances in the area. The required equipment and supplies for maternal and neonatal care in an ALS ambulance are defined by the Tennessee Department of Health (See Appendix V).
- II. Organization and maintenance of additional transport equipment is the responsibility of the transport team.
- III. **Additional equipment and supplies** that may be necessary should be provided by the transporting team. These include:
 - A. **EQUIPMENT**
 1. Infusion pump
 - B. **SUPPLIES**
 1. Obstetrical Emergency Kit (standard on an ALS ambulance)
 2. Add 2 extra cord clamps if necessary so there are a total of 4 cord clamps available
- IV. **Additional medications** (or therapeutic equivalents) that may be necessary should be provided by the transport team or referring facility after communication among providers. Such medications, including but not limited to those listed below, may be given when ordered by the referring care provider.
 - A. **MEDICATIONS (Not routinely available on an ALS Ambulance)**
 1. *Antenatal Corticosteroids*

Indicated for pregnancies at <34 weeks gestation.

 - Betamethasone for injection – 12 mg IM is usual dose
 2. *Eclampsia (seizures) Medications*

Option 1 – Magnesium sulfate

 - a. If patient is **not currently seizing**, administer magnesium sulfate – 6 g bolus IV over 30 minutes, then 2 g/hr IV. The 2 g/hr **MUST be on a pump and not free flow.**
 - b. If patient is **actively seizing**, administer magnesium sulfate – 6 g bolus IV over 5 minutes, then 2 g/hr IV. The 2 g/hr IV **MUST be on a pump and not free flow.** Additional dose of 2 g IV over 5 to 10 minutes for persistent seizures (repeat x 1 only). First choice medication.

(Calcium gluconate – 1 g IV to reverse magnesium overdose)
(i.e., profound respiratory depression/compromise)

Option 2 – Diazepam (Valium) – 2-10 mg IV
Option 3 – Midazolam (Versed) – 5 mg SLOW IV push
 3. *Oxytocics for postpartum hemorrhage*

Indicated for prevention of postpartum hemorrhage Give **after every delivery:**

- Oxytocin (Pitocin) – 10 units per ampule/vial IM if no IV access or 30-40 units in 1,000 ml of lactated ringers to be given free flow.

Indicated only **for true postpartum hemorrhage:**

Option 1 – Methergine – 0.2 mg IM x 1 dose only. **Do not give** if BP >160 systolic or >110 diastolic

Option 2 – Misoprostol (Cytotec) – 400 mcg buccal and 400 mcg rectal. Give both simultaneously.

4. *Tocolytics for preterm labor*

Indicated for suspected or confirmed preterm labor:

Option 1 – Nifedipine (Procardia) – 10 mg PO x 1 dose only.

Option 2 – Magnesium sulfate – 6 g bolus IV over 30 minutes, then 2 g/hr IV. The 2 g/hr **MUST be on a pump and not free flow.**

Option 3 – Terbutaline sulfate (Brethine) for injection (0.25 mg subcutaneously) x 1 dose only. Contraindicated if maternal heart rate is >120 beats/minute.

5. *Antihypertensives**

Indicated for BP \geq 160 systolic or \geq 110 diastolic

Hold if BP is \leq 140 systolic or \leq 90 diastolic

Option 1 – Initial first line management with **Labetalol** (Trandate) IV if pressure remains elevated for 15 minutes or more:

- Labetalol – 20 mg IV over 2 minutes.
- Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 40 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 80 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 10 minutes and record results.
- If either BP threshold is still elevated, then:
 - Hydralazine – 10 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

Option 2 – Initial first line management with **Hydralazine** (Apresoline) IV if pressure remains elevated for 15 minutes or more:

- Hydralazine – 5-10 mg IV over 2 minutes.
- Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Hydralazine – 10 mg IV over 2 minutes. If BP is below threshold, continue close monitoring.
 - Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Labetalol – 20 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

Option 3 – Initial first line management with **Immediate-Release Oral Nifedipine** if pressure remains elevated for 15 minutes or more:

- Immediate-release Nifedipine – 10 mg PO.
- Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
 - Immediate-release Nifedipine – 20 mg PO. If BP is below threshold, continue close monitoring.
 - Measure BP in 20 minutes and record results.
- If either BP threshold is still elevated, then:
- Labetalol – 20 mg IV over 2 minutes. Then obtain emergency consultation from maternal-fetal medicine, internal medicine, anesthesia, or critical care subspecialist.

*Emergent therapy for acute-onset, severe hypertension during pregnancy and the postpartum period. ACOG Committee Opinion No. 767. American College of Obstetricians and Gynecologists. Obstet Gynecol 2019; 133:e174-180.

MATERNAL REFERRAL DOCUMENTATION

Records are essential for continuing care of the patient and evaluation of the referral process. Both the referring and receiving centers have responsibilities to provide adequate documentation of clinical data.

When possible, it is recommended that all communication between the referring and receiving centers and/or transport team be made via a mode (telephone or radio) where conversations can be recorded.

I. REFERRING CENTER RESPONSIBILITIES

- A. The following documents/EMR should be available to the receiving center for the transported patient:
 - 1. Available medical and prenatal records, including the EMTALA form
- B. The referring center should maintain a record regarding disposition of transported mothers.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. Develop and maintain a record of care during transport

III. RECEIVING CENTER RESPONSIBILITIES

- A. Maintain a record regarding the disposition of the transported patient
- B. Send a summary of care of both mother and/or infant to the referring and follow-up care providers

EVALUATION OF MATERNAL REFERRAL PROCESS

- I. Interhospital care of the high-risk perinatal patient requires the cooperation and coordination of many skilled health care personnel. Outreach education efforts should include discussions of the regional referral process and can be used to reinforce cooperation and coordination.
- II. Outreach education related to transport should focus on the following objectives:
 - A. Informing perinatal care and EMS providers in the region of specialized resources available through the perinatal network
 - B. Assisting perinatal care providers in developing their abilities to identify high-risk perinatal patients, anticipate complications, and stabilize those patients before transport
 - C. Continuing quality improvement through ongoing education of perinatal providers and EMS personnel
- III. Planning of the perinatal referral process requires participation of those who will use the service and those who will provide it. Criteria considered in planning and evaluating the referral process are:
 - A. Availability
 - B. Accessibility
 - C. Responsiveness
 - D. Effectiveness
 - E. Safety
- IV. Referring facilities should periodically review their maternal referrals with or without the assistance of the receiving center.

NEONATAL TRANSPORT

Level IV

Level IV units include the capabilities of Level III units with additional capabilities and considerable experience in the care of the most complex and critically ill infants. Pediatric medical and pediatric surgical specialty consultants should be continuously available 24 hours per day. Level IV facilities also must include the capability for surgical repair of complex conditions (e.g., congenital cardiac malformations that require cardiopulmonary bypass with or without extracorporeal membrane oxygenation). (See the most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and the *Tennessee Perinatal Care System Guidelines for Regionalization, Hospital Care Levels, Staffing and Facilities*.)

The Level IV unit, if it so chooses, is responsible for providing equipment and qualified staff to transport sick infants and/or infants from other referring hospitals.

The Level IV facility is responsible for delivery of a formal ongoing program of education in obstetrics and neonatal-perinatal medicine for its staff.

In Level III and IV maternal care facilities, the director of obstetric services, the director of the neonatal intensive care unit, and the director of the maternal-fetal medicine service should co-direct the perinatal medical service.

INDICATIONS FOR NEONATAL CONSULTATION AND/OR TRANSPORT

- I.** Neonatal conditions requiring or potentially requiring specific medical or surgical services unavailable at the Level IV facility. This may require consult / transfer to an out of state facility.

NEONATAL REFERRAL PROCESS

Neonatal transport is initiated by the health care provider responsible for the patient's medical care. Guidelines for the referral process are outlined below.

I. REFERRING CENTER RESPONSIBILITIES

- A. The referring health care provider's decision to request consultation is the first step in the referral process.
- B. Telephone consultation with the receiving care provider is necessary to initiate the referral process and to prepare the receiving center. This consultation may aid the referring health care provider in developing a treatment plan for stabilizing the patient before transport.
- C. A discussion between the referring health care provider and receiving care provider regarding the infant will result in one of three possible dispositions:
 1. Required neonatal care can be provided at the referring center. The receiving care provider under these circumstances has only a consultative role.
 2. The infant requires further observation, investigation, or other preparation before possible transport. Continued contact between the providers is necessary.
 3. Transport of the infant is necessary. Condition and potential disposition of the infant will be discussed with the family by the referring health care provider, and referral upon family agreement. The optimal time, mode of transfer, transport personnel, and additional information regarding the infant should be discussed. The process of stabilization of the infant at the referring center should be reviewed and documented.
- D. Responsibility for the infant:
 - During the preparation for transport by the referring facility, the referring physician and hospital are responsible for the patient unless there have been other prior agreements.
 - If the infant is transported by the referring center, the referring health care provider is responsible for the patient until arrival at the receiving center.
 - If the infant is transported by the receiving center, the referring health care provider shares joint responsibility for the patient with the receiving facility until the departure of the transport team.
 - Transport services should work with the referring hospital to clearly delineate the primary medical responsibility for the patient when the patient is still within the referring hospital but is being cared for by the transport team. (See the most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and *Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients*, American Academy of Pediatrics.)
 - If the transport is aborted by the referring facility due to clinical improvement, patient responsibility is retained by the referring facility. Any care provided by the transport team should be documented and the documentation provided to the referring facility.

- If the transport is aborted secondary to patient demise, any care provided by the transport team should be documented and the documentation provided to the referring facility.
- E. Obtain the newborn screen prior to departure from the referring facility.
 - F. The maternal and neonatal medical records should be organized as the patient is prepared for transport and sent with the patient. Electronic medical records, when available, should be provided to the receiving facility in a timely manner.
 - G. Consent forms to authorize transfer must be obtained.
 - H. Parents should be encouraged to see and touch the infant.
 - I. Appropriate maternal/neonatal identification should be in place before transport.
 - J. If a delay in transport occurs, a repeat telephone or radio call should be made for further assessment and advice.
 - K. All referrals should be directly admitted to the receiving unit to avoid unnecessary delays in the emergency department.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. The transport team should communicate their estimated time of arrival to the referring facility and if a delay in response to the referring facility is anticipated, a telephone or radio call should be made.
- B. On arrival of the transport team, assessment and further stabilization of the infant should be done in collaboration with the referring staff.
- C. After neonatal stabilization, the transport team responsibilities before departure, include:
 - Verify proper identification of the infant
 - Ensure that the newborn screen has been obtained
 - Discuss the infant's condition, possible course, and therapeutic intervention that has been undertaken or is anticipated with the parents
 - Encourage parents to see and touch the infant
 - Provide written information about the receiving center and resources
 - Develop a lactation plan for successful breastfeeding
 - Complete medical necessity and consent forms to authorize transfer, treatment, and admission to the receiving hospital
 - Communicate with the medical control physician regarding the infant's history, current status, and planned management during transport
- D. Enroute to the receiving facility, communicate any change in patient status and estimated time of arrival to the receiving facility and the medical control physician.
- E. Telephone the parents shortly following admission of the infant.

III. RECEIVING CENTER RESPONSIBILITIES

- A. The receiving care provider is responsible for the decision to accept the referring health care provider's request for transport and make preparations at the receiving center. If unable to accept the transport, assistance in locating appropriate care should be provided to the referring health care provider.
- B. Responsibility for the infant:
- During the preparation for transport by the referring facility, the referring physician and hospital are responsible for the patient unless there have been other prior agreements. Transport services should work with the referring hospital to clearly delineate the primary medical responsibility for the patient when the patient is still within the referring hospital but is being cared for by the transport team. (See the most recent editions, *Guidelines for Perinatal Care*, published by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics and *Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients*, American Academy of Pediatrics.)
 - If the infant is transported by the referring center, the referring health care provider is responsible for the patient until arrival at the receiving center.
 - If the infant is transported by the receiving center the referring health care provider shares joint responsibility for the patient with the receiving facility until the departure of the transport team.
 - If the infant is transported by a third party neonatal transport team, under the direction of their medical control physician, the transport team and the receiving facility share joint responsibility after departure from the referring facility and until arrival at the receiving facility.
 - If the transport is aborted by the referring facility due to clinical improvement, patient responsibility is retained by the referring facility. Any care provided by the transport team should be documented and the documentation provided to the referring facility.
 - If the transport is aborted secondary to patient demise, any care provided by the transport team should be documented and the documentation provided to the referring facility.
- C. Within 72 hours of admission, communication with the referring care provider regarding events during transport and since admission should occur.
- D. Periodic communication with appropriate health care providers from the referring facility should be maintained.
- E. Consideration should be given to returning the care of the patient to the referring health care provider or primary care physician when practical and medically appropriate.
- F. Upon discharge of the infant, a discharge summary should be sent to the referring perinatal health care providers and the infant's follow-up health care provider.

NEONATAL TRANSPORT PERSONNEL, MODALITY AND EQUIPMENT

- I. The referring health care provider should be aware of the availability of Advanced Life Support (ALS) ambulances in the area. The required equipment and supplies for maternal and neonatal care in an ALS ambulance are defined by the Tennessee Department of Health (See Appendix V).
- II. Organization and maintenance of additional transport equipment is the responsibility of the transport team.
- III. Refer to pages 116-117 for **transport personnel and modality guidance**.
- IV. **Additional equipment, supplies and medication** that should be provided by the transport team or referring facility after communication among providers are listed on pages 118-121.

NEONATAL REFERRAL DOCUMENTATION

Records are essential for continuing care of the patient and evaluation of the referral process. Both referring and receiving center personnel have responsibilities to provide adequate documentation of clinical data.

When possible, it is recommended that all communication between the referring and receiving centers and/or transport team be made via a mode (telephone or radio) where conversations can be recorded.

I. REFERRING CENTER RESPONSIBILITIES

- A. The following documents/EMR should accompany the transported infant:
 - 1. Available maternal medical and prenatal records
 - 2. Current neonatal medical record, including medical imaging studies
 - 3. Record of care during transport, if the referring facility is transporting the patient

- B. The referring center should maintain a record regarding disposition of transported infants.

II. TRANSPORT TEAM RESPONSIBILITIES

- A. Develop and maintain a record of care during transport

III. RECEIVING CENTER RESPONSIBILITIES

- A. Maintain a record regarding the disposition of the transported infant
- B. Send a summary of care to the referring perinatal health care providers

EVALUATION OF NEONATAL REFERRAL PROCESS

- I. Interhospital care of the high-risk infant requires the cooperation and coordination of many skilled persons. Outreach education efforts should include discussions of the regional referral process and can be used to reinforce cooperation and coordination.
- II. Outreach education related to transport should focus on the following objectives:
 - A. Informing perinatal care and EMS providers in the region of specialized resources available to them through the perinatal network.
 - B. Assisting neonatal care providers in developing their abilities to identify high-risk neonatal patients, anticipate complications, and stabilize those patients before transport.
- III. To promote continuous quality improvement, efforts should include ongoing education of neonatal providers and EMS personnel (See Appendix I). Educational requirements for EMS personnel have been revised as the national EMS educational standards. They are available on the website <https://www.ems.gov/pdf/811077a.pdf>
- IV. Planning of the neonatal referral process requires participation of those who will use the service and those who will provide it. Criteria considered in planning and evaluating the referral process are:
 - A. Availability
 - B. Accessibility
 - C. Responsiveness
 - D. Effectiveness
 - E. Safety
- V. Referring facilities should periodically review their neonatal referrals, with or without the assistance of the receiving center.

RETURN TRANSPORT

- I. Return transports occur to take patients back to their original or local hospital for further care when the problems that required initial transport have been resolved. Return transports have the following benefits:
 - Facilitate family centered care, including visits and infant/family bonding
 - Restore family/community support network
 - Promote successful breastfeeding
 - Assist with discharge planning
 - Allow capacity for higher acuity infants in Level IV centers when the infant's acuity no longer meets criteria for Level IV care

II. NEONATAL RETURN TRANSPORT

- A. The hospital to which the infant is returned and the timing of the return transport are largely determined by individual patient care needs, the anticipated length of stay and receiving institutional capabilities.
- B. A telephone consultation with the receiving health care provider is necessary to initiate the return transport process and to prepare the receiving hospital. This consultation may aid the health care provider and nursing staff in developing a treatment plan. In the event the infant is returned to a hospital other than the original referring hospital, the original referring health care provider must be notified.
- C. The mode of transport, composition of the transport team, and equipment needs should be based on the condition of the infant and other factors such as distance and weather conditions.
- D. The physician directing the return transport is responsible for the patient during transport.
- E. Medical necessity and consent forms to authorize transfer, treatment, and admission to the receiving center must be obtained.
- F. The parents should be encouraged to visit and become familiar with the receiving center nursery prior to the return transport.
- G. The transport team should communicate with receiving center personnel regarding the estimated time of arrival.
- H. On admission of the infant to the receiving center, the transport team should communicate with receiving center personnel regarding the infant's history, events during transport, and current status.
- I. A comprehensive medical record, including imaging studies, should be made available to the receiving facility at the time of admission.
- J. Periodic communication between referring and receiving hospitals should be maintained.

**NEONATAL TRANSPORT PERSONNEL, MODALITY AND
EQUIPMENT**

NEONATAL TRANSPORT SERVICES

For many critically ill infants, particularly those being treated at institutions that are unable to provide the level of care or availability of subspecialty care that is required, access to a skilled transport team is essential. There may also be situations in which the infant requires transport to receive convalescent care at another facility. Neonatal-pediatric transport is one component in the continuum of care in a system of emergency medical services for children (EMSC). A qualified, highly trained, well-prepared and equipped team is the key to providing optimal care during interfacility transport and to preventing deteriorating condition or adverse events

NEONATAL TRANSPORT PERSONNEL

- I. The composition of the transport team should be decided jointly by the referring and receiving health care providers based on the condition of the infant.
- II. Transport team members should be selected from appropriately trained physicians, neonatal nurse practitioners, registered nurses, respiratory therapists, emergency medical technicians, advanced emergency medical technicians, and paramedics. Educational requirements for EMS personnel have been revised as the national EMS educational standards. They are available on the website, <https://www.ems.gov/pdf/811077a.pdf>. The minimum number of transport team members should be three, of which one is the operator of the transport vehicle. The other team members should be comprised of a neonatologist, neonatal fellow, neonatal nurse practitioner, neonatal specialty trained registered nurse, or neonatal specialty trained respiratory therapist.
- III. Transport team members should have the collective expertise sufficient to provide the following, if necessary:
 - A. Observation of the infant throughout the transport
 - B. Monitoring of body temperature, respiratory status, and cardiovascular status
 - C. Delivery and monitoring of oxygen therapy
 - D. Initiation and maintenance of IV access and therapy
 - E. Supportive care for a wide variety of emergency conditions, including advanced neonatal resuscitation
- IV. Members of the transport team (physicians, neonatal nurse practitioners, registered nurses, and respiratory therapists) should be current Basic Life Support (American Heart Association), Neonatal Resuscitation Program (American Academy of Pediatrics and American Heart Association) and S.T.A.B.L.E. providers. It is strongly recommended that EMS personnel are also trained in NRP and S.T.A.B.L.E. National certification specific to high risk neonatal care or neonatal transport is also recommended.
- V. Transport team members should be oriented to the transport vehicle and use of transport equipment. All transport team members should follow state and national standards.
- VI. The knowledge and skills required for a nurse to perform neonatal transport are listed in the most current edition of the *Educational Objectives for Nurses, Levels I, II, III, IV, Neonatal Transport Nurses*, Tennessee Perinatal Care System, Tennessee Department of Health (Appendix I). Other suggested supplemental education includes the AAP/AHA Neonatal Resuscitation Program and The S.T.A.B.L.E. Program[®], endorsed by the American Academy of Pediatrics and the March of Dimes.

NEONATAL SPECIALTY TRANSPORT MODALITY

- I. Selection of the mobile neonatal intensive care unit should be based on the condition of the infant.
- II. The vehicle used for the provision of neonatal intensive care and transportation may be owned and operated by the transporting hospital or, alternatively, by a commercial source.
- III. The vehicle used for the provision of neonatal intensive care and transportation between medical facilities shall conform with the following standards for design and construction as defined by the Office of EMS of the Tennessee Department of Health. Refer to the latest edition of the *Tennessee Emergency Medical Services Statutes and Rules, Rule 1200-12-1-.02[4]*, Specialty Care Vehicle Requirements, <https://www.tn.gov/health/health-program-areas/health-professional-boards/ems-board/ems-board/general-information.html> (click on Rules and Regulations).
- IV. In the event a RWA or FWA is used for neonatal transport, the following additional precautions should be observed:
 - A. Use of a licensed air medical transport program with appropriately credentialed neonatal care providers
 - B. Secure fastening of transport equipment
 - C. An independent power source to allow uninterrupted and fail-safe operation of the incubator and other supporting equipment
 - D. Environmental conditions for the infant that minimize the risk of temperature instability, noise and vibration
 - E. Protective headgear for crew use during transport
 - F. System for easy communication among the members of the transport team and medical control at receiving center
 - G. Seat belts
 - H. Seating arrangement that permits close observation and handling of the patient
 - I. Flame retardant flight suits
- V. Latex free equipment and supplies must be provided.

NEONATAL TRANSPORT EQUIPMENT

- I. Organization and maintenance of neonatal transport equipment is the responsibility of the transporting facility (See Appendix V).
- II. Equipment to maintain a neutral thermal environment for the infant should include:
 - A. transport incubator
 - B. thermometer or temperature strips
 - C. blanket, insulating blanket, chemically-activated heat pack (appropriate for neonatal use), or plastic wraps
- III. Equipment for providing neuroprotective hypothermia
 - A. Active cooling
 1. therapeutic cooling device
 2. continuous skin temperature monitoring
 3. continuous rectal temperature monitoring
 4. cooling mattress or blanket
 5. sterile water
 - B. Passive cooling
 1. continuous skin temperature monitoring
 2. continuous rectal temperature monitoring
- IV. The transport incubator should meet the following requirements:
 - A. Approved by the manufacturer for use during transport and installed in the transport vehicle with crashworthy restraints.
 - B. If used in RWA and FWA it shall meet FAA requirements for crashworthiness and flammability of materials. The transport incubator and monitoring equipment should be tested by an FAA certified mechanic to assure equipment does not interfere with navigational instruments.
 - C. A heat source that requires minimal time for preheating and should maintain ambient temperature within the desired range of 29° to 36° C. The control for temperature setting should be readily accessible and easy to operate, and there should be provision for easy determination of ambient temperature. It is essential to have a fail-safe alarm system that will recognize overheating or underheating.
 - D. Provide an environment in which the oxygen supply is constant and controllable.
 - E. Provide unrestricted visibility of the infant with a functional independent light source for general illumination provided in or on the incubator.
 - F. Easy accessibility to the infant resulting in minimal interference with thermal protection and oxygen supply.
 - G. Safety restraint devices to secure the infant inside the incubator that conform to Federal Motor Vehicle Safety Standards and FAA Standards.
- V. Equipment for oxygen delivery and monitoring should include:
 - A. oxygen, medical air and nitric tanks
 - B. pressure gauges
 - C. flowmeters (needle control valve preferred)

- D. oxygen analyzer
 - E. oxygen blender
 - F. oxygen tubing and adapters
 - G. oxygen hood or nasal cannulas (preterm and term)
 - H. neonatal oxygen masks (preterm and term)
 - I. neonatal resuscitation manual bag and mask with manometer or T-piece resuscitator
 - J. continuous positive airway pressure apparatus
 - K. mechanical ventilator
 - L. inhaled nitric oxide delivery system
- VI.** The following guidelines are related to the use of oxygen during transport:
- A. A portable supply of oxygen and compressed air in cylinders adequate to last the entire journey with surplus to cover unexpected needs and delays should be carried. Proper restraint of these cylinders is mandatory throughout the transport. An oxygen cylinder usage chart may be used in determining the number and type of oxygen cylinders necessary during transport (Appendix II).
 - B. Oxygen cylinders in use should be provided with pressure gauges and flow meters.
 - C. The ambient oxygen concentration must be monitored continuously by an oxygen analyzer, if appropriate.
- VII.** Devices to maintain the patency of the airway and gastric decompression must be readily available and should include:
- A. bulb syringe
 - B. regulated suction with gauge
 - C. suction catheters (#6, 8, 10 Fr)
 - D. feeding tube (#6, 8 Fr) with a 20 mL syringe
 - E. replogle tube (#6, 8, 10 Fr)
- VIII.** Equipment for vital sign monitoring should include:
- A. continuous heart rate monitor
 - B. neonatal stethoscope
 - C. body temperature monitor
 - D. noninvasive and invasive blood pressure monitoring devices
 - E. pulse oximeter for noninvasive monitoring of oxygen saturation
- IX.** Equipment for monitoring blood glucose levels must be available.
- X.** Equipment for monitoring blood gases must be available when transporting infants requiring HFOV and/or iNO.
- XI.** If intravenous therapy is required, an infusion pump that is portable, battery-powered, fail-safe, and calibrated to ensure accurate delivery of calculated fluid microvolumes must be used. Critical infants may require multiple intravenous lines requiring additional infusion pumps.
- XII.** The equipment and supplies required for resuscitation of an infant must be available,

portable and should include:

A. Endotracheal intubation

1. laryngoscope handle with blades (#00, 0, 1)
2. laryngoscope spare bulbs (if necessary)
3. laryngoscope spare batteries
4. endotracheal tubes, uncuffed (#2.5, 3.0, 3.5, 4.0 mmID)
5. laryngeal mask airway (LMA) (size 1)
6. oral airways (sizes 00 and 0)
7. neonatal resuscitation manual bag and masks or T-piece resuscitator
8. pressure manometer (to monitor PIP and PEEP if manual ventilation is necessary)
9. disposable stylet (#6 Fr)
10. adhesive tape or commercial endotracheal tube holders
11. scissors
12. end tidal carbon dioxide (CO₂) detector, continuous monitoring optional

B. Intravenous infusion

1. intravenous needles and catheters (#22, 23, 24, 25, 26 gauge)
2. syringe ([1] 60 mL)
3. intravenous armboard
4. intravenous tubing and T connector
5. infusion device
6. tape or site dressing
7. site preps
8. 3-way stopcock
9. medication dispensing / transfer devices
10. umbilical catheterization equipment
11. invasive blood pressure transducer (for use with umbilical arterial line)

C. Medications should include the following drugs or an approved therapeutic equivalent based on local program protocols. Weight-based administration guides including both milligrams and milliliters should be available for the medications used.

1. adenosine
2. acyclovir
3. ampicillin
4. atropine
5. calcium gluconate
6. dextrose solution (D5W)
7. dextrose solution (D10W)
8. dextrose solution (D50W)
9. dobutamine
10. dopamine
11. epinephrine (0.1 mg/mL)
12. fentanyl

13. furosemide
14. gentamicin
15. heparin
16. midazolam
17. morphine sulfate
18. naloxone hydrochloride
19. normal saline, bags and/or prefilled syringes
20. paralytic agent
21. phenobarbital
22. prostaglandin E₁ (requires refrigeration)
23. sodium bicarbonate (4.2%)
24. sterile water
25. surfactant (requires refrigeration)

XIII. Equipment for diagnosis and management of air leak syndrome

- A. cool transilluminator
- B. chest tubes (8, 10, 12 Fr)
- C. chest tube kit
- D. 18 to 20 gauge over the needle catheters
- E. drain with one-way check valve
- F. 3-way stopcock
- G. luer lock and slip tip syringe (35/60 mL)

XIV. Equipment for handwashing and personal protection

- A. antiseptic solution or towelettes
- B. gloves
- C. full face protection or goggles and masks
- D. fluid-retardant and fluid-resistant gowns
- E. infectious waste disposal bags
- F. soiled linen disposal bags
- G. sharps container

XV. Latex free equipment and supplies must be provided

XVI. Ambulance Child Restraint ≤4 lbs and above (name brand is Quantum EMS Baby ACR)

APPENDICES

APPENDIX I

TENNESSEE PERINATAL CARE SYSTEM EDUCATIONAL OBJECTIVES FOR NEONATAL TRANSPORT NURSES

Reference: This section is from the 6th edition (2017) of *Educational Objectives for Nurses, Levels I, II, III, IV, and Neonatal Transport Nurses*, Tennessee Perinatal Care System, Tennessee Department of Health.

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

Neonatal transport nurses should maintain current NRP and S.T.A.B.L.E. provider status. National certification specific to high risk neonatal care or neonatal transport is also recommended. 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 NEWBORN

- A. Provide for a receiving health care provider an accurate record of necessary resuscitative procedures and the infant's physiological responses.
- B. Perform appropriate resuscitation if needed during transport as outlined in the most recent edition of NRP.

III. PHYSICAL ASSESSMENT OF THE NEWBORN

- A. Collaborate with other transport team members in performing 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, altitude, and velocity of air flow on the thermal status of the infant.
- B. Describe safe methods of obtaining, maintaining, increasing, and/or decreasing an infant'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 body cooling measures when indicated.

V. NUTRITIONAL REQUIREMENTS OF THE NEWBORN

- 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 and proper storage 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 infant.
- B. Provide for a receiving care provider an accurate record (drug name, dose, time, and route) of medications used prior to and during transport and the infant'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 an infant's risk of infection.

XIV. CARDIAC DISORDERS OF THE NEWBORN

- 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, infant, and staff interactions as well as appropriate cultural and social histories.
- E. Encourage pumping of breast milk within 4 to 6 hours of delivery. Work with referring staff to assist the mother with proper pumping and breast milk storage.

XVI. REFERRING-RECEIVING CARE PROVIDER RELATIONSHIPS

- A. When given a report by the referring care provider, anticipate and 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 acquire all applicable hospital records required prior to transport.
- G. Describe facility policy for obtaining transport consent.
- H. Identify and evaluate communication methods utilized in the transport region.
- I. Seek and accept constructive evaluation of the referral process from nurses in referring and receiving facilities.
- J. 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. Describe and utilize effective techniques for entering and exiting the transport vehicle to provide maximum safety for medical personnel and for newborn patient(s).
- D. Determine adequacy of illumination in transport vehicles.
- E. Provide continuous visibility of the infant, support equipment, and monitors during transport.
- F. Determine that space available in the transport vehicle is adequate for safe emergency intervention during transport.
- G. Describe briefly the effects of vibration and sound level on the infant in transit and develop a plan to diminish these effects.
- H. Determine the adequacy of power sources to assure uninterrupted power availability during transport.
- I. 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.

- J. Determine and provide an adequate supply of oxygen and air required for transport.
- K. Describe and utilize effective methods for testing equipment function prior to transport.
- L. Identify and provide the life support and monitoring equipment and supplies necessary for transport.
- M. Implement a plan which provides for replacement, cleaning, and maintenance of transport vehicle, equipment, and supplies.
- N. Communicate an infant assessment which will assure adequate professional support and equipment upon the arrival of the transported infant at the receiving center.
- O. Describe to others and utilize appropriate steps for stabilizing the infant prior to transport.
- P. Utilize appropriate communication methods to effectively obtain consultation from the medical control physician (MCP).
- Q. Maintain records which can be readily utilized to evaluate the effectiveness of the transport system.
- R. Assist in evaluation and implement measures to improve the transport process.

APPENDIX II

OXYGEN CYLINDER USAGE DURING TRANSPORT

OXYGEN CYLINDERS: DURATION OF FLOW

SIMPLE FORMULA:

Gauge pressure in psi (pounds per square inch) minus the safe residual pressure (always 200 psi) times the constant (see list below) divided by the flow rate in liters per minute = duration of flow in minutes.

CYLINDER CONSTANTS

D = 0.16	G = 2.41
E = 0.28	H = 3.14
M = 1.56	K = 3.14

EXAMPLE

Determine the life of an M cylinder that has a pressure of 2000 psi displayed on the pressure gauge and a flow rate of 10 liters per minute.

$$\frac{(2000-200) \times 1.56}{10} = \frac{2808}{10} = 280.8 \text{ minutes}$$

OXYGEN SUPPLY AND REGULATORS

Oxygen is supplied either as a compressed gas or as a liquid. Compressed gaseous oxygen is stored in an aluminum or steel tank in 400 liter (D), 660 liter (E), or 3,450 liter (M) volumes. To calculate how long the oxygen will last: For example, the calculation for an E cylinder would be:

$$\text{Tank life in minutes} = (\text{tank pressure in psi} \times 0.28) \div \text{liters per minute}$$

APPENDIX III

COBRA/EMTALA STATUTE: 42 USC 1395

There are a variety of resources for obtaining the COBRA/EMTALA Statute in its entirety. This information was obtained from the web site www.medlaw.com.

The COBRA/EMTALA Statute was developed in response to actions construed as patient "dumping" related to reimbursement source. The EMTALA portion relates to the transfer and medical treatment of women in active labor. The components delineate the circumstances under which an individual may be transferred to another medical care facility and the steps to be undertaken for stabilization and treatment prior to transfer.

This federal law has been in effect for a number of years. All health care facilities have been made aware of these regulations and have programs in place to address these situations. Facilities that do not abide by these regulations are subject to significant monetary sanctions.

The *Guidelines for Transportation* have been written with the understanding that all facilities will abide by the federal regulations of COBRA/EMTALA. It is the intent of the subcommittee that all facilities will abide by COBRA/EMTALA regulations.

Appendix IV

Neonatal Resuscitation Equipment and Supplies

For a list of recommended equipment and supplies, refer to the current edition of the Neonatal Resuscitation Program textbook (<https://shop.aap.org/product-list/?q=nrp>). In addition, please refer to the 1st edition (2020) of [Guidelines on Equipment, Supplies and Training for Emergency Medical Services and Emergency Department Staff](#), Tennessee Perinatal Care System, Tennessee Department of Health.

Appendix V

TENNESSEE EMERGENCY MEDICAL SERVICES EQUIPMENT AND SUPPLIES SPECIFICATIONS PER EMS RULE 1200-12-01-.03, EFFECTIVE JULY 1, 2019

The equipment, supplies and medications specified below have been approved by the Board of Emergency Medical Services and are required on all permitted ambulances operating in Tennessee in accordance with Rule 1200-12-01-.03 Emergency Medical Services Equipment and Supplies.

It is anticipated that this document will need to be updated from time to time. Any proposed updates will be discussed by the Clinical Issues Committee and presented to the Board for its approval at one of its regularly scheduled public meetings, the date and time of which can be found on the department's website at <http://health.state.tn.us/EMS/board.htm>.

KEY:

C = Critical Violation

N = Non-Critical Violation

SAFETY DEVICES			
Ambulance Lacks Item	Ambulance Lacks Item in Quality Required		
	N (2)	FIRE EXTINGUISHERS	Two (2) ABC dry chemical, multipurpose 5 lb. unit fire extinguishers, in restraint brackets. One mounted in the driver/cab compartment or in a body compartment reachable from outside the vehicle. On ambulances, a fire extinguisher shall be located in the patient compartment or in a cabinet within the patient compartment. If enclosed in a compartment, outside of compartment must be labeled to indicate presence of fire extinguisher within.
	N (3)	REFLECTIVE TRIANGLES	Three (3) bi-directional reflective triangles, approved per FMVSS 125, for any transport vehicle.
	N (2)	FLASHLIGHTS	Two, three cell, lantern type flashlights of 4.5 volt or greater, or equivalent, for on-scene use. One must be accessible to the driver and one must be accessible to technician.
	N (2)	REFLECTIVE SAFETY WEAR	Reflective safety wear for each crewmember (must meet or exceed ANSI/ISEA Performance Class I, II or III).
	N	DOT EMERGENCY RESPONSE GUIDE	Current Paper or electronic version (TEMA gives them out Free)

OXYGEN INHALATION, VENTILATION AND AIRWAY MANAGEMENT DEVICES; RESUSCITATION AND AIRWAY DEVICES; ADJUNCTS FOR VENTILATION			
Ambulance Lacks Item	Ambulance Lacks Item in Quantity Required		
C	N (2)	BAG VALVE DEVICE	With a bag volume of at least 1000 milliliters and oxygen reservoir for adult use with adult mask.
C	N (2)	BAG VALVE DEVICE	With a bag volume of 450-750 milliliters and oxygen reservoir for pediatric use with child mask and infant mask.
C	N (2)	BAG VALVE DEVICE	Neonatal size with a bag volume of 200 - 250 milliliters and oxygen reservoir with neonatal mask. (one mask of the two masks to fit 750-1500 grams)
C	N (1 ea)	OROPHARYNGEAL AIRWAY DEVICES	One (1) in each size of 0,1,2,3,4 and 5
C	N (1ea)	NASOPHARYNGEAL AIRWAY DEVICES	One (1) in size 16 or 18; one (1) in size 20 or 22; one (1) in size 24 or 26; one (1) in size 28 or 30; and one (1) in size 32 or 34
C		BLIND INSERTION AIRWAY DEVICES	Device not intended for the trachea. (double lumen airways)
C		END TIDAL CARBON DIOXIDE DETECTION/MONITORING	For adult and pediatrics.
	N	NEBULIZERS	For adult and pediatrics
	N	CPAP	One device
OXYGEN			
C		INSTALLED OXYGEN SUPPLY	<ul style="list-style-type: none"> • An installed oxygen supply with a capacity of at least 2,000 liters of oxygen. • Cylinder shall be restrained with a device manufactured to not allow movement of the cylinder • Pressure regulator and flow meters shall comply with federal specifications and automatically supply a line of pressure of 50 psi. • At least two distribution outlets and flow meters shall be operable in the compartment.
C	N (2)	PORTABLE OXYGEN	<ul style="list-style-type: none"> • Two cylinders with at least 300 liters, or "D" size cylinders. • A full spare cylinder shall be provided. • Pressure regulator and flow meter shall comply with federal specifications. • Oxygen unit and spare cylinders shall be restrained as not to allow movement in storage area

OXYGEN DELIVERY DEVICES			
C	N (2 ea)	TRANSPARENT NON-REBREATHING MASK	<ul style="list-style-type: none"> Two in adult and child sizes with tubing at least 6 foot in length.
C	N (2 ea)	NASAL CANNULA	<ul style="list-style-type: none"> Two each adult and pediatric
		HUMIDIFIERS	<ul style="list-style-type: none"> Optional, but when supplied shall be for single patient use.
SUCTION DEVICES AND SUPPLIES			
C		INSTALLED SUCTION DEVICE	<ul style="list-style-type: none"> With vacuum gauge, a control and collection container, and a minimum capacity of 1,000 milliliters. Must pull at least 300 milliners in 4 seconds.
C	N (2)	SUCTION TUBING	<ul style="list-style-type: none"> Two (2), six (6) feet in length.
C		PORTABLE SUCTION DEVICE	<ul style="list-style-type: none"> A collection bottle (disposable preferred) of at least 250 milliliters shall be provided with (1) spare of the same size. Must pull at least 300 milliners in 4 seconds. At least two (2) sets of suction tubing, two feet or more in length. <p>Note: A manually operated portable suction aspirator will not qualify as a portable suction device.</p>
C	N (2ea)	RIGID SUCTION TIPS	<ul style="list-style-type: none"> Two (2), Yankauer style. <ol style="list-style-type: none"> One may be stored with portable suction device.
C	N (2ea)	FRENCH SUCTION CATHETERS	<ul style="list-style-type: none"> Two sets. <ol style="list-style-type: none"> Each set consists of 6,8,10,14 and 16, French catheters one each One set may be stored with the portable suction aspirator.
DIAGNOSTIC AND ASSESSMENT DEVICES			
C		SPHYGMOMANOMETER	<p>With inflation bulb and gauge or automatic device.</p> <ul style="list-style-type: none"> With adult and pediatric blood pressure cuffs and Adult large or thigh blood pressure cuff
C		STETHOSCOPE	<ul style="list-style-type: none"> May be carried as personally assigned equipment, provided the service has a posted policy regarding supply of this device.
	N	BANDAGE SHEARS	<ul style="list-style-type: none"> May be carried as personally assigned equipment, provided the service has a posted policy regarding supply of this device.
C		PULSE OXIMETER	<ul style="list-style-type: none"> With sensors for use with adult and pediatric patients.

	N	PATIENT THERMOMETER	<ul style="list-style-type: none"> One non mercury
BANDAGES AND DRESSING MATERIALS			
C	N (2)	RIGID EYE SHIELD	<ul style="list-style-type: none"> Two rigid eye shields
	N (2)	ADHESIVE TAPE	<ul style="list-style-type: none"> Two hypoallergenic (2) rolls: one inch wide (1) and 2 inch wide (1)
	N (6)	GAUZE ROLLER BANDAGE	<ul style="list-style-type: none"> Six (6), each at least three (3) inches wide.
	N (6)	TRIANGULAR BANDAGES	<ul style="list-style-type: none"> Six (6), with base at least forty-two (42) inches long.
	N (25)	4"X4" DRESSING	<ul style="list-style-type: none"> Twenty-five (25)
	N (8)	ABDOMINAL /COMBINE DRESSINGS	<ul style="list-style-type: none"> Eight (8) composite pad sterile compresses.
C	N (2)	OCCCLUSIVE DRESSING	<ul style="list-style-type: none"> Two (2) sterile occlusive dressings of white petrolatum-coated gauze or plastic membrane film at least 3"x3".
	N(2)	BURN SHEETS	<ul style="list-style-type: none"> Two (2) separate hospital or commercially packaged sheets, at least 60"x60".
C	N(2)	TOURNIQUET	<ul style="list-style-type: none"> Two (2) commercially available arterial tourniquets.
C	N	IRRIGATION SOLUTION	<ul style="list-style-type: none"> Saline or sterile water in plastic containers sufficient to supply 2000 milliliters. Bagged IV solutions may be substituted, but if substituted will not fulfill IV solution requirements elsewhere in these specifications.
IMMOBILIZATION DEVICES			
C	N (2)	SPINAL IMMOBILIZATION DEVICE	<ul style="list-style-type: none"> Two (2) spinal immobilization devices, backboards, whole body splints or other approved devices capable of immobilizing a patient with suspected spinal injuries which is translucent for x-ray. Straps or restraints that immobilize the patient at or about the chest, pelvis, and knees shall be provided for each device. Wooden devices must be sealed with finishes to prevent splintering and aid in decontamination. Note: Wooden devices will no longer be acceptable after July 1, 2018.

C	N	SHORT SPINAL IMMOBILIZATION DEVICE	<ul style="list-style-type: none"> One (1) short spinal immobilization device consisting of a clamshell wraparound type vest. Device must: <ol style="list-style-type: none"> include affixed restraint straps, head straps and integral padding. be maintained in dust resistant container
C	N (2)	CERVICAL SPINAL IMMOBILIZATION OR HEAD IMMOBILIZERS	<ul style="list-style-type: none"> Two (2) designed to prevent lateral head movement of the restrained patient. <ol style="list-style-type: none"> Four (4) disposable or plastic covered foam blocks with tape or restraint straps may be provided to fulfill this requirement. Commercial devices must include accompanying straps or restraint materials. <p>Note: Sand bags will not fulfill this requirement.</p>
C	N (2 sets)	CERVICAL COLLARS	<ul style="list-style-type: none"> Two (2) sets shall be available. Each set must contain the following sizes: <ol style="list-style-type: none"> Pediatric Small Adult Medium Adult Large Adult (Adjustable collars may be combined to make at least two adult collars and at least two pediatric collars).
IMMOBILIZATION DEVICES			
	N	UPPER AND LOWER EXTREMITY IMMOBILIZATION DEVICES	<ul style="list-style-type: none"> Must be made of a rigid support material capable of immobilizing all four extremities, as well as the joint above and the joint below the fracture, in sizes appropriate for adults and pediatrics. Must be placed in dust-resistant containers. <p>Note: Inflatable splints will not meet this requirement.</p>
C	N	LOWER EXTREMITY TRACTION SPLINTS	<ul style="list-style-type: none"> Adult and Pediatric provided with attachments sufficient to immobilize femoral fractures involving both lower extremities. (If one traction splint can splint both legs and the device be adjusted to pediatric size one splint will sufficient) Must be placed in dust-resistant containers.

C	N	PELVIC IMMOBILIZATION DEVICE	<ul style="list-style-type: none"> Commercial or medically-recognized, improvised device (<i>i.e.</i> sheet and clips)
PATIENT CARE SUPPLIES			
	N	CONTAINERS FOR HUMAN WASTE AND EMESIS	<ul style="list-style-type: none"> One (1) bedpan; One (1) urinal; and Two (2) emesis basins or suitable substitutes. Tissues shall be provided for secretions and toilet use.
	N	BLANKETS OR PROTECTIVE PATIENT COVERS WITH THERMAL INSULATING CAPABILITIES	<ul style="list-style-type: none"> Two (2) for adults. One (1) for infant, including head cover. Must be stored in dust-resistant cover
C	N (4)	SHEETS	<ul style="list-style-type: none"> Four (4) linen or disposable material for cot and patient covers.
	N	PILLOW	<ul style="list-style-type: none"> 1 time use or with fluid proof covering.
	N	COLD PACKS	<ul style="list-style-type: none"> 2 cold packs
OBSTETRICAL EMERGENCY EQUIPMENT			
C		OBSTETRICAL EMERGENCY PACK	<ul style="list-style-type: none"> Obstetrical Emergencies Packs or OB Kits shall contain the following: <ol style="list-style-type: none"> Drape towel or underpad. Gauze dressings. Sterile gloves. Sterile cutting instrument Bulb syringe or aspirator Cord clamps and /or umbilical ties Plastic bags and ties for placental tissue. Infant receiving blanket or swaddling materials and head covering (if not included in OB kit may use infant blanket and head cover from patient care supplies).
INFECTION CONTROL SUPPLIES			
C	N	PERSONAL PROTECTIVE EQUIPMENT	<ul style="list-style-type: none"> Must conform to current CDC guidelines for infectious disease, including but not limited to the following: <ol style="list-style-type: none"> Disposable gloves sized for the crew. Protection of Mucus membranes. (<i>i.e.</i> goggles/ faceshields below chin and to hairline) Full body protection with (<i>i.e.</i> Fluid-proof/ impermeable covers or

			<p>gowns, and leggings</p> <ol style="list-style-type: none"> Protective footwear Two (2) face mask (NIOSH, compliant with at least N-95 specifications). Compliance with Occupational Safety and Health Administration rules for annual fit testing. <p>Roll of impermeable tape.</p>
C	N	DECONTAMINATION AND DISPOSAL OF INFECTED WASTE	<p>According to CDC</p> <ul style="list-style-type: none"> Materials for decontamination and disposal of potentially infected waste to include: <ol style="list-style-type: none"> Red plastic bags or trash bags labeled for biohazard with at least two (2) bags 24"x30". Puncture resistant container shall be supplied for sharps disposal in a locking –style bracket or in a locked compartment within the ambulance. Sheath style or single use containers shall be disposed of in a larger approved container. Antiseptic hand cleaners Environmental Protection Agency approved hospital grade disinfectant for equipment application.
INTRAVENOUS THERAPY SUPPLIES			
	N (3 ea)	FLUID ADMINISTRATION SETS	<ol style="list-style-type: none"> Three (3) each <ul style="list-style-type: none"> Macro drip: ten (10) to twenty (20) drops per milliliter. Micro drip: sixty (60) drops per milliliter.
C	N	VENOUS TOURNIQUETS	<ul style="list-style-type: none"> Non-latex disposable, sufficient for adult and pediatric use.
	N (12)	ANTISEPTIC WIPES	<ul style="list-style-type: none"> Twelve (12).
	N (4)	CATHETERS OVER NEEDLE	<ul style="list-style-type: none"> Four (4) in each gauge size 16,18, 20, 22, and 24. 14 gauge not required
C	N (3)	INTRAVENOUS FLUIDS	<ul style="list-style-type: none"> Three (3) liters, two (2) of which must be crystalloid fluids.
C	N (3)	INTRAOSSEOUS INFUSION DEVICES OR NEEDLES	<ul style="list-style-type: none"> Two between 14-18 gauge for the adult and /or pediatric and 18 gauge for patients weighing less than three (3) kilograms.
C		PRESSURE INFUSION DEVICE	<ul style="list-style-type: none"> Pressure infusion device

CARDIAC DEFIBRILLATORS AND MONITORS			
C		SEMI-AUTOMATED EXTERNAL DEFIBRILLATOR	<ul style="list-style-type: none"> • Shall be provided on each staffed BLS unit. Note: Semi-automated external defibrillators replaced after July 1, 2015 shall have pediatric capability.
MEDICATIONS REQUIRED			
Medications must be packaged and stored in accordance with pharmacologic guidelines for sterility, cleanliness, temperature control, dosage and expiration.			
C		ANAPHYLAXIS KIT	<ul style="list-style-type: none"> • Epinephrine 1:1,000 in a preloaded syringe of 0.3 ml per dose or a 1 cc syringe with a needle capable of intra muscular injection. Also sufficient quantity of Epinephrine 1:1000 to administer four (4) doses.
C		ASPIRIN OR THERAPEUTIC EQUIVALENT	<ul style="list-style-type: none"> • For Suspected cardiac patients
C		BETA –ADRENERGIC AGONIST OR THERAPEUTIC EQUIVALENT	<ul style="list-style-type: none"> • With appropriate administration devices for acute pulmonary distress.
C		NITROGLYCERINE	<ul style="list-style-type: none"> • 1/150 grain (0.4mg) tablets, intranasal or sublingual spray or therapeutic equivalent
C		NARCAN (NALOXONE)	<ul style="list-style-type: none"> • Minimum of 4 mg., or therapeutic equivalent
HYPOGLYCEMIC COUNTERMEASURES			
C		GLUCOSE CLIA APPROVED FOR WAVIED TESTING DEVICES	<ul style="list-style-type: none"> • For semi-quantitative blood glucose determinations, with, testing and calibration capabilities.
C		DEXTROSE	<ul style="list-style-type: none"> • At least two doses of 25 grams for parenteral administration.
MEDICATION ADMINISTRATION SUPPLIES			
C	N	SYRINGES	<ul style="list-style-type: none"> • For drug administration shall have at least 1cc, 3cc, and 10cc sizes with needles to include sizes for intra muscular injections. • 2 – 60cc luer lock syringes • 2 – three way stop cocks.
C		LENGTH BASED PEDIATRIC DOSING TAPE	<ul style="list-style-type: none"> • Or appropriate reference material that converts length to estimated ideal body weight in kilograms for pediatric drug dosing and equipment sizing based on the most current guidelines. Note: Length-based dosage tapes shall be ordered within ninety (90) days and replaced within one (1)

			year of the successor version becoming commercially available.
	N	MUCOSAL ATOMIZER DEVICE	<ul style="list-style-type: none"> One
MASS CASUALTY SITUATIONS/INCIDENTS			
	N	TRIAGE TAGGING SYSTEM	<ul style="list-style-type: none"> Scanable system required. Should organize the injured into four (4) groups by color. <ol style="list-style-type: none"> The expectant or dead/dying that are beyond help. The injured who can be helped by immediate transportation. The injured whose transport can be delayed. Those with minor injuries, which need help less urgently.
ADDITIONAL EQUIPMENT SPECIFICATIONS FOR ADVANCE LIFE SUPPORT AMBULANCES			
Ambulance Lacks Item	Ambulance Lacks Item in Quantity Required		
ENDOTRACHEAL INTUBATION DEVICES			
C	N (1 ea)	LARYNGOSCOPE	<ul style="list-style-type: none"> Shall have operable handles, in adult and pediatric sizes appropriate for use with laryngoscope blades with extra batteries.
C	N (1 ea)	LARYNGOSCOPE BLADES	In sizes 0 through 4, straight, and 2 through 4 curved with extra bulbs.
C	N (2 ea)	ENDOTRACHEAL TUBES	<ul style="list-style-type: none"> Individually packaged in a sanitary, sealed envelope or plastic package, Cuffed sizes two (2) of each size 2.5 millimeter through 8.5 millimeter
C	N (6)	STERILE SURGICAL LUBRICANT OR EQUIVALENT	<ul style="list-style-type: none"> Six packets or equivalent
C	N (1 ea)	STYLETS	<ul style="list-style-type: none"> One each adult and pediatric
C	N (2)	SYRINGE	<ul style="list-style-type: none"> Two 10cc with plain luer tip for cuff inflation
C	N (1 ea)	MAGILL FORCEPS	<ul style="list-style-type: none"> One each adult and pediatric sizes
C	N	BOUGIE DEVICE	<ul style="list-style-type: none"> With coude tip
C		END TIDAL CARBON DIOXIDE MONITORING	<ul style="list-style-type: none"> For adult and pediatrics. <p>Note: Addition of Waveform capnography technology will be required after July 1, 2018</p>
C		MECONIUM ASPIRATOR ADAPTERS	<ul style="list-style-type: none"> Shall provide for endotracheal aspiration of meconium, allowing direct connection of suction to the endotracheal tube.

C	N(2)	CHEST DECOMPRESSION NEEDLE	<ul style="list-style-type: none"> Minimum length 3.25 inches large bore
CARDIAC DEFIBRILLATORS AND MONITORS			
C		CARDIAC MONITOR	<ul style="list-style-type: none"> ALS units shall be equipped with cardiac monitor with electrocardiographic recorder and defibrillator. Shall have same number of electrodes to match number of monitoring leads, plus an equal number of spares for adults and pediatrics. Defibrillators shall have a minimum setting of ten (10) joules Defibrillator shall be equipped with the appropriate paddles or pads to treat adult and pediatric patients. <p>Note: Biphasic waveform technology will be required on any cardiac monitor/defibrillator acquired after July 1, 2015.</p>
C		TRANSCUTANEOUS CARDIAC PACEMAKER	<ul style="list-style-type: none"> A transcutaneous cardiac pacemaker, with adult and pediatric capabilities and adult and pediatric pads. <p>Note: This requirement will go into effect after July 1, 2018.</p>
C		TWELVE (12) LEAD MONITOR	<ul style="list-style-type: none"> Twelve (12) lead monitor shall be required on any cardiac monitor/defibrillator after July 1, 2018.
	N		<ul style="list-style-type: none"> Capable of twelve (12) lead transmission. <p>Note: Required after July 1, 2018.</p>
MEDICATIONS REQUIRED FOR DEFINITIVE AND CARDIAC CARE			
Medications must be packaged and stored in accordance with pharmacologic guidelines for sterility, cleanliness, temperature control, dosage and expiration. Medications must be compatible with current specifications as approved by the ambulance service's medical director.			
C	N	ADENOSINE	<ul style="list-style-type: none"> Minimum 24 milligrams, or therapeutic equivalent.
C	N	ATROPINE SULFATE	<ul style="list-style-type: none"> Minimum four (4) milligrams, or therapeutic equivalent.
C	N	ANTIARRHYTHMIC AGENTS	<ul style="list-style-type: none"> Lidocaine for cardiac arrhythmia at minimum of 400 milligrams or Amiodarone minimum of 450 milligrams, or therapeutic equivalent.
C	N	MAGNESIUM SULFATE	<ul style="list-style-type: none"> Minimum 2 grams in successive doses with dilution, or therapeutic equivalent.

C		SODIUM CHLORIDE	<ul style="list-style-type: none"> For injection and dilution of medications.
C	N	BENZODIAZEPINE	<ul style="list-style-type: none"> In amounts sufficient to administer two successive maximum doses, or therapeutic equivalent.
C	N	VASOPRESSOR AGENTS	<ul style="list-style-type: none"> Sufficient to administer four maximum doses, or therapeutic equivalent.
NARCOTIC AGENTS AND ANTAGONISTS			
C	N	NARCOTIC ANALGESICS	<ul style="list-style-type: none"> In an amount to sufficient to administer two maximum adult doses.
ALKALINIZING AGENTS			
C	N	SODIUM BICARBONATE	<ul style="list-style-type: none"> Minimum of 100 milliequivalents or therapeutic equivalent.
ANTIEMETICS			
C		ANTIEMETIC	<ul style="list-style-type: none"> Ondansetron, or therapeutic equivalent.
ANTIHISTAMINE			
C	N	DIPHENHYDRAMINE	<ul style="list-style-type: none"> Minimum 50 milligrams or therapeutic equivalent.

Appendix VI: PERINATAL REGIONS

NORTHEAST TENNESSEE (Johnson City)	MIDDLE TENNESSEE (Nashville)	WEST TENNESSEE (Memphis)
Carter	Bedford	Benton
Greene	Cannon	Carroll
Hancock	Cheatham	Chester
Hawkins	Clay	Crockett
Johnson	Coffee	Decatur
Sullivan	Davidson	Dyer
Unicoi	Dekalb	Fayette
Washington	Dickson	Gibson
	Franklin	Hardeman
	Giles	Hardin
EAST TENNESSEE (Knoxville)	Hickman	Haywood
Anderson	Houston	Henderson
Blount	Humphreys	Henry
Campbell	Jackson	Lake
Claiborne	Lawrence	Lauderdale
Cocke	Lewis	McNairy
Cumberland	Lincoln	Madison
Fentress	Macon	Obion
Grainger	Marshall	Shelby
Hamblen	Maury	Tipton
Jefferson	Montgomery	Weakley
Knox	Moore	
Loudon	Overton	
Monroe	Perry	
Morgan	Putnam	
Pickett	Robertson	
Roane	Rutherford	
Scott	Smith	
Sevier	Stewart	
Union	Sumner	
	Trousdale	
	Van Buren	
SOUTHEAST TENNESSEE (Chattanooga)	Warren	
Bledsoe	Wayne	
Bradley	White	
Grundy	Williamson	
Hamilton	Wilson	
McMinn		
Marion		
Meigs		
Polk		
Rhea		
Sequatchie		

Appendix VII: EMS REGIONS

<p>NORTHEAST TENNESSEE (Johnson City)</p> <p>Carter Greene Hancock Hawkins Johnson Sullivan Unicoi Washington</p> <p>EAST TENNESSEE (Knoxville)</p> <p>Anderson Blount Campbell Claiborne Cocke Grainger Hamblen Jefferson Knox Loudon Monroe Morgan Roane Scott Sevier Union</p> <p>SOUTHEAST TENNESSEE (Chattanooga)</p> <p>Bledsoe Bradley Franklin Grundy Hamilton McMinn Marion Meigs Polk Rhea Sequatchie</p>	<p>UPPER-CUMBERLAND (Nashville)</p> <p>Cannon Clay Cumberland DeKalb Fentress Jackson Macon Overton Pickett Putnam Smith Van Buren Warren White</p> <p>MID-CUMBERLAND (Nashville)</p> <p>Cheatham Davidson Dickson Houston Humphreys Montgomery Robertson Rutherford Stewart Sumner Trousdale Williamson Wilson</p> <p>SOUTH CENTRAL (Columbia)</p> <p>Bedford Coffee Giles Hickman Lawrence Lewis Lincoln Marshall</p>	<p>Maury Moore Perry Wayne</p> <p>WEST TENNESSEE (Jackson)</p> <p>Benton Carroll Chester Crockett Decatur Dyer Gibson Hardeman Hardin Haywood Henderson Henry Lake Madison McNairy Obion Weakley</p> <p>MEMPHIS-DELTA (Jackson)</p> <p>Fayette Lauderdale Shelby Tipton</p>
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REFERENCE LIST

Tennessee Perinatal Care System Guidelines for Regionalization, Hospital Care Levels, Staffing Facilities (2020) - <https://www.tn.gov/health/health-program-areas/mch/mch-prp/publications.html>

Tennessee Guidelines on Equipment, Supplies and Training for Emergency Medical Services and Emergency Department Staff (2020) - https://www.tn.gov/content/dam/tn/health/program-areas/reports_and_publications/EMS_ED-Staff-Guidelines.pdf

Tennessee Department of Health, Office of Emergency Medical Services - <https://www.tn.gov/health/health-program-areas/health-professional-boards/ems-board/ems-board/general-information.html>

The American Academy of Pediatrics (AAP) *Guidelines for Perinatal Care*, 8th Edition – (2017) <https://shop.aap.org/guidelines-for-perinatal-care-8th-edition-paperback>

The American Academy of Pediatrics (AAP) *Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients*, 4th Edition – (2015) <https://ebooks.aappublications.org/content/guidelines-for-air-and-ground-transport-of-neonatal-and-pediatric-patients-manual-4th-ed>

National Highway Traffic Safety Administration Office of EMS – <https://www.ems.gov/>

National EMS Education Standards - <https://www.ems.gov/pdf/National-EMS-Education-Standards-FINAL-Jan-2009.pdf>. Updates to the standards are under final review. The latest edition will be posted on the Office of EMS [website](#) once it has been approved.

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