Critical Care Guidance for Obstetrical Patients

University of North Carolina School of Medicine

These algorithms are designed to assist the primary care provider in the clinical management of a variety of problems that occur during pregnancy. They should not be interpreted as a standard of care, but instead represent guidance for management. Variation in practices should take into account such factors as characteristics of the individual patient, health resources, and regional experience with diagnostic and therapeutic modalities. This document should not be considered a substitute for clinical judgement and interdisciplinary communication.

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Table of Contents **Page**

Last updated 2.2025 J. Quist-Nelson, E. Coviello, E. Trawick

ICU Placement Suggestions for High Risk OB Patients*

This is not a substitute for clinical judgement. Final disposition determined by MFM/ICU Attending discussion.

	CTCCU***	STCCU***	CICU	MICU	BURN ICU	NSICU
ANTEPARTUM	• Laboring AND mWHO class IV with critical care needs • High risk for ECMO antepartum due to cardiac problem	• Laboring AND non-cardiac critical care needs • High risk for ECMO due to maternal disease (non-cardiac)	• Known cardiac disease <24 weeks • Nicardipine**	• Non-cardiac non-surgical critical care needs AND low risk for delivery • DKA, ARDS, hypertensive urgency if <24 weeks	• Any patients with burns with discussion of emergency delivery planning • Laboring to be moved to STCCU	• Any patients with neurocritical needs with discussion of emergency delivery planning • Laboring to be moved to STCCU
	CTCCU***	STCCU***	CICU	MICU	BURN ICU	NSICU
POSTPARTUM	• mWHO class IV patients with critical care needs • High risk for ECMO due to cardiac problem	• High risk postpartum surgical care including PPH • Nicardipine** • Attending to attending discussion is encouraged	• Postpartum patient with known cardiac disease low risk for ECMO • Nicardipine* • Attending to attending discussion is encouraged	• Non-cardiac non-surgical critical care needs such as DKA, ARDS, sepsis • Attending to attending discussion is encouraged	• Postpartum patients with burns	• Postpartum patients with neurocritical needs

*__Fetal viability is defined as ≥24 weeks.__

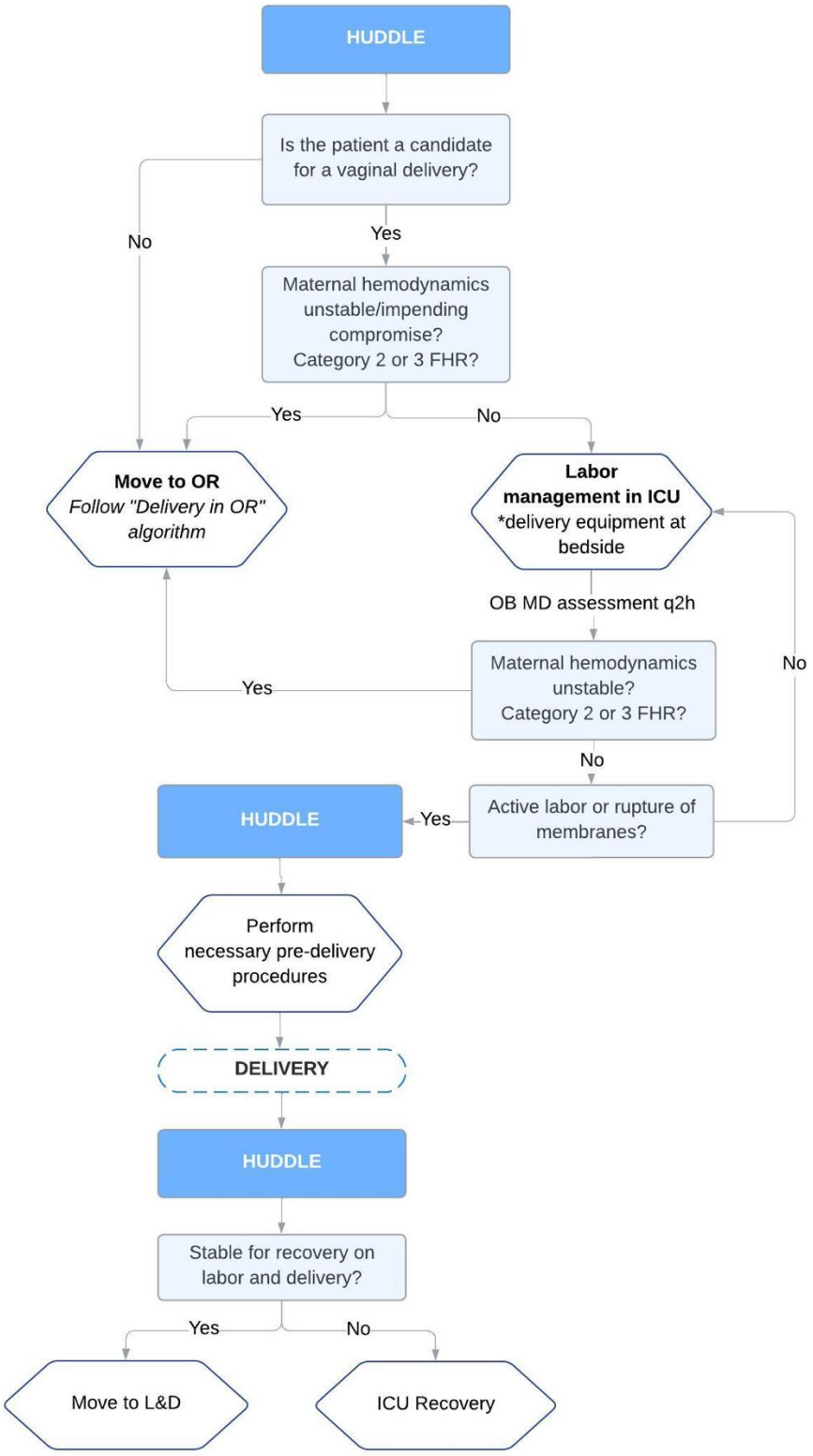
**__Disposition of those with preeclampsia, respiratory failure, and sepsis should be individualized based on anticipated medical and surgical needs.__

**Pending bed availability - Nicardipine can be performed in any ICU level care

***OB to remain primary team in CTCCU and STCCU as those are semi-open units, MICU and CICU to be primary team for patients in those units

Abbreviations:
CTCCU: Cardiovascular and Thoracic Critical Care Unit, previously CTICU, CVTICU, TICU and CTSU; STCCU: Surgical Trauma Critical Care Unit, previously SICU and ISCU

Delivery Algorithm for the Critical Care Patient*
ICU vaginal delivery



Huddle team members

- Maternal fetal medicine MD
- OB RN
- OB Anesthesia MD
- NICU
- ICU MD and RN
- OR Staff
- *Repeat huddle each change of shift*

Huddle components

- **Communication mechanisms between team members (pager, cell, Vocera, etc)**
- Patient name/MRN
- Delivery route, consents completed
- Medical summary of events, including diagnosis and critical findings
- Recommended hemodynmic parameters and preferred pressors
- Labor management needs
  - Medications
  - Monitoring (cEFM, tocometry)
  - MD assessment timing
  - Anticipated timing of delivery, transport to OR
- Anesthesia plan
- ICU support
  - Anticipated critical events in ICU
  - Risk of maternal cardiac arrest
- Additional teams/procedures needed
- Postpartum plan
  - Disposition
  - Anticipated critical events
  - Risk of hemorrhage, medication contraindications

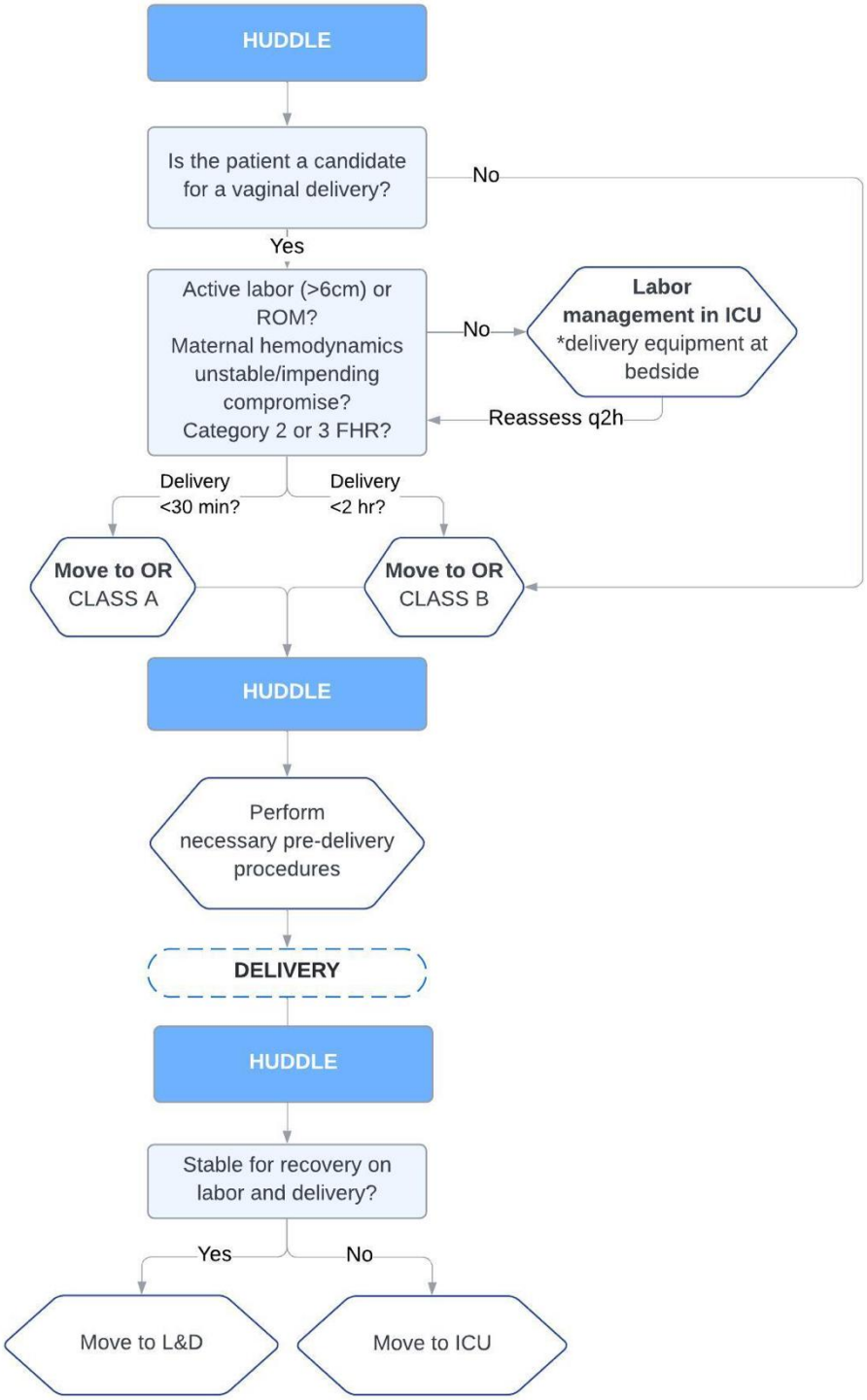
ICU Emergency Delivery Equipment

- Vaginal delivery tray +/- forceps
- Cesarean delivery tray
- Neonatal warmer
- Airway tower
- Terbutaline or nitroglycerine for uterine relaxation
- Postpartum hemorrhage medications, including pitocin, misoprostol and hemabate/methergine if appropriate and tamponade device

*This guideline applies to critically ill patients requiring delivery.
Critically ill is defined as

- Requiring respiratory (>6L O2 nasal cannula) support, OR
- Requiring vasopressor or vasodilator (nicardipine) support, OR
- At high risk of cardiac decompensation defined as mWHO Class IV that cardiac care team has recommended pre-delivery ECMO cannulation.

Delivery Algorithm for the Critical Care Patient*
Planned OR Delivery



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Team Roles and Responsibilites
Planned Vaginal Delivery
Delivery in ICU

LABOR

OB MD	OB RN and OB Staff	Anesthesia	ICU	NICU	Additional Teams
• Lead huddle pre-labor • Communicate with OB staff, assigned anesthesia attending, consulting teams • MFM MD in house • OB MD evaluate q2 hours • Inform anesthesia and main OR staff of move to OR, class per algorithm	• Join huddle • OB RN to call NICU • OB RN to remain a bedside to monitor fetal heart tones, manage labor medications • Ensure delivery equipment at bedside, including forceps and labor bed	• Join huddle • Manage anesthesia in ICU • Discuss emergency airway preparation with ICU team • Communicate with anesthesia MD coordinator • Transport patient to OR as needed	• Join huddle • ICU physician to manage respiratory support, hemodynamic support, and invasive monitoring • ICU RN to manage hemodynamic monitors and infusions other than pitocin	• Join huddle if needed • Prepare warmer at ICU bedside	• OR staff to hold OR for patient • CT Surgery team aware of patient, join pregnancy huddle as needed

DELIVERY

OB MD	OB RN	Anesthesia	ICU	NICU	Additional Teams
• Lead huddle at beginning of active labor • Inform main OR, anesthesia and CT surgery of patient status • Perform delivery, provide assistance with forceps as needed	• Join huddle • OB RN to monitor fetal heart tones, assist OB physician • OB RN to manage labor medications, PPH meds • OB RN to call NICU for delivery •	• Join huddle • Provide anesthesia appropriate for current clinical condition • Anesthesia MD present for second stage • Ensure appropriate anesthesia for assisted delivery if needed	• Join huddle • ICU physician to manage critical care needs • ICU RN to manage hemodynamic monitors and infusions other than pitocin	• Respond to call from OB RN • Resuscitate neonate	• Main OR staff, CT surgery team, and additional teams to be aware of patient status, available if needed

POSTPARTUM

OB MD	OB RN	Anesthesia	ICU	NICU	Additional Teams
• Lead postpartum huddle • Complete handoff with ICU team • Maternal fetal medicine to round daily	• Join huddle • OB RN to monitor postpartum recovery in ICU for 1 hour • OB RN to complete handoff to primary ICU RN/5W RN if bleeding stable • Ensure breast pump available as needed	• Join huddle • Manage regional anesthesia if epidural catheter remains in place • Advise on postpartum pain plan	• Join huddle • Primary team for 24-48 hours pospartum • ICU RN to be primary RN	• Remove warmer from ICU if needed	• Consulting teams to round at least one day postpartum

Team Roles and Responsibilites
Planned Vaginal Delivery
Delivery in OR

ICU

OB MD	OB RN and OB Staff	Anesthesia	ICU	NICU	Additional Teams
• Lead huddle pre-labor • Communicate with OB staff, assgined anesthesia attending, consulting teams • MFM MD in house • OB MD evaluate q2 hours • Inform assigned anesthesia attending and main OR staff of move to OR, class per algorithm	• Join huddle • OB RN to call NICU • OB RN to remain a bedside to monitor fetal heart tones, manage labor medications • Ensure delivery equipment at bedside, including forceps • OB Scrub tech available for delivery if available	• Join huddle • Manage anesthesia in ICU • Discuss emergency airway preparation with ICU team • Communicate with anesthesiology MD coordinator • Transport patient to OR when necessary	• Join huddle • ICU physician to manage respiratory support, hemodynamic support, and invasive monitoring • ICU RN to manage hemodynamic monitors and infusions other than pitocin	• Join huddle if needed • Prepare warmer at ICU bedside	• OR staff to hold OR for patient • CT Surgery team aware of patient, join huddle as needed

DELIVERY IN OR

OB MD	OB RN	Anesthesia	ICU	NICU	Additional Teams
• Lead pregnancy huddle in OR • Perform delivery, provide assistance with forceps as needed	• OB RN to monitor fetal heart tones, manage labor pitocin • OB RN to call NICU • OB RN to assist circulating OR RN in ensuring appropriate equipment available • OB Scrub tech to be present for delivery if available	• Provide anesthesia appropriate for current clinical condition • Manage all non-labor infusions, including vasopressors, insulin, epoprostenol, etc • Manage postpartum pitocin infusion	• Hold ICU bed for patient	• Respond to call from OB RN • Transport warmer to OR • Resuscitate neonate	• Circulating RN to collaborate with OB RN and OB scrub tech as needed • OR staff to supply scrub tech • Cardiothoracic Surgery team to perform femoral line placement for ECMO cannulation if needed

POSTPARTUM

OB MD	OB RN	Anesthesia	ICU	NICU	Additional Teams
• Lead postpartum huddle • Complete handoff with ICU team • Maternal fetal medicine to round daily	• Join huddle • OB RN to monitor postpartum recovery in ICU for 1 hour • OB RN to complete handoff to primary ICU RN/5W RN if bleeding stable • Ensure breast pump available as needed	• Transport patient to ICU • Join huddle • Complete handoff with ICU team • Manage regional anesthesia if epidural catheter remains in place • Advise on postpartum pain plan	• Join huddle • Primary team for 24-48 hours pospartum • ICU RN to be primary RN	• Remove warmer from OR if needed	• Cardiothoracic surgery to decannulate as appropriate • Operating teams to round at least one day postpartum • Lactation to round daily

Team Roles and Responsibilites
Planned Cesarean Delivery

PRE-DELIVERY

OB MD	OB RN and OB Staff	Anesthesia	ICU	NICU	Additional Teams
• Lead huddle preoperatively • Communicate with OB staff, assigned anesthesia attending, consulting teams • Accompany patient to OR	• Join huddle • OB RN to call NICU • OB RN to accompany patient to OR • OB RN to monitor fetal heart tones • OB RN to bring main OR cart from L&D • OB scrub tech to prep OR ahead of cesarean (if available)	• Join huddle • Determine type of anesthesia • Call cell saver • Bring necessary PPH medications from L&D • Accompany patient to OR • Communicate with anesthesia MD coordiantor	• Join huddle if needed • Hold ICU bed for patient as needed	• Join pregnancy huddle if needed • Prepare warmer in OR	• OR staff to join huddle • OR staff to prepare OR • Cardiothoracic Surgery team aware of patient, join pregnancy huddle as needed • Additional teams to join huddle as needed

OPERATING ROOM

OB MD	OB RN	Anesthesia	ICU	NICU	Additional Teams
• Lead preoperative huddle in OR • Perform obstetrical surgery	• OB RN to monitor fetal heart tones throughout ALL procedures* • OB RN to assist circulating OR RN • OB scrub tech to assist with OB surgery if available	• Provide anesthesia appropriate for current clinical condition	• Hold ICU bed for patient	• Resuscitate neonate	• Circulating RN to collaborate with OB RN and OB scrub tech as needed • Cardiothoracic Surgery team to perform femoral line placement for ECMO cannulation if needed

POSTPARTUM

OB MD	OB RN	Anesthesia	ICU	NICU	Additional Teams
• Complete handoff with ICU team • Maternal fetal medicine to round daily	• OB RN to monitor postpartum recovery in ICU for 1 hour • OB RN to complete handoff to primary ICU RN/5W RN if bleeding stable • Ensure breast pump available as needed	• Complete handoff with ICU team • Manage regional anesthesia if epidural catheter remains in place • Advise on postpartum pain plan	• Primary team for 24-48 hours pospartum • ICU RN to be primary RN	• Remove warmer from OR if needed	• Cardiothoracic surgery to remove lines as appropriate • Operating teams to round at least one day postpartum • Lactation to round daily

***Procedures requiring external fetal monitoring (with sterile EFM/ultrasound) include epidural, line placement, VIR procedures**

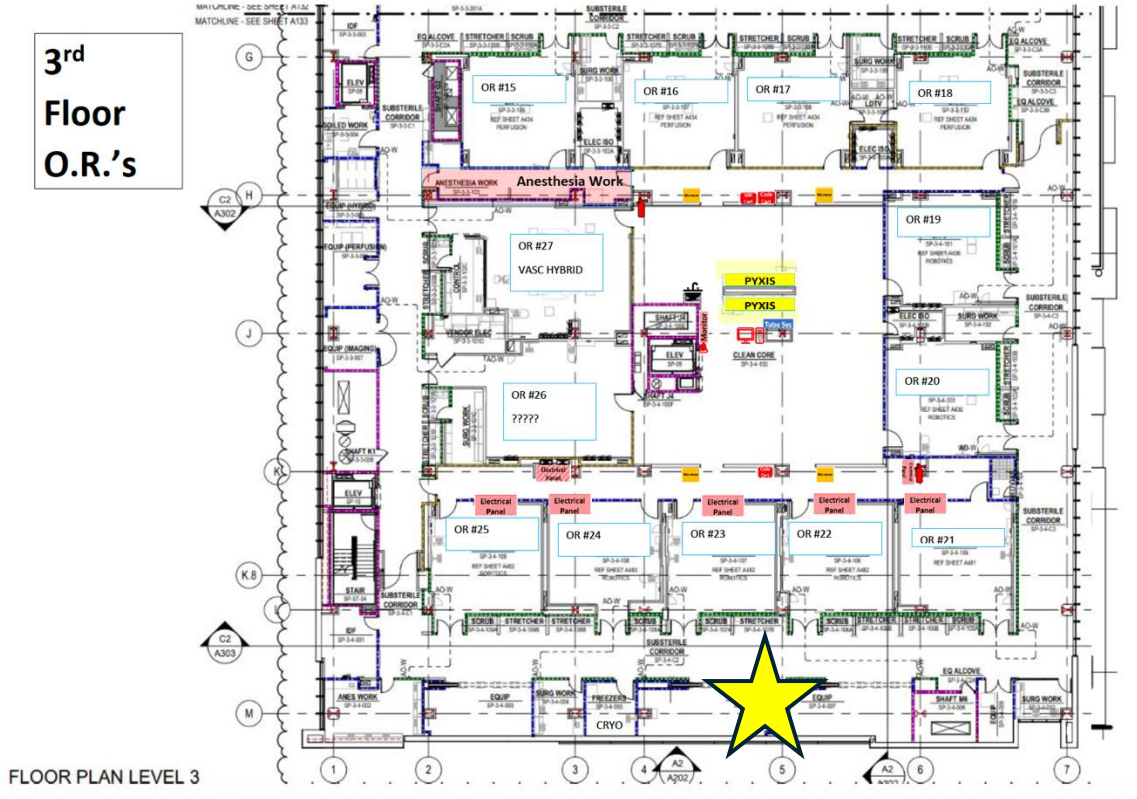
Delivery Supplies
for deliveries outside of 4 Women's Hospital

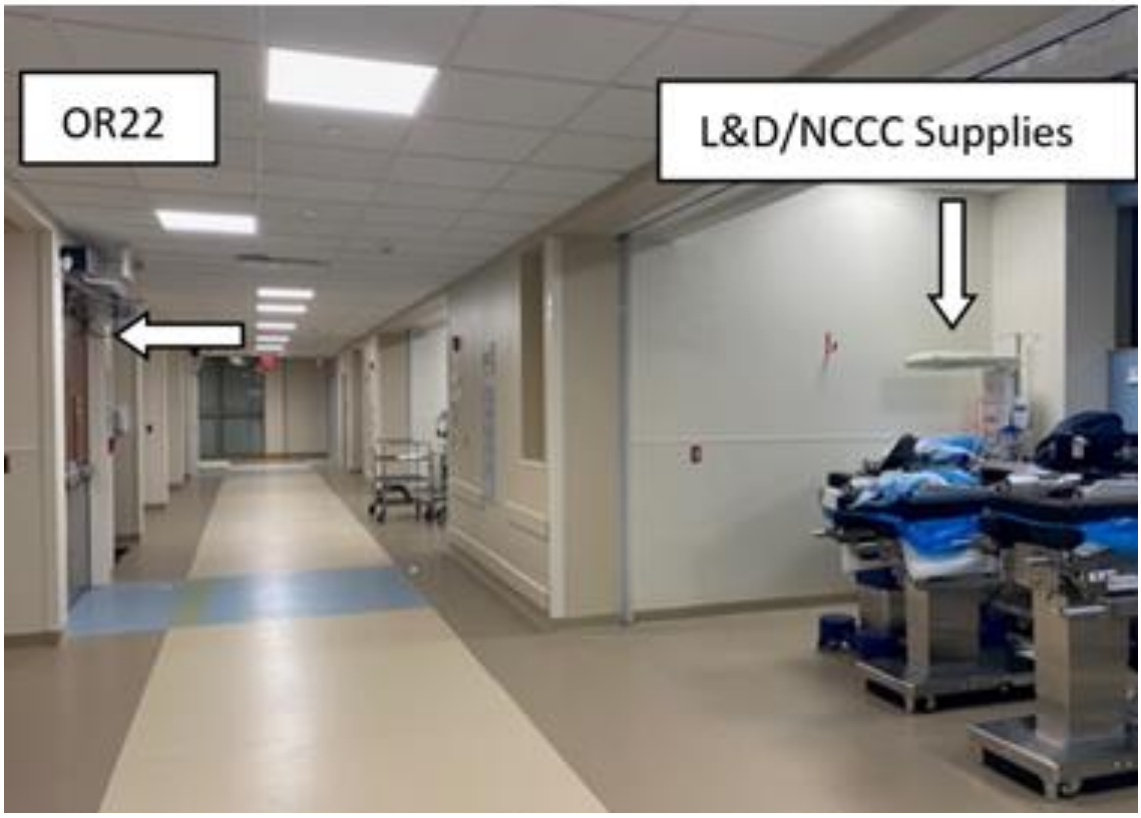
Vaginal Delivery	C-Section Delivery	General Supplies

• Vaginal instrument tray
• Vaginal delivery pack
• Forceps – Simpson, Tucker-McLane, other if requested by MD
• Sutures:
  ○ 3-0 Rapide
  ○ 4-0 SH
• 2 packs of laps
• Vaginal packing x1
• Vaginal Delivery Triton
• Exactomed adapter for lidocaine
• 10mL syringe and needle for lidocaine
• Sterile Gloves
• Sterile Lube for exams
• Amnihook
• IUPC and Cable
• FSE and Cable
 	
*If laboring - L&D labor bed or stretcher with stirrups
	• C-section tray
	• C-Section Pack
	• PAS red tray if Hyst tray is going to be used
	• Alexis – L & XL
	• Traxi with extender
	• Large tegaderms x4
	• Sutures:
	  ○ 0 CT-1 monocryl
	  ○ 0 CTX vicryl
	  ○ 3-0 CT-1 vicryl
	  ○ 0 CT -1 vicryl
	  ○ 4-0 PS-2 monocryl
	• Telfa, Abdominal Pad, Blue Tape
	• Sterile Gown for baby RN
	• OR triton machine
	• Triton QR card
	• Under buttocks drape
	• Disposable Scissors
	• Sterile probe cover x2
	• Sterile gel x4
		• Roamer with all cables
		• Ultrasound Gel for EFM
		• Ultrasound machine
		• Kiwi Vacuum x2
		• Bakri, Drainage Bag, Bowl
		• Jada
		• Speculum x2
		• Blue peri-pad x5
		• Cord clamps x 2
		• Cord Blood Gas Syringes x2 and 2 extra needles
		• Cord blood type – 10 ml syringe, 18G needle, centrifuge tube
		• Baby Hats x2, Diaper, Bulb Suction
		• Thermometer
		• Infant Warmer
		• Infant Stethoscope
		• NCCC emergency bag

Neonatal Warmer Location

for deliveries outside of 4 Women's Hospital on 3rd floor of North Carolina Surgical Hospital





INPATIENT ACUTE HTN TREATMENT ALGORITHM for the OBSTETRIC PATIENT
≥20 weeks pregnant OR pregnancy within last 6 weeks

ACOG Practice Bulletin 222, 2020
Adapted from the CMQCC Preeclampsia Toolkit
IP OB HTN p 1 of 2 ver 2.0
UNCH OB HTN Work group 4/2024

Vitals ← Routine assessment by RN → Symptoms

SBP ≥160 and/or DBP ≥110
SEVERE HYPERTENSION
Repeat BP in 15 minutes

At risk for seizure, stroke, death, consider preeclampsia

RN to notify clinician via Vocera:
"BP is XX/XX, severe range, in room XX, will call back after 15 minute recheck"

- Headache, visual complaints (most common precursor to eclampsia)
- Altered mental status, seizure, CVA
- Abdominal pain-especially RUQ, epigastric pain
- SOB, pulmonary edema
- Oliguria

Consider preeclampsia; consider magnesium for seizure prevention

First: MEASURE BP *(Accurate BP Video)*

SBP ≥160 and/or DBP ≥110
SEVERE HYPERTENSION

At risk for seizure, stroke, death; needs treatment STAT

RN
- Vocera: "15 min recheck in room XX, BP XX/XX, severe range, I am requesting immediate bedside evaluation"
- Seizure precautions

Clinician
- Immediate bedside evaluation
- Ensure IV access
- Order anti-hypertensives per order set
- *Epic: OB IP Management of Hypertension→OB Hypertensive Emergency Medications*
- Initiate oral antihypertensive
- Obtain labs: CBC, CMP, Urine protein/creatinine ratio
- Consider magnesium for seizure prevention
- Continuous EFM if indicated

Serial BP Monitoring
- Q 10 min X 1 hr
- Q 15 min X 1 hr
- Q 30 min X 1 hr
- Q 1 hr X 4 hr

SBP 140-159 / DBP 90-109
HYPERTENSION

RN
- Vocera: "15 min recheck in room XX, BP XX/XX, not severe range, I am requesting bedside evaluation"
- Serial BP Q 15 min X 1 hr

Clinician
Bedside evaluation
- Ensure IV access
- Consider increasing oral antihypertensive dosage <u>if chronic HTN</u>
- *Epic: OB IP Management of Hypertension->OB Hypertension (NON-Emergency)*
- Obtain labs: CBC, CMP, Urine protein/creatinine ratio
- Consider magnesium for seizure prevention
- Continuous EFM if indicated

SBP < 140 / DBP < 90
NORMAL BP with symptoms

Patients with symptoms may develop preeclampsia with severe features with abnormal BP

RN
- Vocera: Patient in room XX has symptoms of preeclampsia including XX, normal BP XX/XX, normal.I am requesting bedside evaluation"

Clinician
- Bedside evaluation
- Consider serial BP Q 15 min X 1 hr
- Consider IV access
- Obtain labs: CBC, CMP, Urine protein/creatinine ratio
- Continuous EFM if indicated

IF BP INCREASES TO SBP >=160 and/or DBP >=110
Move to **SEVERE HYPERTENSION** pathway
Notify clinician if patient condition changes

Preeclampsia with severe features:
- SBP ≥160 and/or DBP ≥110 sustained over 15 minutes
  OR
- SBP ≥140 and/or DBP ≥90 on 2 occasions ≥4 hours apart <u>AND</u>
  - Thrombocytopenia (<100,000)
  - Impaired liver function that is not accounted for by alternative diagnoses indicated by abnormally elevated liver enzymes or by severe persistent right upper quadrant or epigastric pain
  - Renal insufficiency (> 1.0 creatinine)
  - Pulmonary edema
  - New-onset headache unresponsive to medication and not accounted for by alternative diagnoses
  - Visual disturbances

OB ANTI-HYPERTENSIVE TREATMENT ALGORITHM FOR HYPERTENSIVE EMERGENCIES

Treatment recommendations for sustained **SBP >=160 and/or DBP >=110**

Anti-hypertensive treatment and magnesium sulfate should be administered simultaneously. If concurrent administration is not possible, anti-hypertensive treatment should be first priority

Epic orders: OB IP MANAGEMENT OF HYPERTENSION->OB HYPERTENSIVE EMERGENCY MEDICATIONS, OB MAGNESIUM IV
Pharmacy guidelines (UNCH): *Management of OB Hypertension, Obstetric Magnesium*
Nursing policy: *Severe Hypertension in Pregnancy and the Postpartum Period*

Initiate IV labetalol:
- Repeat blood pressure check **every 10 minutes** while severe range BP persists
- Administer over 2 minutes
  - First dose: 20mg
  - Second dose: 40mg
  - Third dose: 80mg
- If severe range BP persists 10 minutes after third dose, administer **hydralazine 10mg IV**, then repeat BP in **20 minutes**
- If severe range BP persists 10 minutes after third dose, administer **hydralazine 10mg IV**, then repeat BP in **20 minutes**
- If severe range BP persists, consider additional antihypertensive medications and consult MFM or critical care

- Max dose: 300mg/24hr
- Hold for heart rate <60
- Avoide with active asthma, heart disease, heart failure

Initiate IV hydralazine:
- Repeat blood pressure check **every 20 minutes** while severe range BP persists
- Administer over 2 minutes
  - First dose: 5mg
  - Second dose: 10mg
- If severe range BP persists 20 minutes after second dose, administer **labetalol 20mg IV**, then repeat BP in **10 minutes**
- If severe range BP persists 10 minutes after labetalol, administer **labetalol 40mg IV**, then repeat BP in **10 minutes**
- If severe range BP persists, consider additional antihypertensive medications and consult MFM or critical care

- Max dose: 20mg/24hr

Initiate immediate release oral nifedipine:
- Repeat blood pressure check **every 20 minutes** while severe range BP persists
- Administer orally
  - First dose: 10mg
  - Second dose: 20mg
  - Third dose: 20mg
- If severe range BP persists 20 minutes after third dose, administer **labetalol 20mg IV**, then repeat BP in **10 minutes**
- If severe range BP persists, consider additional antihypertensive medications and consult MFM or critical care

- Max dose: 50mg/24hr

For recurrent seizures while on magnesium

1. Secure airway and maintain oxygenation
2. Give 2nd loading dose of magnesium 2-4 gm over 5 minutes
3. If patient still seizing 20 minutes after 2nd magnesium bolus, consider either:
   a. Midazolam 1-2 mg IV, may repeat in 5-10 minutes OR
   b. Diazepam 5-10 mg slow IV push, may repeat q 15 minutes to max of 30 mg OR
   c. Lorazepam 2 mg IV over 1 minute X2 total 4 mg. May repeat in 3-5 min for continued seizure

Target BP: 130-150/80-90 mmHg

Once target is achieved:
- Q 10 min X 1 hr
- Q 15 min X 1 hr
- Q 30 min X 1 hr
- Q 1 hr X 4 hr

ACOG Practice Bulletin 203, 2019
Adapted from CMQCC toolkit
IP OB HTN p 2 of 2 ver 2.0
UNCH OB HTN Work group 3/2024

CARDIAC ARREST

PRESENTATION: pulseless ventricular tachycardia/fibrillation, pulseless electrical activity, aystole

GOAL: PERIMORTEM CESAREAN DELIVERY WITHIN 5 MINUTES FOR >20 WEEKS GESTATION

- Fetal monitoring should NOT guide timing of delivery

START:

- ☐ ***Call for help – Code Blue & Code Stork***
- ☐ **Begin CPR, Do Not Delay**
- ☐ *Bring code cart & cesarean section tray*

LEADER designates
- **Checklist reader**
- **Time Keeper + Scribe**
- **Patient & Family Communicator**

- ☐ Position patient supine on backboard
  - o Manual uterine displacement
- ☐ Establish venous access above diaphragm (humeral IO if no IV access)
- ☐ Draw STAT labs
- ☐ **STOP** sedating medications, epidural, and/or inhalational agent
  - o If on magnesium, give calcium gluconate/chloride
- ☐ **Proceed with ACLS algorithm - See next page**
  - o 100 compressions per minute (rotate every 2 mins)
  - o 2 breaths every 30 compressions (1 every 6 secs if intubated)
  - o Place AED and assess rhythm
  - o Pulse and rhythm check (every 2 mins)
  - o Administer epinephrine
- ☐ **CONSIDER PERIMORTEM CESAREAN DELIVERY**

DEFIBRILLATON – V-FIB/V-TACH:

- Turn on defibrillator and set on DEFIB mode, 120J
- Press CHARGE, do not touch patient, press SHOCK
- Increase to 200J for next shock if no response

DRUG DOSES AND TREATMENTS:

Epinephrine (0.1mg/mL)
- Dose: 1 mg IV/IO every 3-5 minutes

Amiodarone – Refractory VT/VF
- Dose: 300 mg IV/IO, then 150 mg IV/IO

Magnesium sulfate – Torsades de Points
- Dose: 2 grams IV/IO

Sodium bicarbonate (8.4%) – consider for pH <7.2
- Dose: 50 mEq x 1

DIFFERENTIAL DIAGNOSIS: H'S & T'S

Hydrogen (Acidosis)	Thrombosis (coronary/pulmonary)
Hypo/hyperkalemia	Toxins
Hypo/hyperthermia	Tamponade
Hypoxia	Tension pneuomothorax
Hypoglycemia	Trauma

Anaphylaxis (Card 3), *Difficult Airway* (Card 7), *Hemolytic Transfusion Reaction* (Card 17), *Hemorrhage* (Card 9), *LAST* (Card 12), *Magnesium Toxicity* (Card 13), *Opioid Overdose* (Card 1), *Sepsis* (Card 15)

LABORATORY STUDIES:

- Arterial Blood Gas
- Complete Metabolic Panel
- Complete Blood Count
- Fibrinogen
- PT/PTT/INR
- Urine Drug Screen

**Consider BNP, blood cultures, magnesium level, troponins, serum tryptase*

POST-EVENT PLANNING:

- Maternal echocardiography – TTE or TEE
- Order STAT chest X-ray & 12 lead ECG
- Consider arterial line
- Initiate targeted temperature management (TTM)
- Transfer to ICU
- Communicate with family

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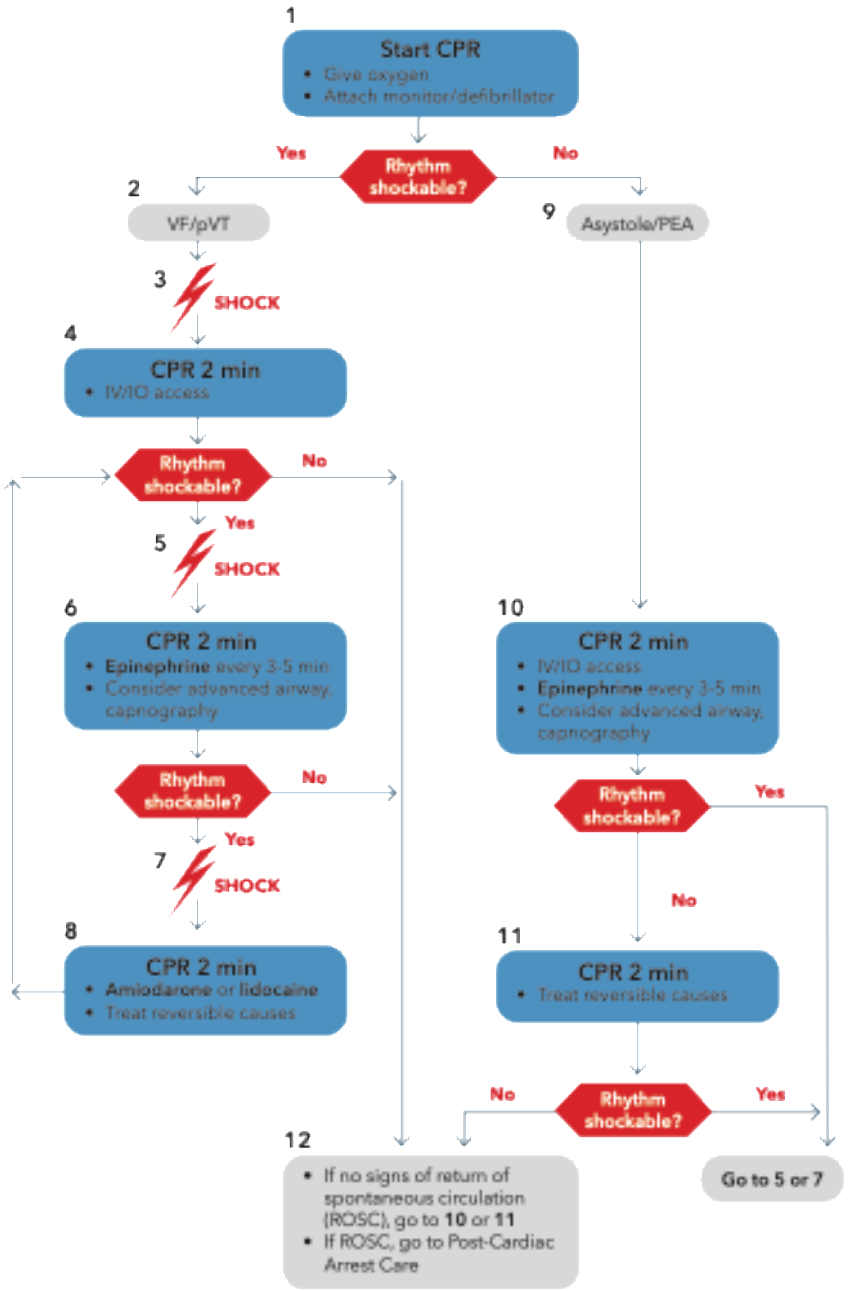
Version 2; 10/22/2022



CPR QUALITY:

- Push hard (at least 2 inches [5 cm] and fast (100-120/min) and allow complete chest recoil.
- Minimize interuptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If $PETCO_2$ <10 mm Hg, attempt to improve CPR quality.
- Intra-arterial pressure
  - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality.

SHOCK ENERGY FOR DEFIBRILLATION:

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

DRUG THERAPY:

- **Epinephrine IV/IO:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO:** First dose: 300 mg bolus.
  Second dose: 150 mg.
  – OR –
  Lidocaine IV/IO dose: First dose 1-1.5 mg/kg.
  Second dose: 0.5-0.75 mg/kg.
  – Max: 3mg/kg

ADVANCED AIRWAY:

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

RETURN OF SPONTANEOUS CIRCULATION (ROSC):

- Pulse and blood pressure
- Abrupt sustained increase in $PETCO_2$ (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

STOP

2018 American Heart Association Focused Update on Advanced Cardiovascular Life Support Use of Antiarrhythmic Drugs During and Immediately After Cardiac Arrest, 2018