

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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Who do I call for help?

When you need the OB team:

Time of day	Who responds	How to call
Weekday (7AM – 6PM)	Resident or fellow on the maternal fetal medicine service	Vocera (or *33 via phone) “OB Ante Resident” or “OB Ante Fellow”
Night (6PM – 7AM) <i>or</i> Weekend	Chief resident on call for the obstetric service	Vocera (or *33 via phone) “OB Chief”

When you have an EMERGENCY:

	Who responds	When to call	How to call
CODE STORK	Activates OB, OB Anesthesia and NICU teams	Labor/delivery emergencies Maternal cardiac arrest	Vocera (or *33 via phone) “Call Emergency”
CODE BLUE	Activates Code team	Maternal cardiac arrest	Vocera (or *33 via phone) “Call Emergency”
ECMO TEAM	Activates ECMO team	Maternal cardiac arrest	Vocera (or *33 via phone) “ECMO First Responder” <u>and</u> page VA ECMO attending

ICU Placement Suggestions for High Risk OB Patients*

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

ANTEPARTUM		CTCCU***	STCCU***	CICU	MICU	BURN ICU	NSICU
		• Laboring <u>AND</u> mWHO class IV with critical care needs • High risk for ECMO antepartum due to cardiac problem	• Laboring <u>AND</u> non-cardiac critical care needs • High risk for ECMO due to maternal disease (non-cardiac)	• Cardiac patients with critical care needs before the threshold of fetal viability*; later in gestation pending attending discussion • Nicardipine**	• Non-cardiac non-surgical critical care needs <u>AND</u> low risk for delivery • DKA, ARDS, hypertensive urgency if <24 weeks	• Obstetric patients with burns needing ICU level care • Laboring to be moved to STCCU	• Obstetric patients with neurocritical care needs • Laboring to be moved to STCCU
POSTPARTUM		CTCCU***	STCCU***	CICU	MICU	BURN ICU	NSICU
		• 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 and 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, but a trial of neonatal intensive care can be considered at births ≥22 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

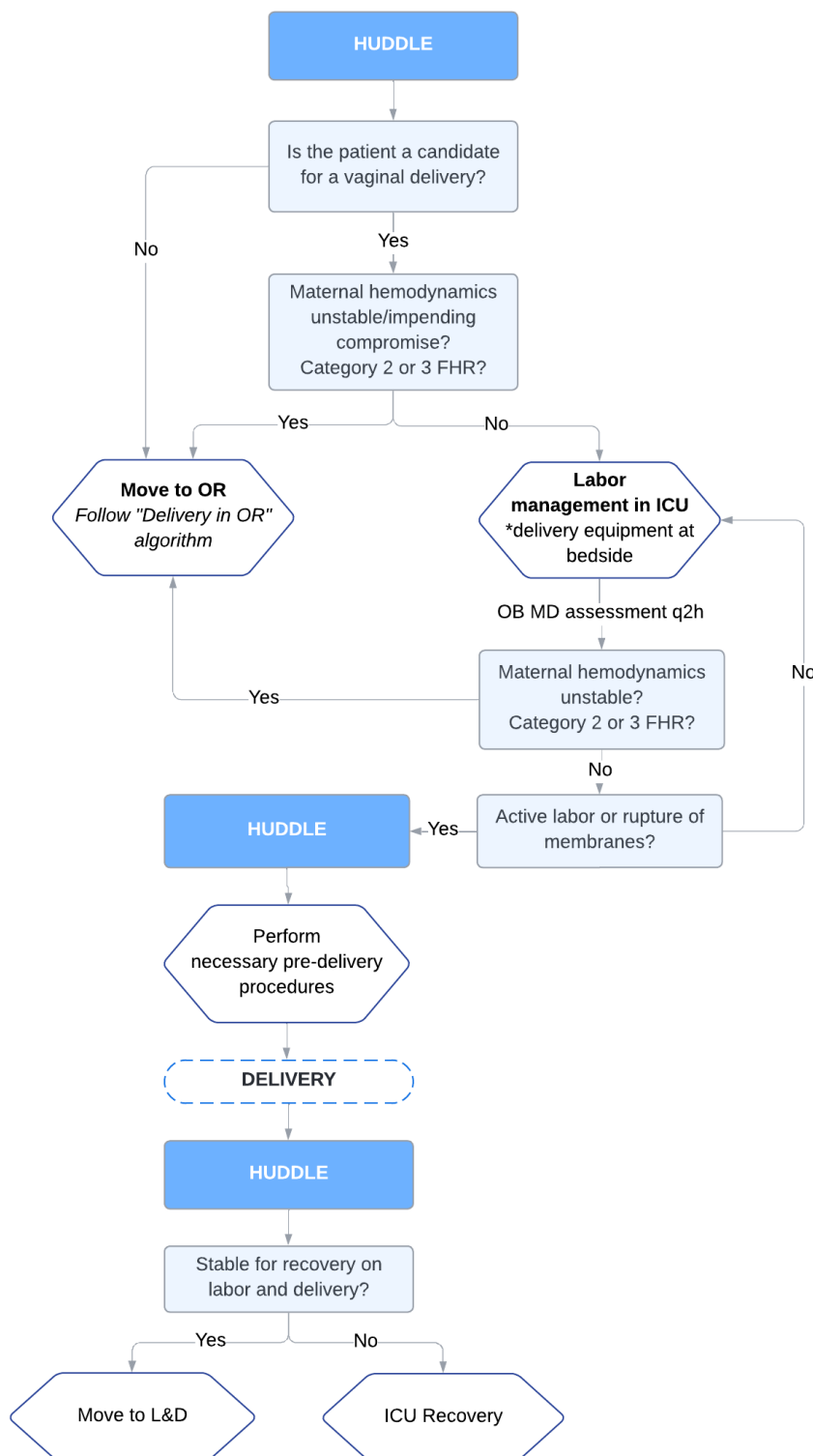
***OB to remain primary team in CTCCU and STCCU as those are semi-open units (though orders are placed by ICU teams), MICU and CICU to be primary team for patients in those units

Abbreviations:

CTCCU: Cardiovascular and Thoracic Critical Care Unit; STCCU: Surgical Trauma Critical Care Unit

Delivery Algorithm for the Critical Care Patient*

ICU vaginal delivery



Huddle team members

- Maternal fetal medicine MD
- OB RN
- OB Anesthesia MD
- 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 hemodynamic 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
- NICU aware
- Additional teams/procedures needed
- Postpartum plan
 - Disposition
 - Anticipated critical events
 - Risk of hemorrhage, medication contraindications

ICU Emergency Delivery Equipment

- Labor bed
- 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

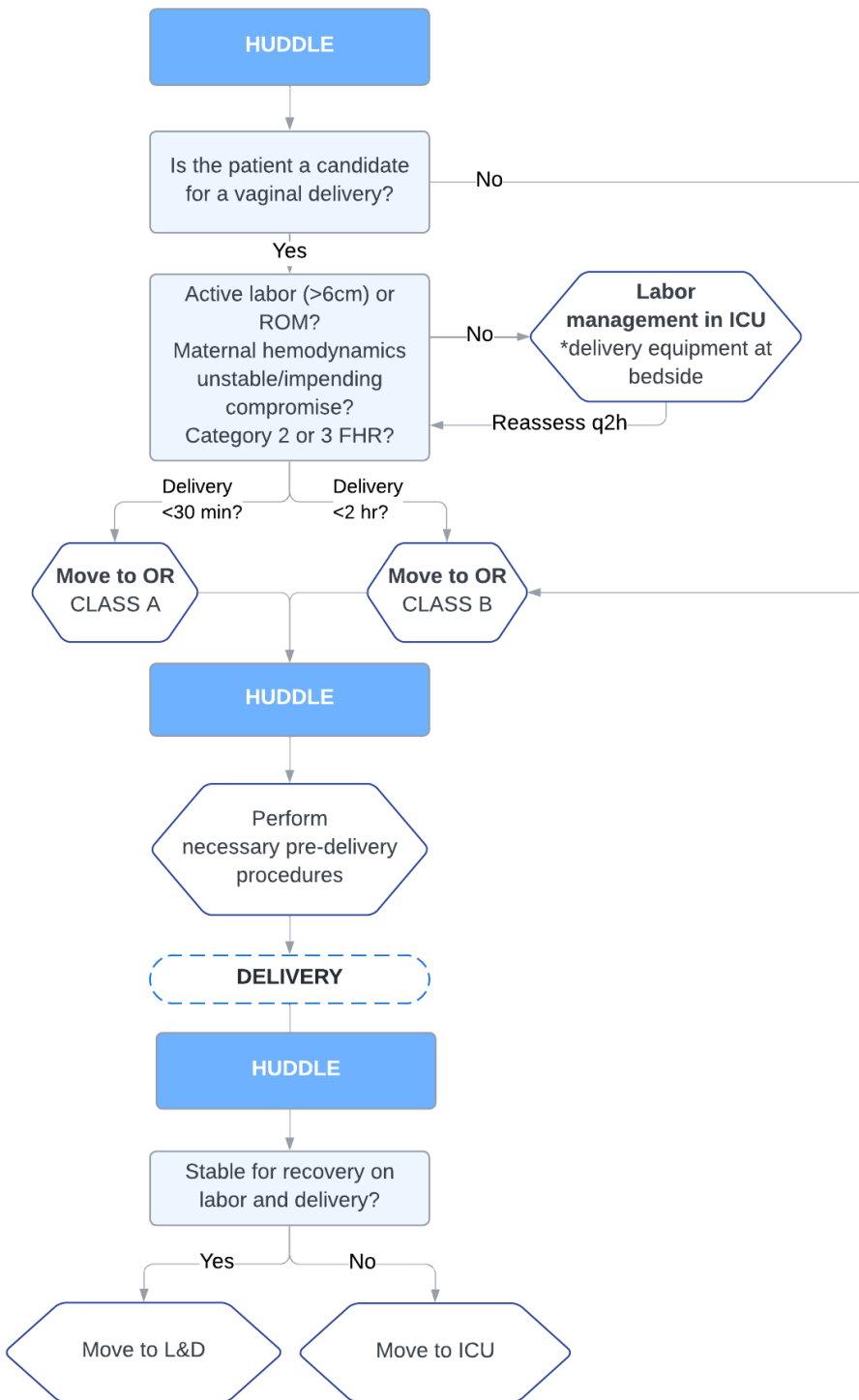
*This guideline applies to critically ill patients requiring delivery.

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



Huddle team members

- Maternal fetal medicine MD
- OB RN
- OB Anesthesia MD
- 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 hemodynamic 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
- Inform NICU
- 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.

Team Roles and Responsibilities

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 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 postpartum • ICU RN to be primary RN	• Remove warmer from ICU if needed	• Consulting teams to round at least one day postpartum

Team Roles and Responsibilities

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, assigned 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 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 postpartum • 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 Responsibilities

Planned Cesarean Delivery

PREF-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 coordinator	• 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/SW 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 postpartum • 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

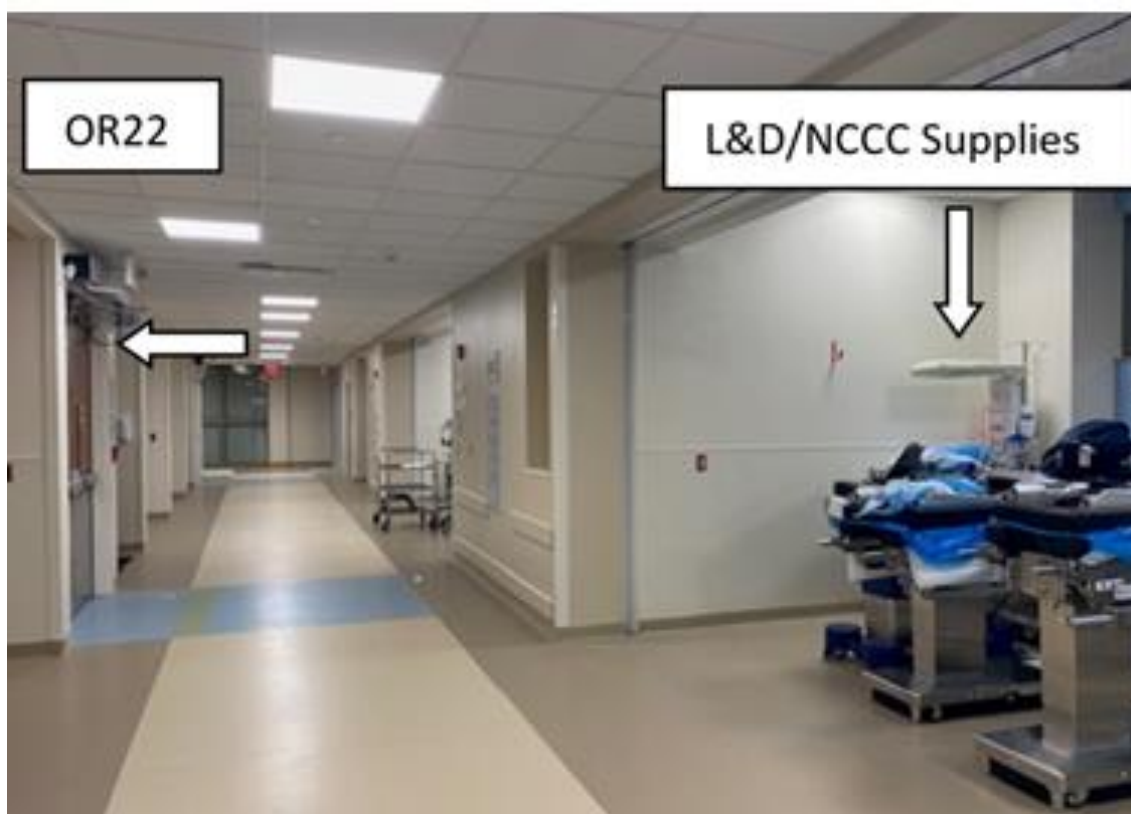
*Procedures requiring external fetal monitoring (with sterile EFM/ultrasound) include epidural, line placement, VIR procedures

Delivery Supplies

for deliveries outside of 4 Women's Hospital

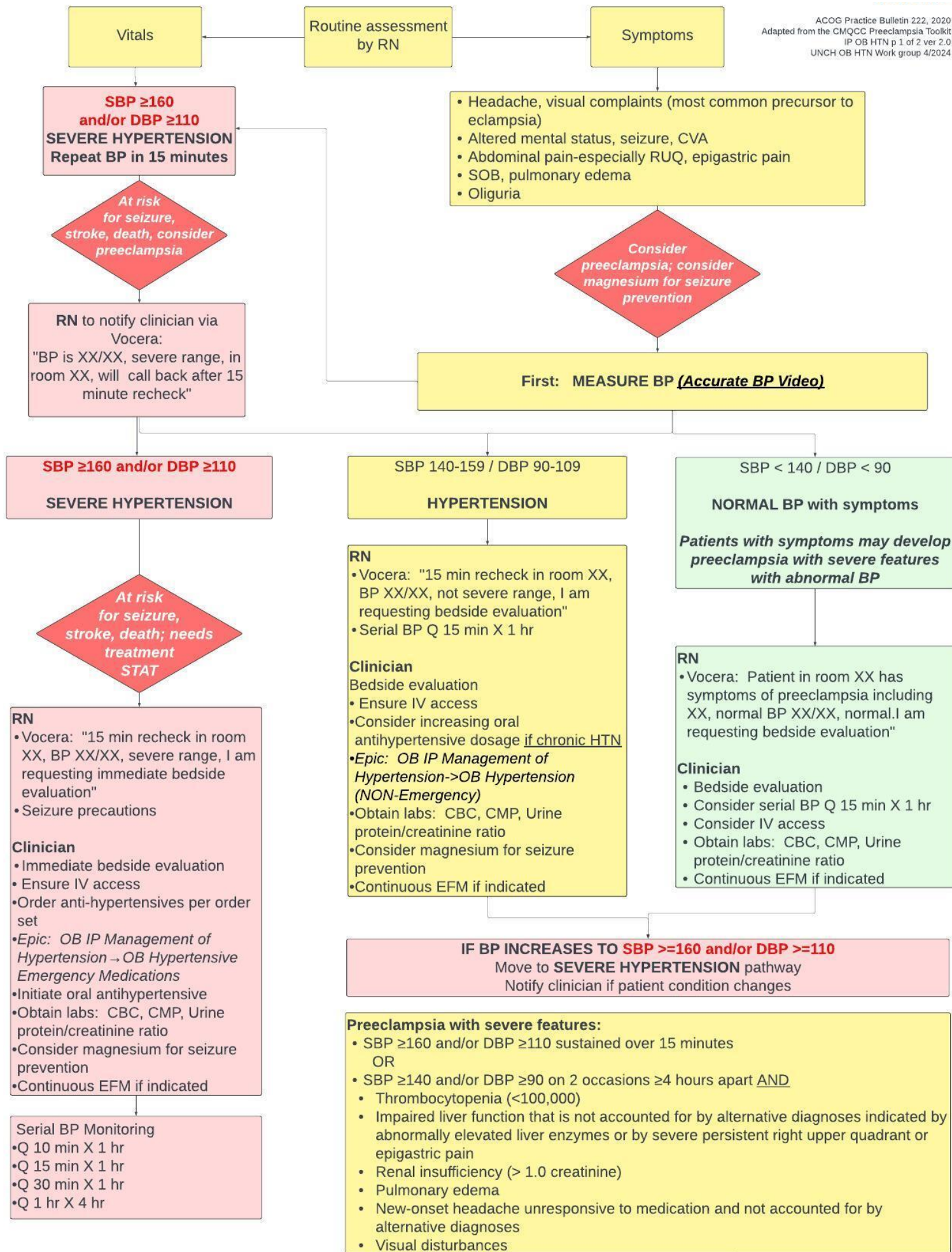
Vaginal Delivery	C-Section Delivery	General Supplies
• Vaginal instrument tray • Vaginal delivery pack • Forceps – Simpson, Tucker-McLane, other if requested by MD • Sutures: ○ 3-0 Rapide ○ 4-0 SH • 2 packs of laps • Vaginal packing x1 • Vaginal Delivery Triton • Exactomed adapter for lidocaine • 10mL 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 emergency 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



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
- Avoid 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