Maternal Hypertension with Postpartum Hemorrhage (PPH)

Facilitators

Objectives

1. Demonstrate clear team and patient communication during obstetric emergencies
2. Demonstrate timely treatment for severe maternal hypertension (MHTN)
3. Demonstrate initiation of magnesium sulfate IV therapy
4. Utilize quantitative blood loss to identify staged based postpartum hemorrhage (PPH) management needs
5. Demonstrate interventions for postpartum hemorrhage according to ACOG staged recommendations

Simulation Modality

Low fidelity with MamaNatalie and NeoNatalie. Option to adjust per facility resources.

Roles in Scenario

Standardized patient, Primary Nurse, Baby Nurse, Delivering provider.

Optional per facility resources and group sizes: Charge Nurse, Patient support person, Documenter, Observer (checklist), Surgical Tech, Respiratory Therapy, House Supervisor, Unit Secretary, Anesthesia, etc.

Recommend no more than 5-7 in scenario so all can fully engage.

Pilot date and attendee plan

Plan to trial at least 1 week prior to allow adjustments in session, supply gathering, etc.

Materials list and set up details

Mama Natalie: Load with mock blood and baby. Utilize protectant mat	Maternal Vital Signs and EFM (print out or verbalize)	Nonrebreather O2 Mask	Unit PPH Cart with Small scale for Quantitative Blood Loss (QBL), Jada, Bakri, etc.
Delivery set up sterile table with vag laps, instruments and placenta basin	Supplies for Mock 2nd IV	Wall suction device and padded side rail device	3 chux with mock blood (red food coloring and water) prepared for QBL weights
Baby blankets, hat, neo stethoscope, bulb suction.	Urinary catheter or Straight Cath kit	Mock HTN Medications (Nifedipine, MgSo4 bolus and maintenance) Mock PPH medications (Pitocin, Methergine, Cytotec, TXA)	Administration devices (syringes, needles)
Standardized patient with mock IV (drain to floor), wearing a gown and in patient bed / stretcher	Fluid resuscitation: 1L LR, NS, IV tubing and pressure bags	Mock Blood products appropriate for facility stock Mock lab results (see last page)	Team Resources: NPQIC Toolkit items or facility specific procedures

Session Dates, Times and Location

Plan for 1 hour sessions: 15 min pre brief, 20 min scenario, 15 min debrief and 10 minute reset.				

Interdisciplinary roles attending simulation:

Nursing, Surgical Tech, Providers

Participants sign up process, confidentiality form plan and session evaluation

Participant notification and reminder dates

Pre-work: *Optional*

Pre-brief and Confidentiality Agreements

- **Welcome:** Introduce purpose of session and review of Objectives
- **Overview of session:** Review management of Severe Maternal Hypertension and PPH. Then we will show you around the simulation room, assign roles and read the lead in. We will work through the scenario and then debrief together. There are feedback evaluations to help us improve future training.
- **Ground rules and Confidentiality Agreement:** Treat as real as possible. Request assistance as need from facilitators. What happens here stays here.
    - Commit to confidentiality for learning in this space (via form or verbal). We are here to work through processes so we can explore what things may be needed further developed or equipment obtained, etc. This is about the team.
- **Review expected Severe Maternal HTN recognition and response through Q&A:**
    - What blood pressure is considered Severe for maternal? Who is maternal?
        - SBP ≥160 and/or DBP ≥110 mmHg persists for 15 minutes or more.
        - Treat within 30-60 minutes of initial high pressure. Do not delay (epidural, pain, etc)
        - Pregnant through 6 weeks postpartum
    - What are the key elements of ensuring accurate blood pressure?
        - patient resting / not talking, cuff appropriate size and location, legs uncrossed
    - What are key assessments to be done on all pregnant and postpartum patients regarding pre-eclamptic symptoms?
        - neurological symptoms- headaches, changes in vision or blurry vision, DTRs, clonus, epigastric pain and shortness of breath

- What is given to help lower blood pressure? How often?
  - Review ACOG algorithms on Nifedipine and Labetalol, (optional hydralazine)
- What is given to decrease risk of seizures? What is bolus rate? Maintenance rate?
  - Magnesium sulfate, ideally in it's own IV.
  - Bolus 4g over 20-30 minutes, 6g for eclampsia.
  - Maintenance dose 20g/500mL at 2 g per hour. Other option is IM 5g in each buttock)
- What is to be assessed during MgSO4 infusion? (CMQCC Pre Eclampsia Toolkit, 2013)

	Severe Preeclampsia Intrapartum and Postpartum for women on Magnesium Sulfate
BP, Pulse, Respiration, SaO2	• Every 5 mins during loading dose and q30 mins during maintenance of magnesium sulfate infusion • Can change to every 60 mins if any one or more of the following criteria are met: ○ Preeclampsia without severe features (mild) ○ BP stable without increases for a minimum of 2 hours ○ No antihypertensives within last 6 hours ○ Antepartum patient ○ Latent phase of labor • Continuous SaO2 during magnesium infusion for intrapartum. For postpartum patient, check with vital signs
Lung sounds	Every 2 hours
Deep tendon reflexes & clonus, Level of consciousness Edema Assessment for headache, visual disturbances, epigastric pain	Every 4 hours
Temperature	Per facility protocol
Intake and output	Intake: • IV solutions and medication drips should all be on a pump • Total hourly intake should be ≤ 125 ml/hr • NPO with ice chips or as permitted by practitioner Output: • Insert foley with urometer Calculate hourly, end of shift, and 24-hour totals
Fetal status and uterine activity	Continuous fetal monitoring

- What should be considered ensuring in room environment?
  - Seizure precautions – suction and padded side rails, quiet and dark environment

- **Review expected Postpartum Hemorrhage recognition and response:**
  - What qualifies as a postpartum hemorrhage?
    - 500 mL blood loss for vaginal or 1000 mL cesarean
  - What are the '4Ts' or 'causes' of PPH to explore to guide necessary interventions
    - Tone #1!, Trauma, Tissue, Thrombin)
  - PPH requires a staged response based on level of bleeding (as assessed by QBL to the best of our ability) rather than all interventions at once. You can utilize tools as we discuss:
    - (OB Facilities) PPH Risk Assessments (AWHONN Resource) What are 3 risk factors for PPH?
    - Each stage of hemorrhage and key interventions (0-4)
    - Are there any contra-indications for any of theses medications?
      - Methergine not in hypertensive. Hemabate not in asthmatic. TXA not if history blood clots
    - Discuss facility blood product availability and processes to obtain more.

Orient to room (enter simulation space)

- Introduce the standardized patient wearing Mama Natalie. Explain the process to work as a team to care for hypertension, birth, and hemorrhage. Abilities to perform assessments, speak to patient per usual, vaginal exam of device, etc.
- Orient medications in space and how expected to administer.
- Relay what other equipment, materials and references are available in the space.
- Relay where to find vital signs, EFM and QBL.
- Discuss how to communicate to get more help, call lab, call provider, etc. during scenario.
- We will get roles, read the scenario lead in and then start supporting the patient with the hypertension, birth, and postpartum hemorrhage. We will then debrief.
- Leave space for further questions regarding space or objectives/session purpose.

Role delegation

Per facility role decisions in session

Scenario lead in

Molly Smith (she/her) is a 28-year-old G3P1 who presents complaints of a headache and blurry vision. She states she is 36.3 weeks and had postpartum pre-eclampsia after her first baby so knew she should come in to be seen. They report routine prenatal care with 'nothing out of range, all went smoothly' (we are working to get records). The only notable health history is asthma for which she takes an inhaler seasonally. No labs or assessments have been done so far as the patient has arrived.

Scenario

Assessment	Expected Participant Events:	Facilitator cues:
VS: HR 110. BP 163/76 RR 22 SpO2 97% RA EFM (for OB facilities) FHR: 135 minimal variability, no accels, no decels UC: Every 10 minutes VE 5/80/-1	❑ **Patient assessment including** ○ **OB history: GP, Provider, Gestation, ROM, allergies/home meds** ○ **Vital signs** ○ **Neuro assessment: vision, headache, DTR and clonus** ○ **RUQ pain** ○ **SOB and lung sounds** ○ **FHR/UC, palpate contractions** ○ **VE** ❑ **Reassess BP** ❑ **Administer 10mg PO Nifedipine** ❑ **Notify provider using SBAR+ repeat back orders:** ○ **Initiate full HTN protocol** ○ **Insert IV** ○ **MgSO4 IV bolus 4g over 20 minutes then run 20g/500mL at 2g/hr. Calcium gluconate available** ○ **CBC, CMP, UA, T&S** ○ **Seizure precautions** ○ **Coordinate transfer** ❑ **Repeat BP post intervention**	**'My head has been hurting since yesterday and Tylenol did not help'** • Facilitator: ***DTR 3+ bilateral, no clonus*** **'I have felt a few contractions; my other birth went very quickly'** • Facilitator: VE is 5/80/-1 • Facilitator: *2nd BP is 159/112* • Facilitator: *3rd BP is 163/110*

	❑ **Identify need to re-dose**	
Treatment	**Expected Participant Events:**	**Facilitator cues:**
VS: HR 90. BP 140/76 RR 20 SpO2 97% RA EFM now moderate variability VE complete	❑ **Discuss plan of care with patient** ❑ **Administer 20mg Nifedipine PO** ❑ **Initiate IV** ❑ **Initiate MgSO4 bolus** ❑ **Mag assessments:** ○ **Continuous SpO2** ○ **BP, HR and RR q 5 minutes until criteria met to go to q30 min** ○ **Respiratory and neuro assessment q4** ○ **Strict I/O (intake to 125/hr).** ○ **Foley if ordered** ○ **Continuous fetal monitoring** ❑ **Post 2nd dose BP reassess: WNL** ❑ **Provider reviews lab results**	**'Oh, I did have a seizure after my first baby when I got home'** • Facilitator: *4th BP is 151/90. About an hour after treatment trending 140/70s* • Facilitator: Give lab results
Birth	**Expected Participant Events:**	**Facilitator cues:**
VS: HR 100. BP 150/76 RR 22 SpO2 97% RA EFM (for OB facilities) FHR: 135 moderate variability, no accels, intermittent variables. UC: q 5 min	❑ ☐ Call for assistance ❑ ☐ Obtain precipitous delivery equipment ❑ ☐ SBAR to team as they arrive ❑ ☐ Coaching and support of patient ❑ ☐ Closed loop team communication ❑ Birth time noted ❑ Infant placed skin to skin ❑ Infant assessed while skin to skin ❑ Cord clamped after 60 seconds of life ❑ Prophylactic Oxytocin administered ❑ Placenta delivery time noted ❑ Placenta inspected (tissue) ❑ Fundal massage performed (tone)	• Patient: "Contractions worse and closer so I came in, now I'm feeling PRESSURE!" • Descend fetus so crowning • Painful response and panic • Yell 'this hurts!' • 'Agh get it out!' Infant cry after delivery. • 'Oh your okay, hi baby!'

Birth QBL 350 **(Stage 0)**	❑ Birth QBL measured (OB teams)	• Facilitator: *Baby is appropriate to stay skin to skin at this time.* • Facilitator: *Placenta is intact*
PPH	**Expected Participant Events:**	**Facilitator cues:**

VS: HR 110. BP 100/60 RR 22 SpO2 95% RA
 	
QBL now 600 **(Stage 1)**
 	
VS: HR 115. BP 90/55 RR 22 SpO2 92% RA
 	
QBL now 1000 **(Stage 2)**
	❑ Fundal massage continues
	❑ Provider inspects for tears or hematomas (trauma)
	❑ Assess patient VS during case
	❑ Assess fundus during case
	❑ Assess bladder
	❑ Measure 1st gush QBL and notify team
	❑ Obtain PPH cart or unit materials if not already present. Refer to cognitive aids.
	❑ First utero-tonic administered
	❑ Team identify contraindications
	  ○ Hemabate contraindication due to asthma
	  ○ Methergine for HTN
	❑ Team identify 'Tone' etiology
	❑ Remove infant from chest as patient states not feeling well
	❑ Order T&C for 2 units
	❑ Ensure second 16g or 18g IV
	❑ IV fluid bolus initiated
	❑ Measure 2nd gush QBL
	❑ Second line uterotonic (TXA not a uterotonic)
	❑ Initiate O2 mask
	❑ Blood products initiated
	❑ Initiate methods to warm patient or fluid products
		• 'Ugh, that is not comfortable, do you have to push my stomach?'
		• Facilitator: *No tears visualized.*
		• Facilitator: *Place bloody chux on to field. Additional QBL 250*
		• Patient: ensure fundus boggy, 1 above the umbilicus
		• 'Oh I felt a gush!'
		• 'I don't feel well, my ears are ringing'
		• Facilitator: *Place bloody chux on to field. Additional QBL 300= 900 total. 'Also, the gown is saturated (EBL 100)' so getting to be around 1000 mL*
		
		• *'I'm so cold, I think I'm going to throw up or faint'*

VS: HR 125. BP 80/45 RR 24 SpO2 89% RA **(Stage 3)**	❑ Provider request intrauterine device (Bakri or Jada) ❑ Call in OR team and Anesthesia to prepare for OR ❑ Prepare and place intrauterine device ❑ Maintenance set up for device (*Antibiotic if Bakri used)*	• Patient: Adjust to firm fundus • Facilitator: *Tone achieved. Bleeding stabilized*.
Recovery	**Expected Participant Events:**	**Facilitator cues:**
VS: HR 105. BP 98/60 RR 24 SpO2 94%	❑ Continue frequent VS and assessments ❑ Continue MgSO4 ❑ Debrief with patient ❑ Team debrief (or verbalize would perform regarding PPH interventions) ❑ Team communication on plan for continued monitoring (prepare for transport pending facility)	• Facilitator prompt if needed: *Uterine tone achieved, bleeding slowed, what are your actions at this time?*

Debrief

What went well? Anything we could do differently? Were any processes tested in this simulation? If checklist observer and/or documenter present in scenario, relay on their records to guide debrief discussion.

Objective	Expected Participant Events (as listed above in scenario)
Demonstrate clear team and patient communication during obstetric emergencies	How was communication during hypertension care? During hemorrhage?
Demonstrate timely treatment for severe maternal hypertension (MHTN)	What findings indicated pre-eclampsia with severe features? Was treatment timely?
Demonstrate initiation of magnesium sulfate IV therapy	Why was MgSO4 initiated, was it to lower blood pressure? What are the signs of MgSO4 toxicity? What is done for this?
Utilize quantitative blood loss to identify staged based postpartum hemorrhage management needs	How was QBL performed?
Demonstrate interventions for postpartum hemorrhage according to ACOG staged recommendations	What interventions were done for PPH? What was the 4T associated cause of this scenario? How are intera- uterine devices managed after placement?

Evaluations

Reset

Admission Lab Results – Molly Smith

CBC

RBC	**4.7**	**(4.0 - 4.9)**
Hgb	**10.8**	**(12.0 - 15)**
Hct	**32.4**	**(36 – 44)**
Platelets	**106**	**(100 – 450)**
WBC	**5.3**	**(3.4 - 8.3)** ** non pregnant range*

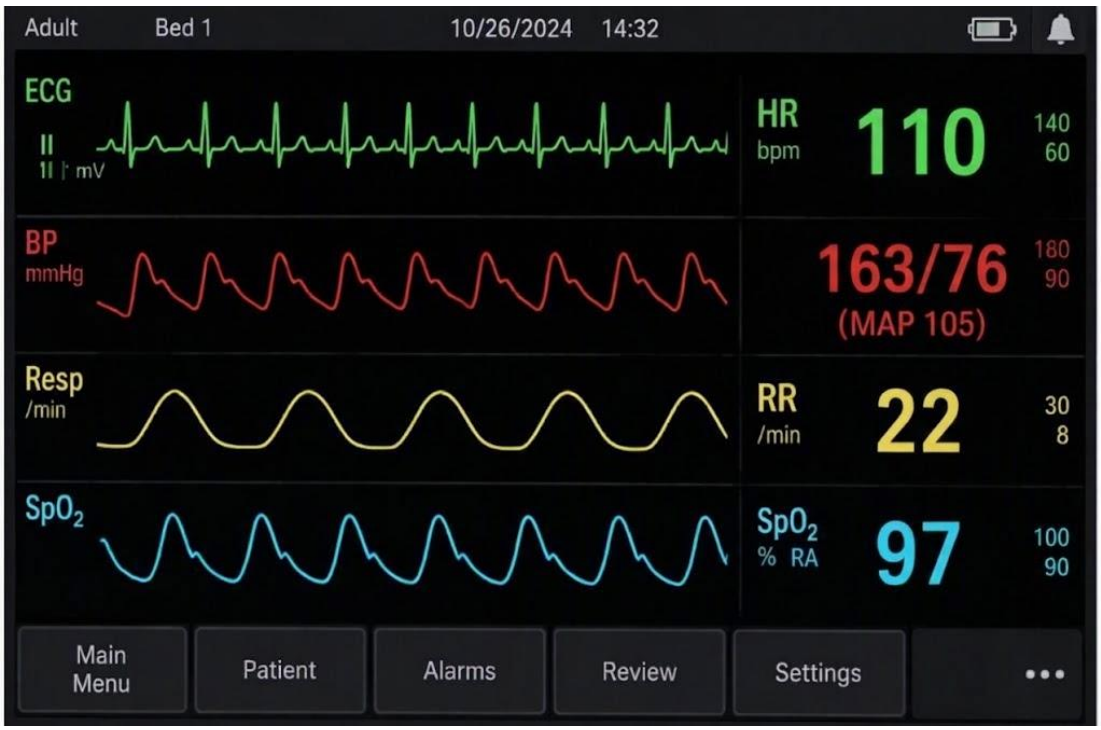
CMP

Creatinine	**0.7**	**(0.5 - 1.4)** ** non pregnant range*
Glucose	**109**	**60 - 110**
Sodium	**137**	**135 - 147**
Potassium	**4.8**	**3.5 - 5.2**
Chloride	**105**	**95 – 107**
Calcium	**9.2**	**8.8 - 10.3**
BUN	**20**	**7 - 20**
AST	**103**	**2 – 35**
ALT	**138**	**0 – 64**
LDH	**500**	**56 – 194**
Total Bilirubin	**1.3**	**0.1 - 1.2**

Urinalysis

Specific Gravity	**1.025**	**1.001 - 1.035**
pH	**6.7**	**4.6 - 8.0**
Protein	**3+**	**Negative**
Protein / Creatinine Ratio	**0.8**	**Less than 0.2** ** non pregnant range*
Glucose	**Trace**	**Negative**
Appearance: dark yellow		

Admission Vitals



Admission EFM (For OB Facilities)

Baseline 135. Minimal Variability. No accelerations. No Decelerations. UC every 10 minutes lasting about a minute.

Vaginal Exam 5/80/-1

Retake BP 15 minutes later

- 159/112

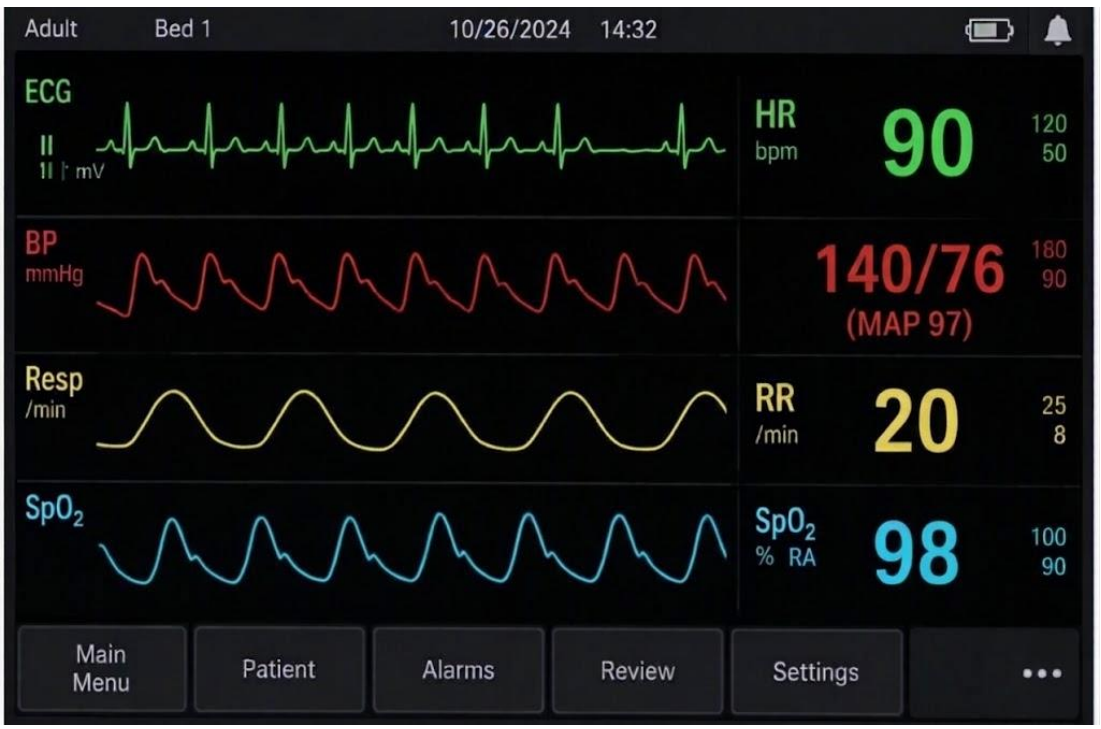
20 minutes after 1st anti-hypertensive treatment

- **163/110**

20 minutes after 2nd dose of anti-hypertensive

- **151/90**

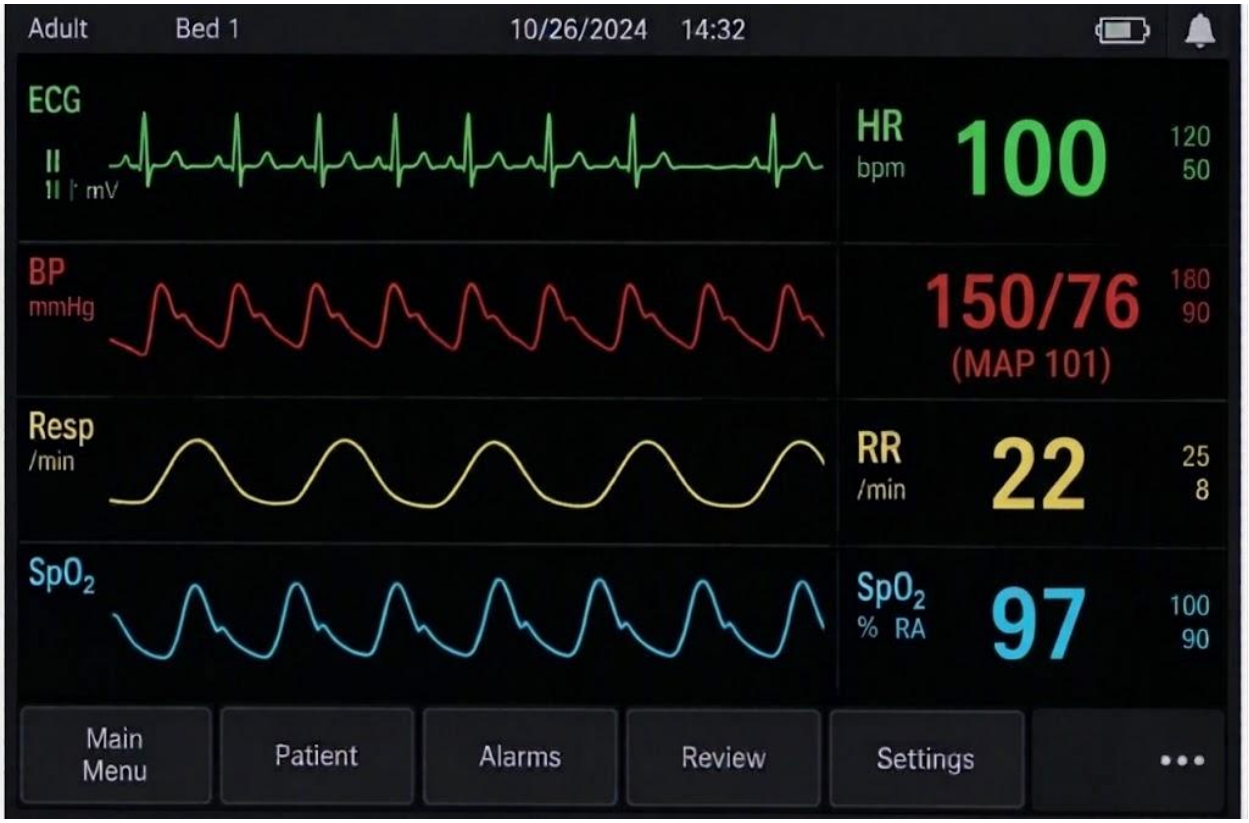
1 hour post anti-hypertensive treatment



EFM (For OB Facilities)

Baseline 135. Moderate Variability. No accelerations. No Decelerations. UC every 5 minutes lasting about a minute.

Birth

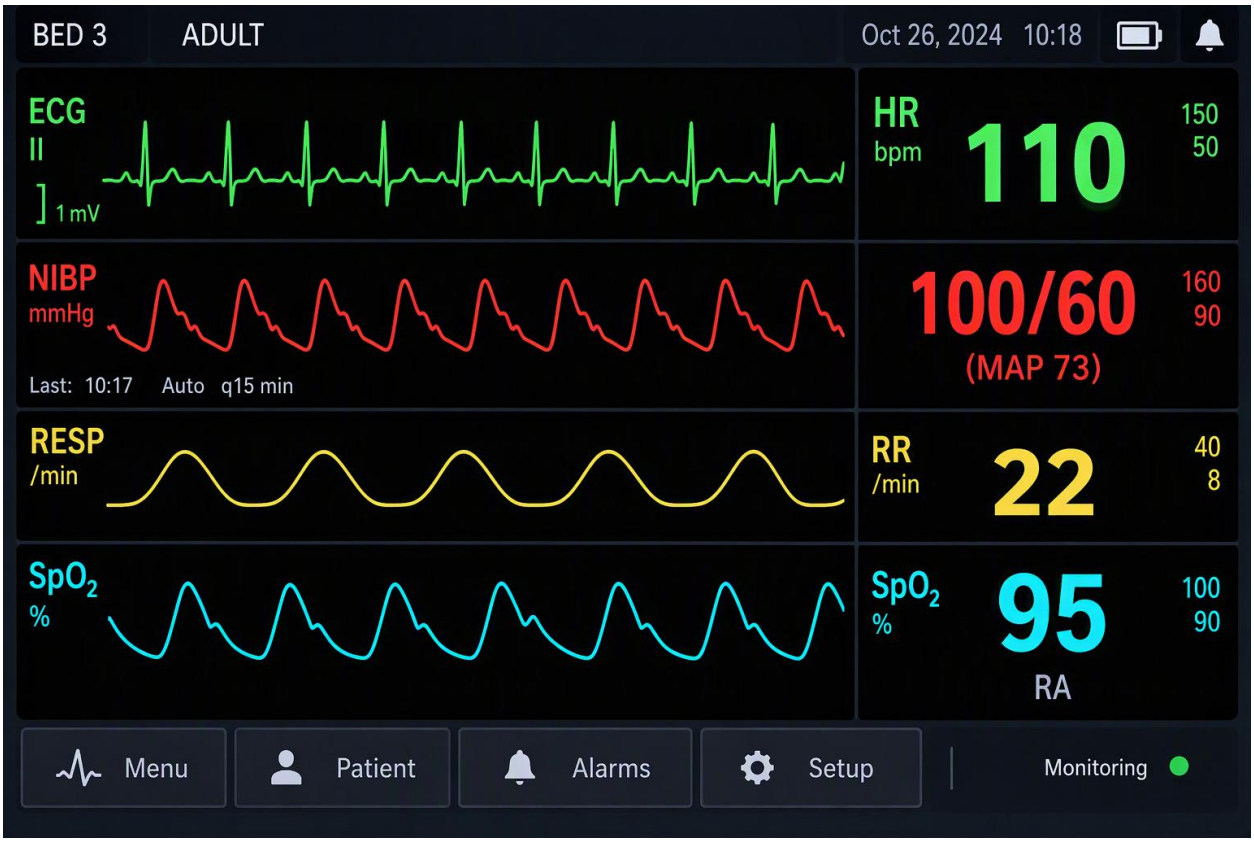


EFM (For OB Facilities)

Baseline 145. Minimal Variability. No accelerations. Intermittent Variables. UC every 5 minutes lasting about a minute.

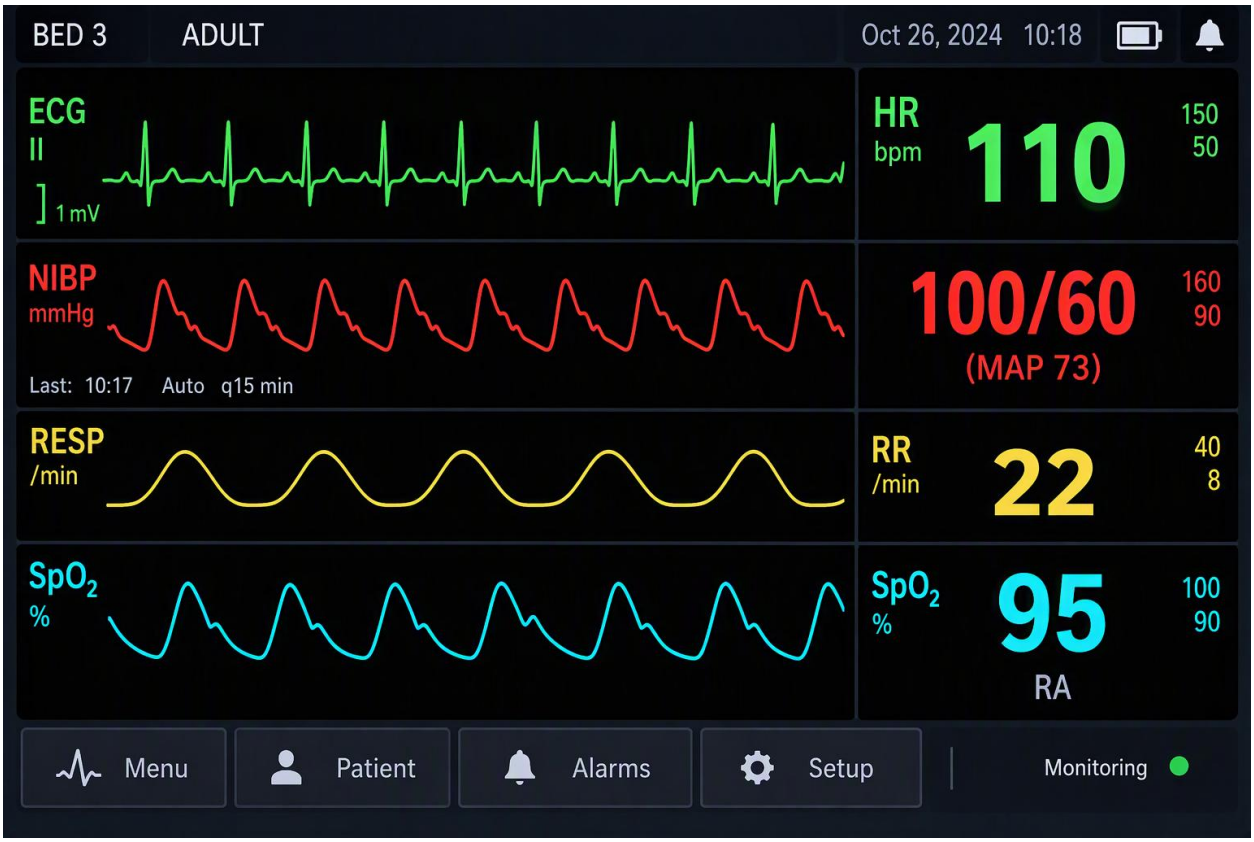
PPH

QBL 600


BED 3
ADULT
Oct 26, 2024 10:18
ECG
II
1 mV
HR
bpm
110
150
50
NIBP
mmHg
Last: 10:17 Auto q15 min
100/60
(MAP 73)
160
90
RESP
/min
RR
/min
22
40
8
SpO2
%
SpO2
%
95
RA
100
90
Menu
Patient
Alarms
Setup
Monitoring

PPH

QBL 1000

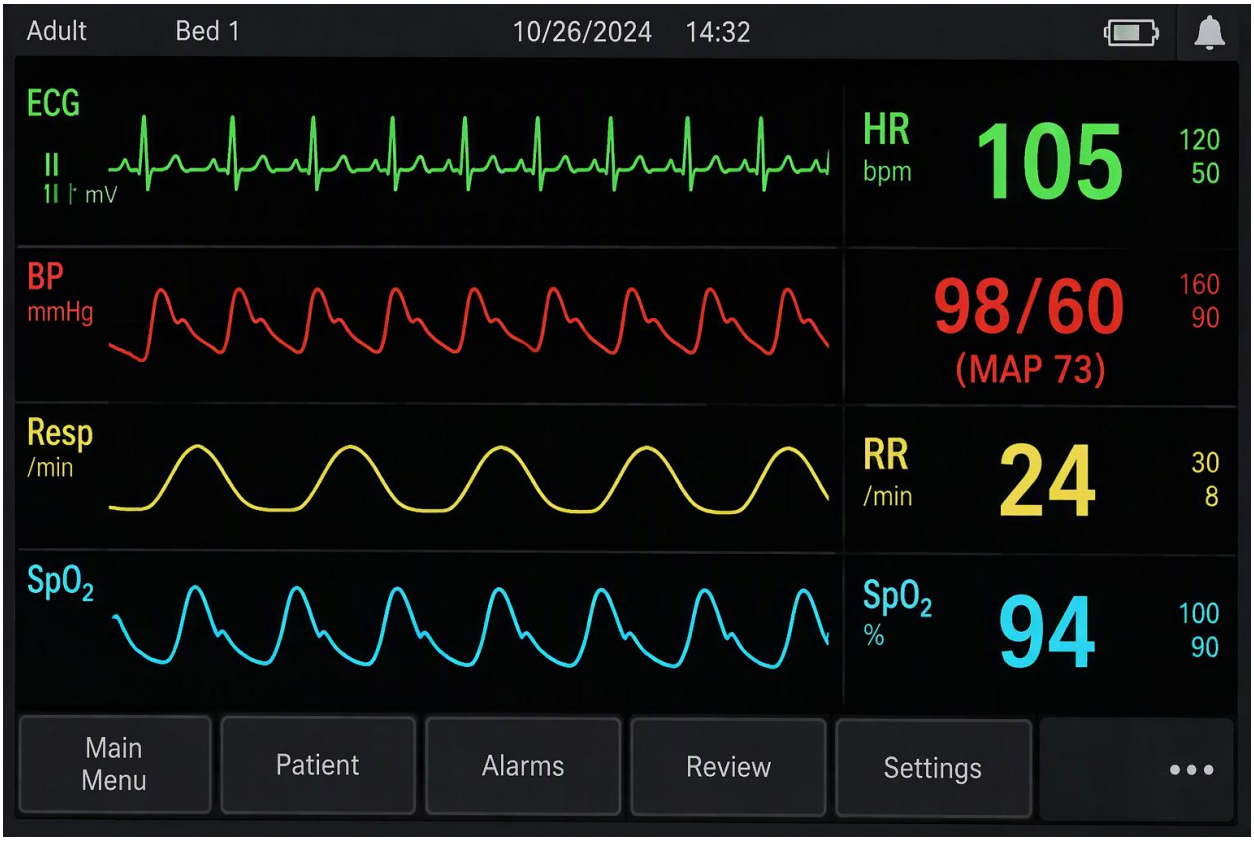

BED 3
ADULT
Oct 26, 2024 10:18
ECG
II
1 mV
HR
bpm
110
150
50
NIBP
mmHg
Last: 10:17 Auto q15 min
100/60
(MAP 73)
160
90
RESP
/min
RR
/min
22
40
8
SpO2
%
SpO2
%
95
RA
100
90
Menu
Patient
Alarms
Setup
Monitoring

PPH

QBL 1500


BED 3
ADULT
Oct 26, 2024 10:18
ECG
II
1 mV
HR
bpm
125
150
50
NIBP
mmHg
80/45
(MAP 57)
160
90
Last: 10:17 Auto q15 min
RESP
/min
RR
/min
24
40
8
SpO2
%
SpO2
%
89
RA
100
90
Menu
Patient
Alarms
Setup
Monitoring

RECOVERY


Adult
Bed 1
10/26/2024
14:32
ECG
II
1I mV
HR
bpm
105
120
50
BP
mmHg
98/60
(MAP 73)
160
90
Resp
/min
RR
/min
24
30
8
SpO2
SpO2
%
94
100
90
Main Menu
Patient
Alarms
Review
Settings
•••