SimBox+
Tele SimBox

A Postpartum Complication

Emergency Department/Hospitalist/Resident

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with links to pages

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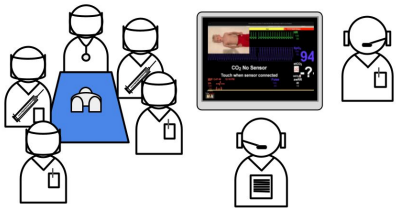
Thank you for your interest in SimBox low-technology learning tools!

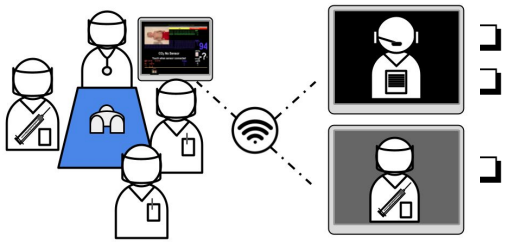
- ❏ Our low-technology simulation series allows your team to engage in the first 10 minutes of an emergency scenario.
- ❏ Use your own equipment and resources in your own clinical environment, or in the convenience of a virtual environment to practice non technical skills.

SimBox Original Version

- ❏ Low-technology manikin.
- ❏ + video.
- ❏ + tablet-based resources (*in situ* or sim lab).



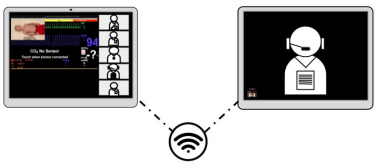
SimBox+ (SimBox Original + tele-facilitator)



- ❏ SimBox Original PLUS.
- ❏ Learners in remote or underserved areas +/- limited access to content or simulation experts.
- ❏ Remote facilitator.

Tele SimBox:

- ❏ Non-technical skills all remote version.
- ❏ Meets post-pandemic demands for virtual learning and continuous education for learners of all levels.



How to use these resources

SimBox or SimBox+

- Review this document + run a session in your ED with a doll/manikin/pillow.

Tele SimBox

- Reference: Tips / Tricks.
- Watch a sample recording of the telesimulation to see how it is run.

*If using this resource for EM / PEM trainees see Resource page at end of booklet with suggested case augmentation to meet Milestones.

**For additional questions or concerns, arrange a one-on-one tutorial with the project team.

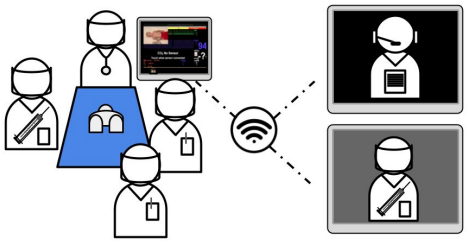
TeleSimBox is a tool meant for you to use as you see fit, based on your own comfort and experience facilitating sims.

The video has a structured, narrated prebrief and debrief and the booklet includes suggested scripts, learning objectives, a prebrief and debrief, case-specific checklists & resources. These can be optional for advanced learners, but are recommended for novice facilitators.

Feel free to run through the video and the facilitator guide prior to the session, and use as many of the resources as you want!

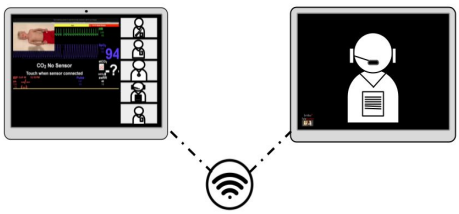
Tele-tips

Trial sharing the video prior to the first session.



Use gallery view & ask the participants to name themselves with the assigned role.

If you use the pre-narrated prebrief and debrief, make sure to make statements and comments to complement the video.



Ask observers to mute the audio and turn off the video for the simulation.

During the simulation, scroll through the monitor video based on the participants' actions.

If the participants quickly stabilize the patient, you can "skip through" to the part of the video where the vital signs have normalized. Conversely, if the necessary interventions have not been performed, you can "scroll back" and spend more time in the part of the video where the vital signs are abnormal.

After this activity, the team will be able to manage a patient with postpartum hemorrhage with emphasis on the following objectives:

1. Apply Crisis Resource Management and teamwork in the care of a patient, with attention to role designation, directed orders, shared mental model and closed loop communication.
2. Prioritize treatment of potential etiologies to stabilize the patient or escalate care.
3. Determine the appropriate destination for transfer.

Overall Scenario Schema

Prebrief: Use narrated video + sample script or your own script

2 mins

Assign or Coach them to allocate roles.
Adapt roles based on the participating team:

Team Leader	Airway	Bedside Survey
Respiratory Tx	Bedside Nurse	Medication Nurse
Parent Liaison	Pharmacy	Recorder

10 mins

Stem: You are called to a assess a 16 year old female who is in active labor en route to the hospital.

Your team will focus on the resuscitation of a patient with postpartum hemorrhage.

Telesim Co-facilitator prompts are indicated in these boxes

15 mins

Debrief: Use the narrated video + sample script or pause the video and use your own script

10 mins

Option: re-run scenario

Scenario script:

"You will hear a brief EMS dispatch and then see a two minute countdown clock as you prepare for the arrival of the patient."

Link to ED "A Postpartum Complication" Video

Video states: "This is EMS, we are coming in with a 16 year old who is in active labor. She was not aware of the pregnancy until 5 hours ago, when she started having vaginal bleeding and lower abdominal pain. We will arrive in 2 minutes."

2 minute warning

- Team assembles + confirms roles
- Asks for equipment: monitor, temperature, oxygen, breathing (BVM/CPAP), access (IV), medications
- Dons PPE (hard stop)
- Calls the NICU/ pediatric and OB team (if available)

Video states: "The patient has arrived. You have put on the appropriate personal protective equipment. The baby was delivered in the ambulance and was pink, vigorous and crying. EMS clamped and cut the umbilical cord. The placenta comes out right when the patient is arriving in the ED. The pediatric team has arrived and scoops the baby. Your team will focus on the resuscitation of the mother."

Time 0

- Team moves the mother to a bed and places the cardiac monitor leads, pulse oximeter, BP cuff, and checks her temperature
- Performs primary assessment: ABCDE

Facilitator states: "Airway is patent. Breath sounds are equal bilaterally. Radial pulses are palpable bilaterally. The abdomen is gravid and tender with no obvious trauma. She is alert and crying, GCS is 15."

Step 1
Min 7

HR 100
BP 100/60
SpO2 99%
RR 18
T 36.1

- Team notes tachycardia
- Performs full exam, including a GU exam
- Requests 2 points of vascular access
- Administers 1L of warmed saline
- Orders CBC, type and Rh, iStat (glucose, electrolytes, Hemoglobin/ Hematocrit), and ultrasound, if available

"You examine the the perineum and vagina. There is bright red blood coming out of the vagina. There is no vulvar or perirectal tears. The uterus does not feel firm on abdominal examination. Two points of IV access are established and IV fluid bolus started."

Step 2
Min 9

HR 130
BP 95/57
SpO2 98%
RR 18
T 36.1

- Team verbalizes illness state: Postpartum hemorrhage
- Approximates estimated blood loss (EBL)
- Asks for the placement of a urinary catheter and bimanual compression
- Orders oxytocin
- Places patient under warm blankets

Case progression: Postpartum Hemorrhage

SAMPLE History
Signs/Symptoms: Unaware of pregnancy, no prenatal care. Unprovoked vaginal bleeding, contractions and lower abdominal pain started 5 hours ago. Unsure about date of last menstrual period. No previous pregnancies, G1P1.
Allergies/Meds: None. Past Medical history/ social: Lives with mother.
Last meal: Last night, decreased appetite. Events: As described. No trauma.

"Administering oxytocin and applying bimanual pressure. The patient becomes lethargic and less responsive. Large clots are being expelled from the vagina. I-stat Hgb is 6.5."

Step 3
Min 11

HR 150
BP 84/41
SpO2 98%
RR 18
T 36.1

- Team notes change in mental status and persistent bleeding
- Activates the major transfusion protocol and asks to start transfusing red blood cells as soon as possible
- Verbalizes the need to inspect the placenta
- Re-pages OB team

"O negative blood is available from the trauma bay, and you initiate the transfusion. You inspect the placenta and it appears whole. OB team is in the OR but they will come as soon as possible. There is persistent bleeding."

Step 4
Min 13

HR 150
BP 80/38
SpO2 99%
RR 18
T 36.1

- Team verbalizes uterine atony as likely cause of postpartum bleeding
- Asks for tranexamic acid (TXA) and second-line uterotonics (methylergonovine, carboprost, misoprostol)
- Reviews the rest of the labs
- Addresses reversible causes (H and Ts)

"1 Unit of O negative blood has been transfused, as well as oxytocin and tranexamic acid. The bleeding seems to be slowing down. Her HR and BP are improving.The patient is slightly more responsive, crying, and asking questions. The OB team is arriving."

Step 5
Min 15

HR 90
BP 113/70
SpO2 99%
RR 18
T 36.5

- Team notes improvement in vital signs, amount of bleeding and patient's mental status
- Updates patient on her and the baby's status
- Asks for social worker support
- Repeats i-stat post transfusion; Hgb is 8
- Hands off patient to the OB team
- Prepares for transfer of mother and baby to L&D

Video guide

Min 6: Patient arrives
Min 7: HR 100, BP normal
Min 9: HR 130, BP normal
Min 11: HR 150, BP 80s/40s
Min 15: HR and BP normal

After team performs handoff, state "This concludes the simulation" and move to debrief.
Link to educational content

TASK		NOT DONE	NOT DONE CORRECTLY	DONE CORRECTLY
Team-centered care	Verbally assemble the necessary staff, equipment and resources to care for a patient with postpartum hemorrhage in the ED.			
	Demonstrate effective teamwork and communication (i.e. designate leader/roles, directed orders, closed-loop communication, sharing mental model).			
	Demonstrate appropriate PPE.			
	Call for NICU/ Pediatric and OB help early.			
Family-centered care	Obtain an appropriate history (SAMPLE).			
	Address patient concerns and questions.			
	Use an interpreter to obtain the medical history and update the patient (if applicable).			
Medical knowledge	Verbalize the initial management of an acutely ill patient with postpartum hemorrhage (ABCDE).			
	Verbalize the first line interventions for an acutely bleeding patient.			
	Discuss indications for emergent transfusion of O negative blood/ activation of the major transfusion protocol.			
	Discuss indications for a full OB exam, and inspection of the placenta and uterus for retained POC.			
	Perform fundal massage.			
	Discuss the use of uterotonic medications (oxytocin) and tranexamic acid for persistent bleeding.			
	Form a broad differential for postpartum bleeding.			
Communication	Demonstrate handoff of care at the end of the case.			

Prebriefing Script

Best practices for establishing psychological safety in simulation

Basic Assumption: "we believe that everyone participating in our activities is intelligent, capable, cares about doing their best and wants to improve"
Center for Medical Simulation, Boston MA

Prebrief

Welcome your team, make introductions:

"This simulated resuscitation is to practice our team's response to an emergency. We will spend about 15' in simulation, then we will debrief for 20' to discuss what went well and what could be improved with input from the team. Even though it is not real, and the manikin can't be harmed, everyone will get the most out of this scenario if we take it as seriously as possible."

Describe

Describe simulator capabilities, equipment and how to participate:

"Act as you would within your role. You will not get monitor feedback unless your equipment is attached to the patient. Airway equipment should be attached to oxygen, etc. Try to make tasks realistic and timely using your equipment. Please ask for clarifications."

Demo

DEMO: Closed loop communication:
Know your role and task designation. Use closed loop communication to verify and complete.

Leader: Tech, we need an EKG.
Tech: OK going to get the machine.
Tech: OK, I've got the EKG machine here.

Disclose

If a safety concern arises during the simulation, I will state:
"Let's take a safety pause."
If a real event happens that is not part of the simulation, I will state:
"This is not a simulation."
Disclose if video recording, privacy and permission.

Components of a Debrief (Based on 3Ds + PEARLS)

"The purpose of this debrief is to discuss areas of great performance and discover areas for improvement. It is not a blame session- everyone is here to do their best."

Defuse
1-2 min

Solicit emotions and reactions.
"Reactions?"; "Let's take a moment to gather our thoughts."

Discover
7-8 min

Clarify facts.
"Can a teammate share a short summary of the case?";
"Were there other thoughts?"

Explore Performance.
"What went well?"
"What could be improved?"

Use observations of learner experiences to highlight strengths of the team and individuals, while asking learners for their thoughts, observations and reflections.

Deepen
1-2 min

Identify patient care priorities.Then provide focused feedback and specific areas of opportunity for improvement. Elicit any other outstanding issues or concerns.

Summary
1-2 min

Identify take-home points to apply to future practice : Round the room reflections and thanks for participation.

Ref: PEARLS Debrief Framework .+ The 3D model of debriefing. *Semin Perinatol*. 2011;35(2):52-58

Family-centered care:

- Obtain appropriate history from family member (SAMPLE).
- Address family concerns and update on care.
- Manage the expectations of those who receive care in the ED and use communication methods that minimize the potential for stress, conflict, and misunderstanding [Assess via their communication to prep family for intubation and then for transfer, Patient Centered Communication (EM Milestone ICS1) Level 3:].

Medical knowledge:

- Verbalize the initial management of an acutely ill pediatric patient (ABC's.
- Verbalize first line diagnostic tests of a seizing patient.
- Verbalize the first line therapeutic interventions of a pediatric seizure.
- Demonstrate handoff of care at the end of the case.
- Integrate hospital support services into a management strategy for a problematic stabilization situation [Trainee should request transfer early, Emergency Stabilization (EM milestone PC1) Level 4], Performs rapid sequence intubation in patients using airway adjuncts Employs appropriate methods of mechanical ventilation based on specific patient physiology [Airway Management (EM milestone PC10) Level 3/Pediatric ACGME intubation procedure requirement].

Links to Resources:

Management of postpartum hemorrhage - First10EM

The 4 T's of Postpartum Hemorrhage

Prevention and Management of Postpartum Hemorrhage | AAFP

https://globalhealthmedia.org/videos/?_sf_s=postpartum%20hemorrhage

Teaching Content: Postpartum Hemorrhage

This page provides possible questions to elicit teaching points during the debrief. These questions are not meant to replace your team's discussion, but can help to steer the debriefing session.

HOW COMMON IS POSTPARTUM HEMORRHAGE?

- Postpartum hemorrhage (PPH) is one of the top 5 causes of maternal mortality in both resource-abundant and resource-limited countries.
- Death rates vary from 0.01% of patients with PPH in the United Kingdom to 20% of patients with PPH in parts of Africa, and from 1 in 100,000 births in the United Kingdom to 1 in 1000 births in resource limited nations.

WHAT ARE YOUR PRIORITIES WHEN MANAGING A PATIENT WITH SEVERE POSTPARTUM HEMORRHAGE?

Stage 1- activate hemorrhage protocol, ensure type and screen available to blood bank, and prepare uterotonics.

Stage 2- Focus on advancing through medications and procedures, mobilizing assistance, and staying ahead with volume and blood products.

Stage 3 - Focus on OB hemorrhage MTP, initiate protocol in conjunction with blood bank and possible surgical intervention for hemostasis

WHAT ARE THE MOST COMMON ETIOLOGIES FOR POSTPARTUM HEMORRHAGE?

- TONE: Uterine atony.
- TRAUMA: Lacerations, uterine rupture, hematoma or inversion.
- TISSUE: Retained products of conception.
- THROMBIN: Coagulopathy (clotting deficiencies).

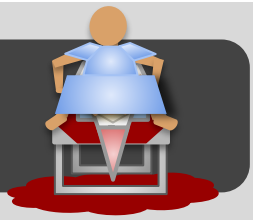
UTERINE ATONY

- Uterine atony (ie, a lack of effective uterine contraction after birth) prevents mechanical hemostasis from occurring and is responsible for at least 80% of cases of PPH.
- The diagnosis is made when the uterus does not become firm to palpation after expulsion of the placenta.
- With diffuse atony, the flaccid, dilated uterus may contain a significant amount of blood, so blood loss can be much greater than observed.
- Risk factors for atony are prior PPH and prolonged labor.
- Prophylactic administration of a uterotonic drug after birth is a routine practice worldwide to prevent atony.

Source: UpToDate: Overview of postpartum hemorrhage, Jul 15, 2022

MANAGEMENT OF POST-PARTUM HEMORRHAGE

BLOOD LOSS > 500ML by VAGINAL DELIVERY



PERFORM FUNDAL MASSAGE

INITIATE ABCDEs
OBTAIN VASCULAR ACCESS (IF NOT ALREADY) & ADMINISTER IV CRYSTALLOIDS (unless unstable**)
CALL OBGYN

ADMINISTER 1ST LINE UTEROTONIC AGENT
Oxytocin (Pitocin)
20-80 U IV* gtt
10 U IM X 1

ADMINISTER 2ND or 3RD LINE UTEROTONIC AGENT

**UNSTABLE VS or EBL > 1500ML transfuse 2U pRBC

INITIATE MTP

IDENTIFY & ADDRESS CAUSE OF BLEEDING: The 4Ts

TONE	TRAUMA	TISSUE	THROMBIN
BOGGY UTERUS 70-80% of PPH	Lacerations Uterine rupture Hematoma OR inversion	Retained products of conception (placenta)	Clotting deficiencies
Administer 2nd line uterotonic agents**	Repair injuries Drain hematoma Reduce uterine inversion	Remove POC	Replace factor

DISPOSITION (OR/IR) AS PER OBGYN

Based on https://www.emra.org/emresident/article/postpartum-hemorrhage/

SECOND & THIRD LINE UTEROTONIC AGENTS**

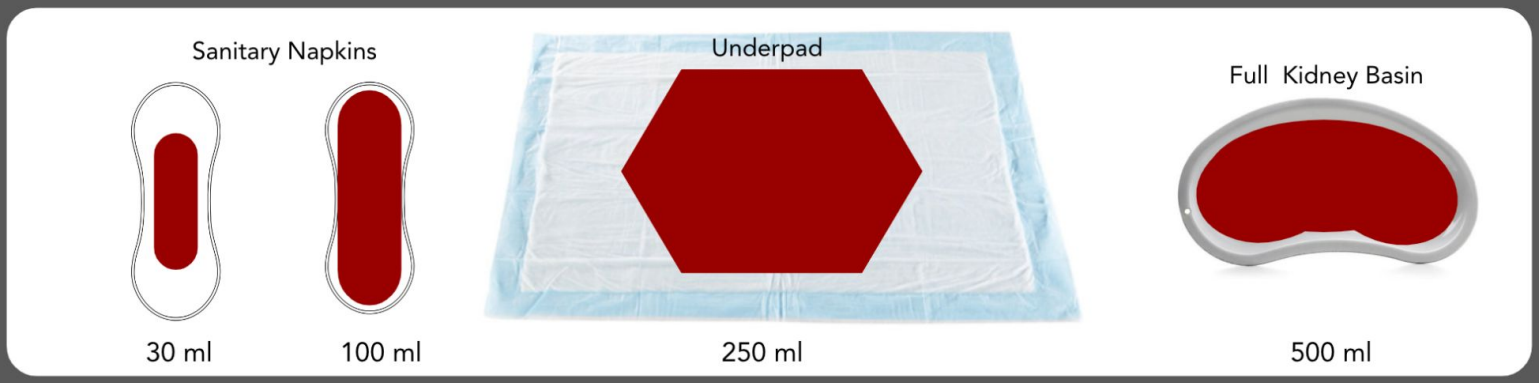
Methylergonovine (*Methergine*)	0.2 MG IM	Every 2 hours	Not in patients with HTN or eclampsia
Tranexamic Acid (TXA) 1G IV over 10 min		May repeat x 1 after 30 min	
15-methyl PGF2-α (*Hemabate*)	0.25 MG IM	Every 15 min to max 2 mg	Not in patients with asthma, caution in hypertension
Misoprostol (*Cytotec*) (3RD LINE)	1000 MCG PR 600 MCG PO 800 MCG SL	Once	Onset 15 min

CAUSES OF POSTPARTUM HEMORRHAGE

PRIMARY	SECONDARY
Uterine Atony Lacerations Retained Placenta Placenta Accreta Placental Abruption Uterine Inversion Known Coagulation Defects	Subinvolution of placental site Retained products of conception Infection Coagulation Defects: DIC/Amniotic Fluid Embolism

Risk factors for Atony:
Precipitous delivery
Prior PPH
Prolonged Labor

ESTIMATING BLOOD LOSS (EBL) IN OBSTETRIC HEMORRHAGE

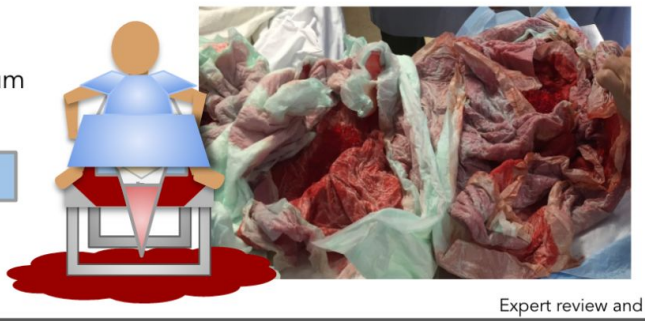


TIP: VISUAL EBL COMMONLY UNDERESTIMATES BLOOD LOSS. USE THESE METHODS INSTEAD:

1. BY DIRECT MEASUREMENT:

Place a collection bag under perineum prior to delivery.

NOTE THE VOLUME OF AMNIOTIC FLUID PRIOR TO DELIVERY OF PLACENTA



2. THE WEIGHT METHOD:

Weigh Soaked Underpad and subtract wt of dry pad.

1 ml of blood weighs about 1 gram

Expert review and Image courtesy Emily Marko MD MEd FACOG

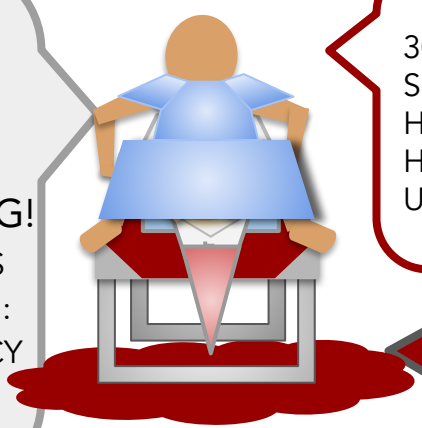
@DrM_Kou

WARNING: HIGH MATERNAL MORTALITY IS LINKED WITH BL > 1000-1500 cc

HYPOTENSION IS A LATE FINDING!

MASSIVE TRANSFUSION IN OBSTETRICS REQUIRES A COORDINATED APPROACH: SEE YOUR INSTITUTION/HOSPITAL POLICY OR LINK TO

ACOG 2020 RECOMMENDATIONS



RULE OF 30 for Shock
30% blood loss
SBP ↓ 30%
HR ↑ 30 bpm
Hb/Hct ↓ 30%
Urine output ↓ by 30cc/hr

If there is no obvious source of hemorrhage, consider retroperitoneal bleeding

TABLE

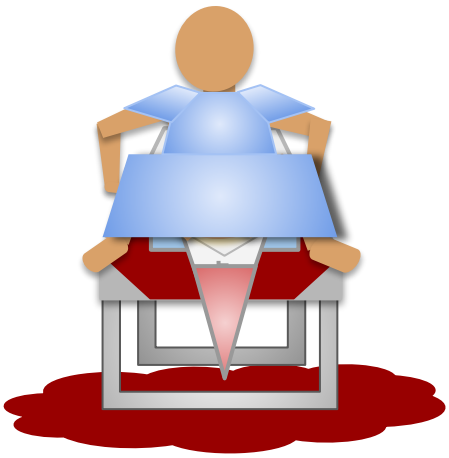
Massive transfusion protocol in obstetrics

	PRBCs	FFP	Platelets	Cryoprecipitate
Round 1	6 U	6 U	6 U	10 U
Round 2	6 U	6 U	6 U	10 U
Round 3	Tranexamic acid 1 g intravenously over 10 min			
Round 4	6 U	6 U	6 U	

Consider activating the protocol when hemorrhage is expected to be massive (anticipated need to replace 50% or more of blood volume within 2 hours), bleeding continues after the transfusion of 4 U of packed red blood cells within a short period of time (1—2 hours), or systolic blood is pressure below 90 mm Hg and heart rate is above 120 beats per minute in the presence of uncontrolled bleeding. Once activated, blood bank personnel will continue preparing blood products until the surgical team inactivates the protocol. After round 4, if not inactivated, the protocol will start again from round 1.

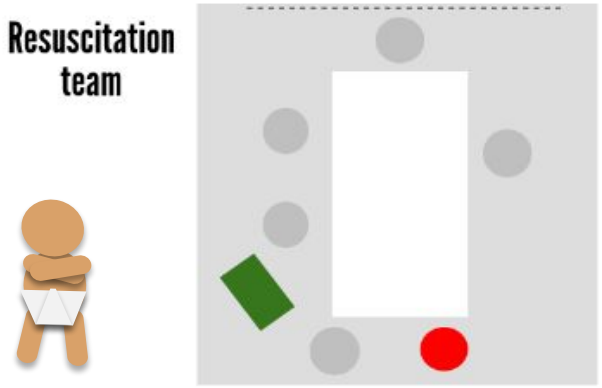
FFP, fresh-frozen plasma; *PRBC*, packed red blood cell; Adapted from Pacheco et al.[4]

Pacheco. Massive transfusion protocols in obstetrics. Am J Obstet Gynecol 2016.



Non-technical team skills

CRISIS RESOURCE MANAGEMENT: CRM, Closed loop Communication and the Shared Mental Model



CRM was established by the airline industry and popularized by high risk anesthesia teams in the 1990s. It highlights the purpose of defining clear roles for all team members for accountability.

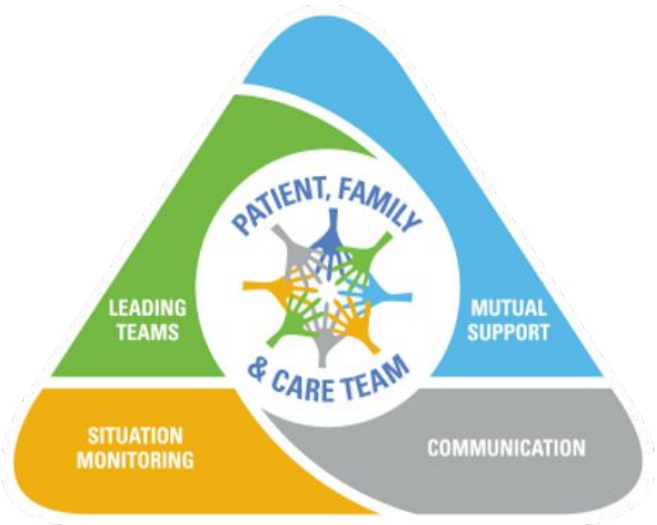
When used by all team members, *closed loop communication* reduces errors and improves safety through:

- Addressing team members by name when assigning tasks
- Giving verbal confirmation when tasks are acknowledged or completed*

Sharing a mental model allows team-members to anticipate the plan for patient care and what equipment or medications might be needed.

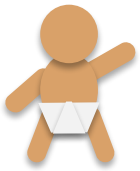
COMPONENTS OF EFFECTIVE TEAMS: TEAMSTEPPS IN A NUTSHELL

COMMUNICATION	LEADING TEAMS	SITUATION MONITORING	MUTUAL SUPPORT
SBAR Situation Background Assessment Recommendation	**BRIEF** Planning, setting the tone	**STEP** Status of pt Team Members Environment Progress toward goal	**TASK ASSISTANCE** Awareness of team workload
CALL OUT Sharing critical information with the team	**HUDDLE** Ad-hoc planning or updates	**"I'M SAFE"** *Tool for self evaluation* Illness Medication Stress Alcohol/Drugs Fatigue Eating + Elimination	**FEEDBACK** Providing information for purpose of team improvement
CHECK BACK Loop Closure*	**DEBRIEF** Exchange of information to inform team of performance and effectiveness		**ADVOCACY & ASSERTION** Advocating for patient in case of a disagreement with decision maker
HANDOFF I PASS the BATON Introduction Patient Assessment Situation Safety Concern Background Actions Timing Ownership Next			**2 CHALLENGE RULE** Information conflict regarding patient safety **DESC Script** *Tool for personal conflict** Describe situation Express concern Suggest alternative State Consensus **CUS STATEMENT** I'm concerned I'm uncomfortable This is a safety issue **COLLABORATION** Working toward a common missio



LINK TO AHRQ RESOURCES
https://www.ahrq.gov/professionals/education/curriculum-tools/cusptoolkit/modules/implement/teamworknotes.html

Cognitive Aid @DrM_Kou



Pediatric Mental Status Assessment: response to stimuli

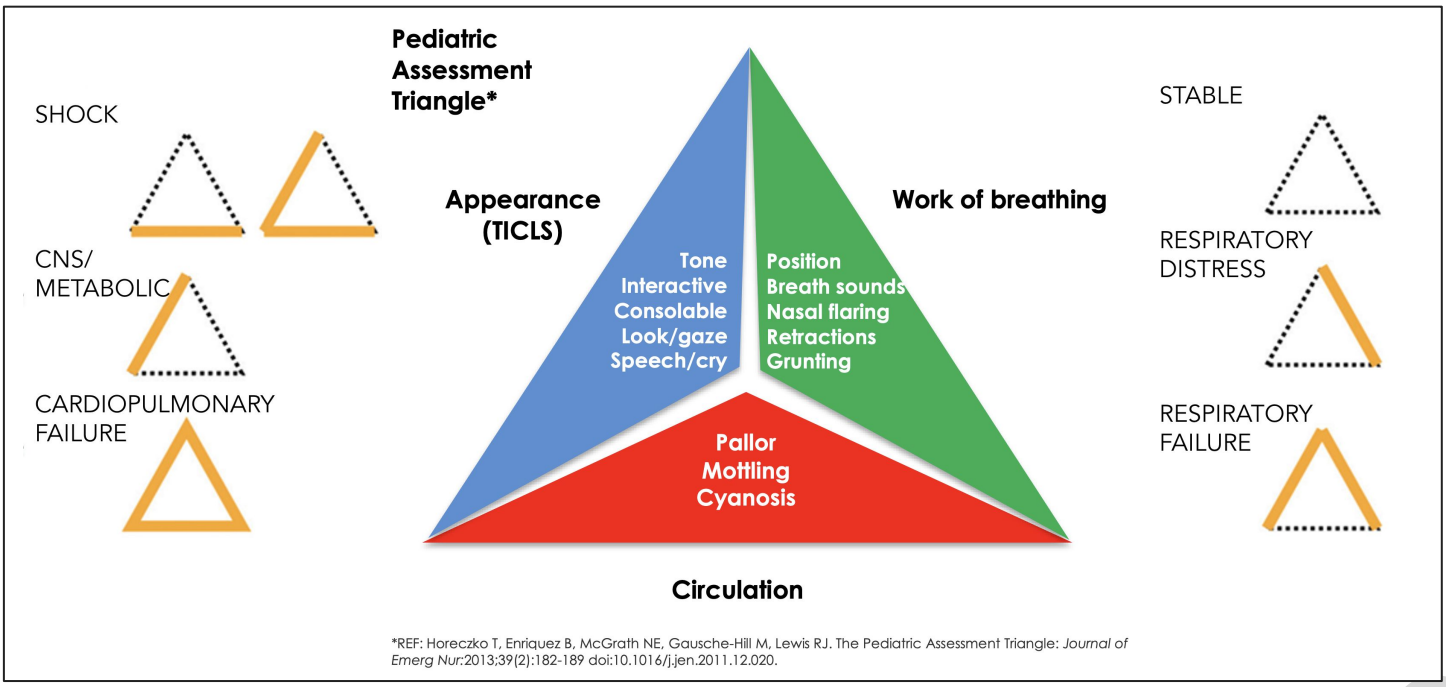
A	V	P	U
Alert	Verbal	Pain	Unresponsive

Pediatric Vital Signs/Weight by Age

*BP in children is a late and unreliable indicator of shock

Age	Weight (kg)	Pulse	Resp	Systolic BP*
Newborn	3	100-180	30-60	60-70
6 mos	7	100-160	30-60	70-80
1 yr	10	100-140	24-40	72-107
2	12	80-130	24-40	74-110
3	15	80-130	24-40	76-113
4	16	80-120	22-34	78-115
5	18	80-120	22-34	80-116
6	20	70-110	18-30	82-117
8	25	70-110	18-30	86-120
10	35	60-100	16-24	90-123
12-15+	40-55	60-100	16-24	90-135

Using the Pediatric Assessment Triangle (PAT)



*REF: Horeczko T, Enriquez B, McGrath NE, Gausche-Hill M, Lewis RJ. The Pediatric Assessment Triangle: *Journal of Emerg Nur*:2013;39(2):182-189 doi:10.1016/j.jen.2011.12.020.

Thank you for participating in the simulation.
Please complete the facilitator and participant surveys by clicking on the links or scanning the QR codes below:

Facilitator Survey

Participant Survey

Posted: November 2022

Authors: Sofia Athanasopoulou, Susanna Cohen, Marc Auerbach, Maybelle Kou, Elizabeth Sanseau