



OB Hemorrhage Part 1: QBL Terms and Techniques

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DOCTOR



Disclosure of Relevant Financial Relationships

Eboni C. January, MD, FACOG, reported no relevant financial relationships or relationships she has with ineligible companies of any amount during the past 24 months.

LEARNING OBJECTIVES

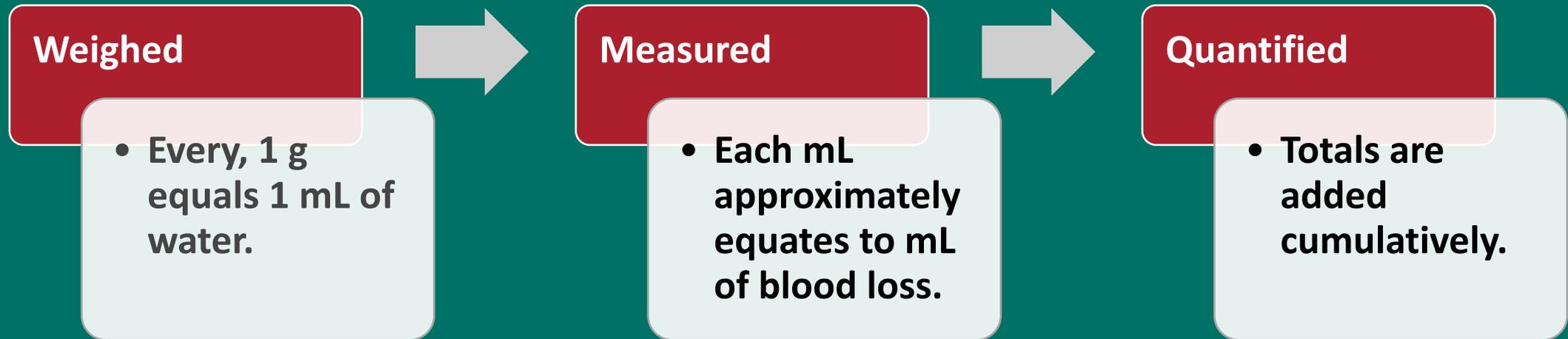
- Define Quantification of Blood Loss (QBL).
- Review measurement techniques for the quantification and cumulation of blood loss.
- Explain the importance of quantification of blood loss for recognition and response to obstetric hemorrhage

What is Quantitative Blood Loss (QBL)?

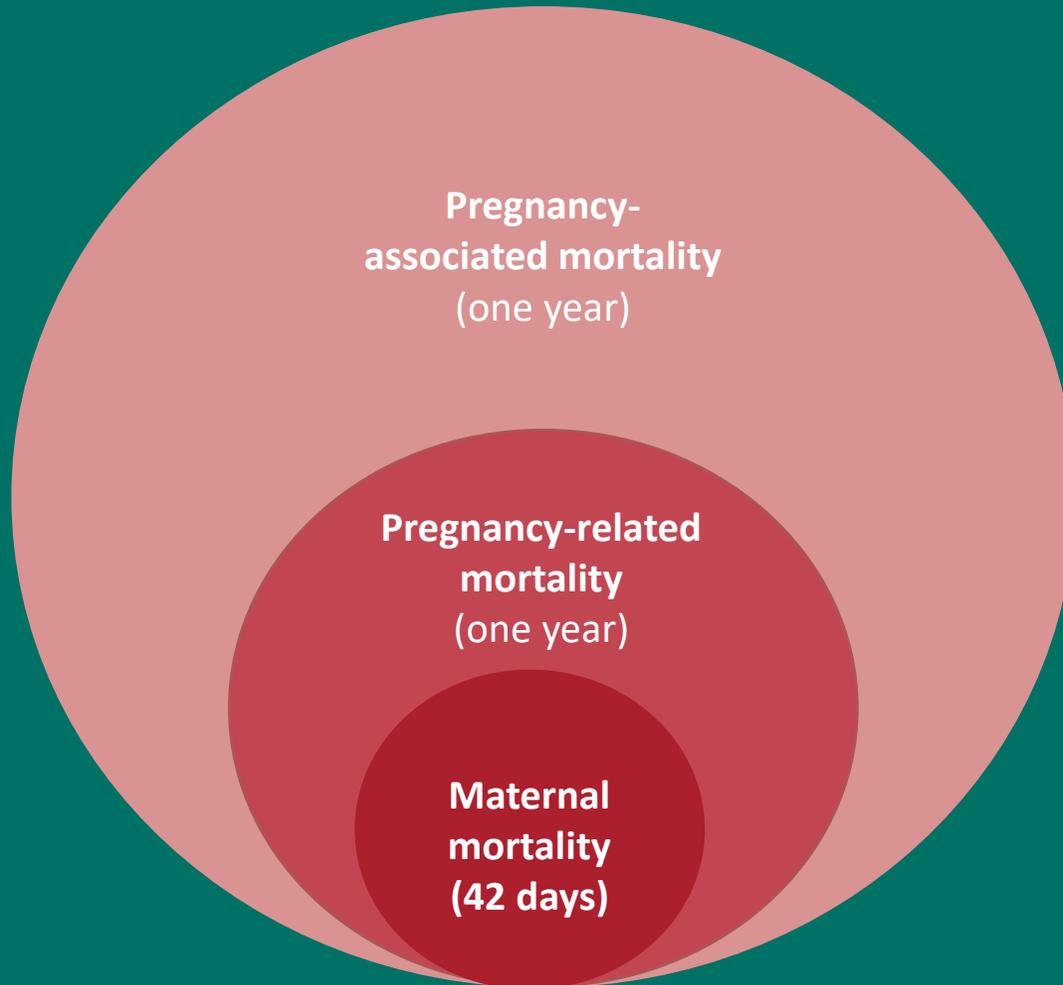
- Systematic use of volumetric containers and weighing scales, or computerized image recognition, to quantify blood loss during surgical procedures or medical conditions.
- It standardizes the process of measuring blood loss, making it more consistent between operating room (OR) teams, providers, and nurses.
- Has a higher probability of accurately detecting postpartum hemorrhage but is not 100% accurate



Quantitative Blood Loss (QBL)



What Do We Mean By Maternal Mortality?

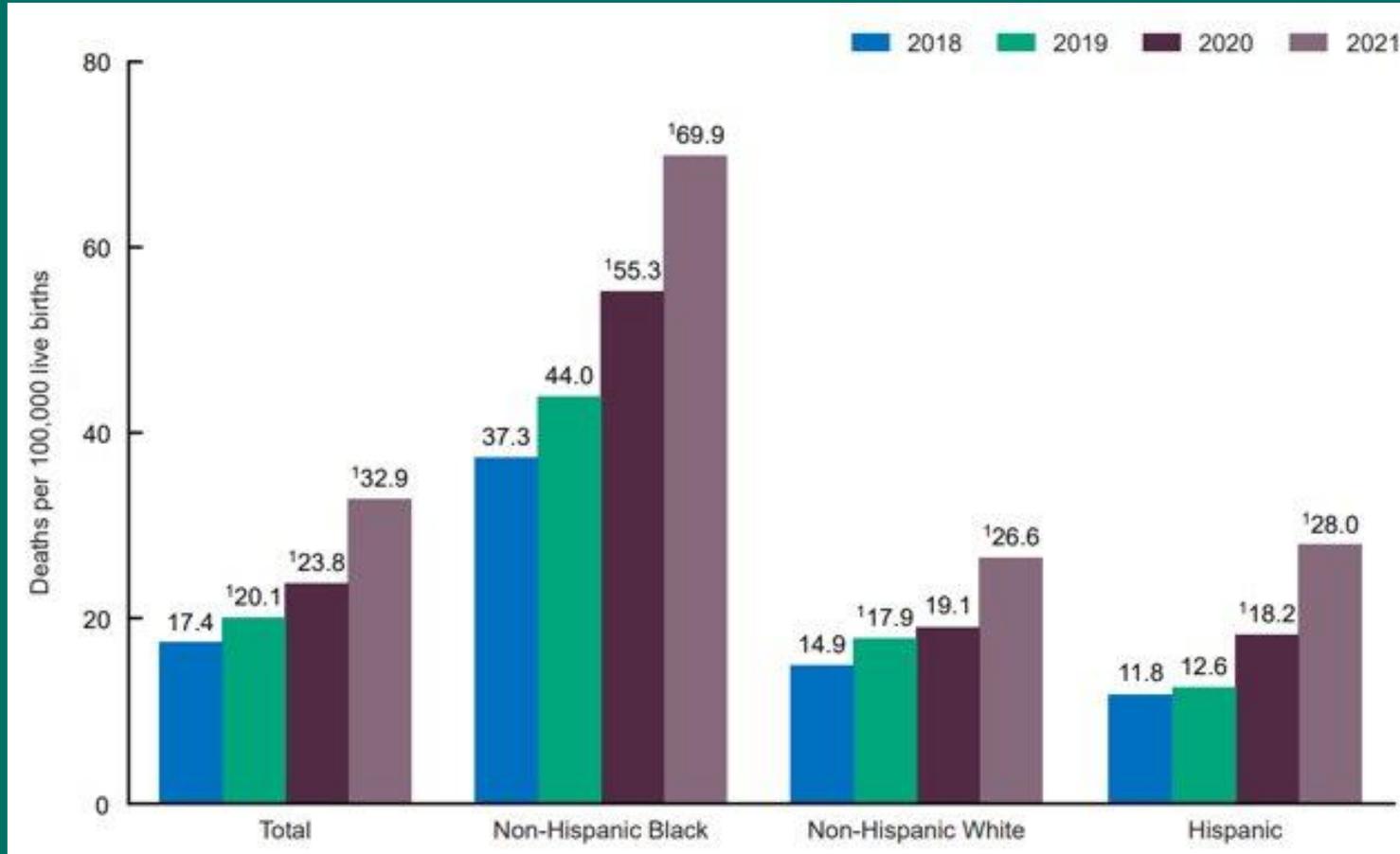


Pregnancy-associated mortality: Deaths during pregnancy and up to one year postpartum

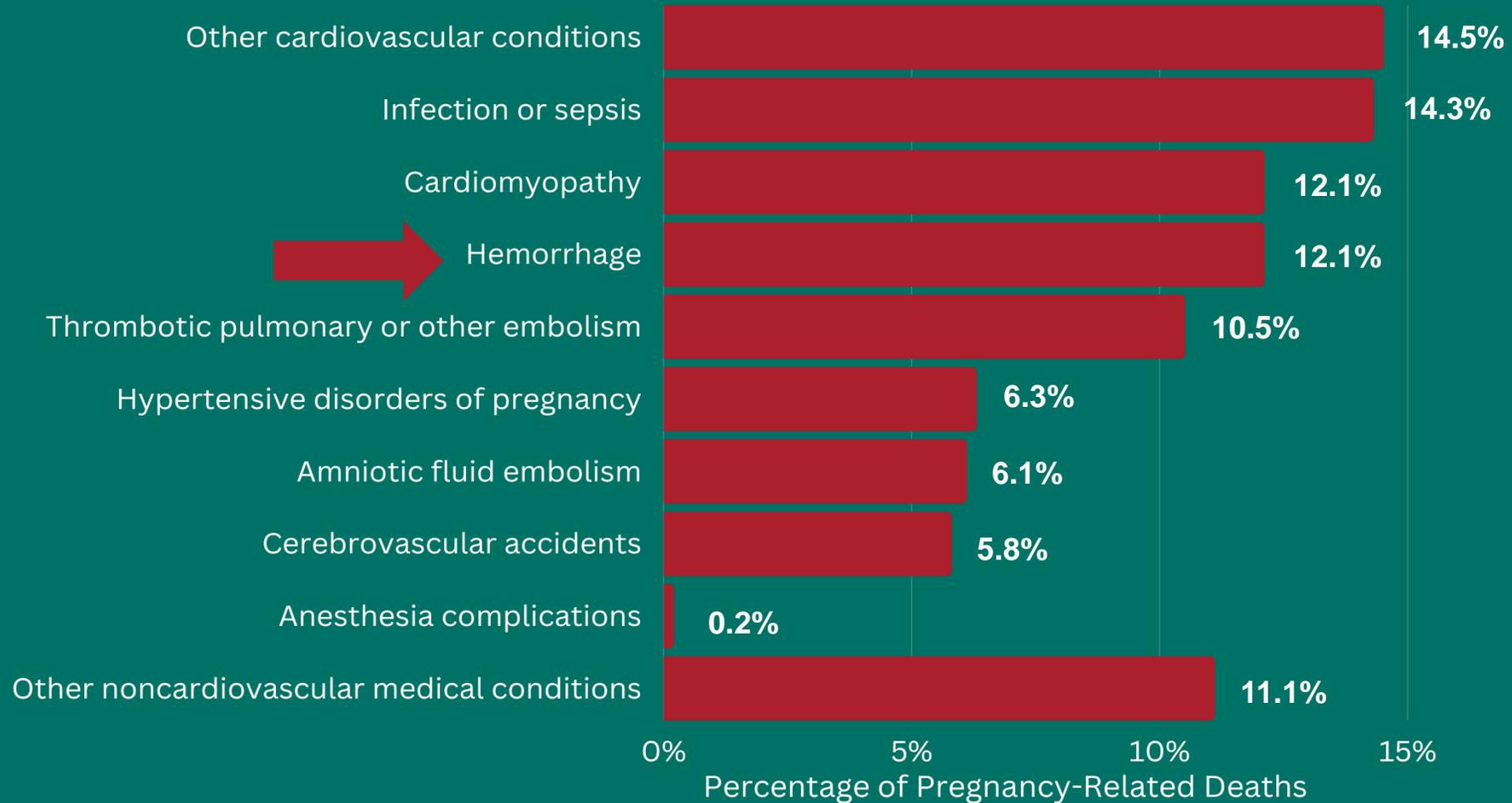
Pregnancy-related mortality: Deaths during pregnancy and up to one year postpartum that are related to pregnancy

Maternal mortality: Deaths during pregnancy and up to 42 days postpartum that are related to pregnancy

Maternal Mortality Rates, by Race and Hispanic Origin: US, 2018–2021



Hemorrhage is the 3rd (Same as Cardiomyopathy) Leading Cause of Pregnancy-Related Death in the US: 2017-2019



EBL vs QBL

Estimated Blood Loss

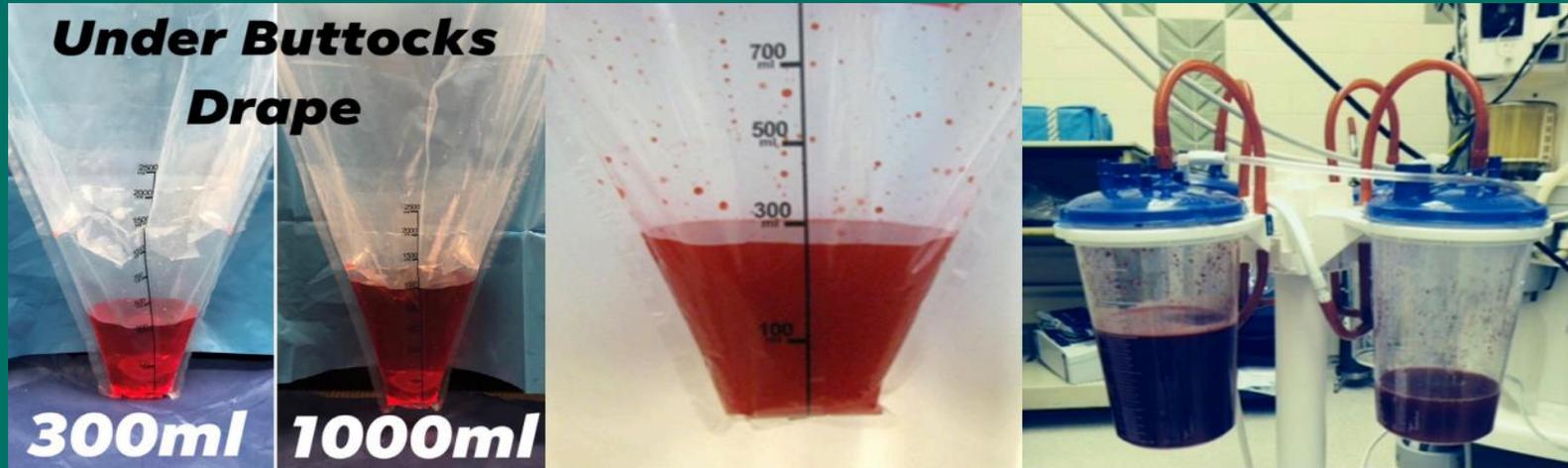
- Quick & easy
- Subjective
- Visual estimation
- High rate of error
- Not 100% accurate

Quantitative Blood Loss

- Can be laborious
- Objective
- Quantifiably measured
- Lower rate of error
- Not 100% accurate

NOTE: With practice and routine adoption, QBL takes only minutes in most births.

Techniques for Quantitative Assessment of Blood Loss (QBL)



Quantify Blood Loss by Measuring:

- Under buttock drapes with graduated markings – may have to lift the bottom of the drape out of the kick bucket to see markings.
- Graduated collection containers
- Account for other fluids (amniotic fluid, urine)
- At C/S, hold irrigation until after blood loss is calculated

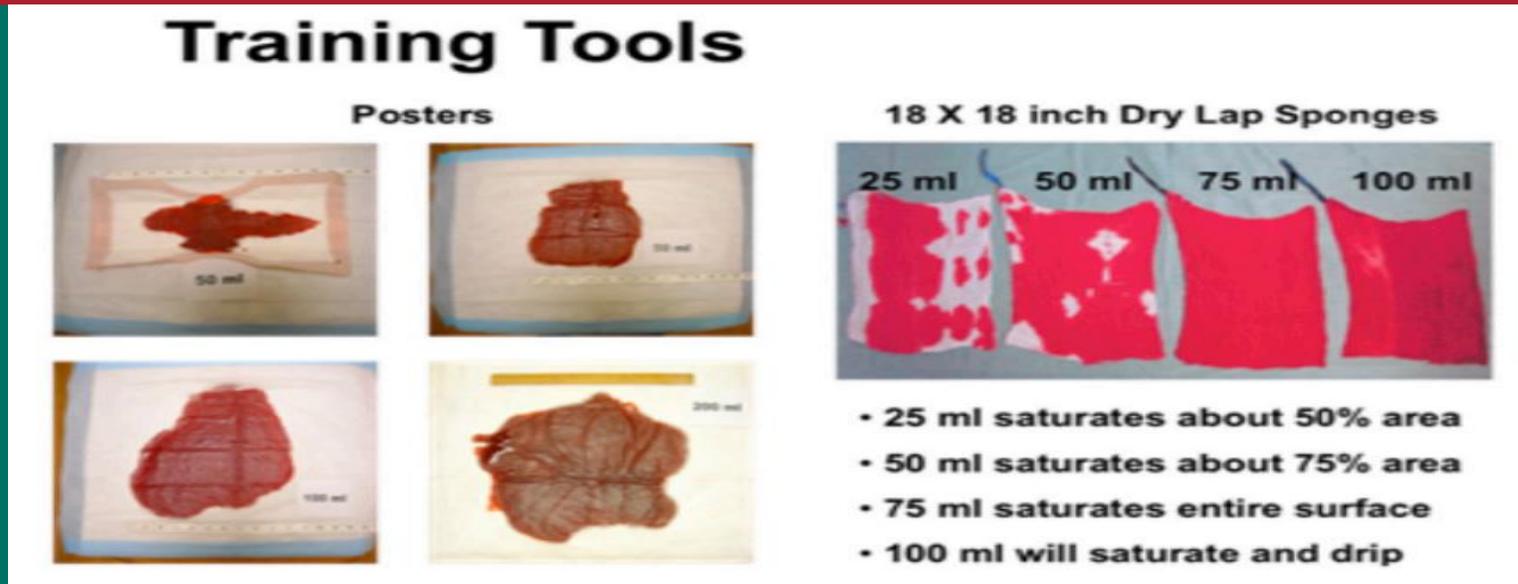
Techniques for Quantitative Assessment of Blood Loss (QBL)



Quantify Blood Loss by Weight:

- Make scales available in all delivery rooms.
- Standardize supplies and establish dry weights of commonly used items (Chux, peripads, lap holder, etc.)
- Incorporate weighing of appropriate materials into routine practice
- Build electronic calculator into electronic health record (EHR)

Techniques for Quantitative Assessment of Blood Loss (QBL)



Quantify Blood Loss by Colorimetric Analysis System:

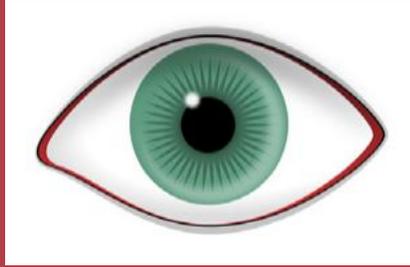
- Use of a computer system programmed with a color density-based algorithm to quantify hemoglobin content in canisters, containers, and absorbed by surgical sponges.

Use formal estimation only if other methods are unavailable:

- Record percent (%) saturation of blood-soaked items using visual cues such as pictures/posters to determine blood volume equivalence of saturated/blood-soaked items.

Terms and Techniques for Describing Blood Loss

EBL



ESTIMATED BLOOD LOSS: Traditional estimation of blood loss by looking at sponges, drapes, and blood in containers and determining blood loss. It tends to be normalized by overestimating small losses and underestimating significant losses.

Multiple observers typically do EBL measurements at the end of the case. Research has shown that training can improve the technique, but accuracy fades unless repeatedly trained.

**QBL
Gravimetric**



Quantitated blood loss by gravimetric technique: The blood loss is determined by weighing items and subtracting the dry weight of the sponge, gauze, or container to determine weight.

The method of QBL measurement has been made easier by embedding calculation tools in the electronic record and making sure scales are readily available.

**QBL
Volumetric**

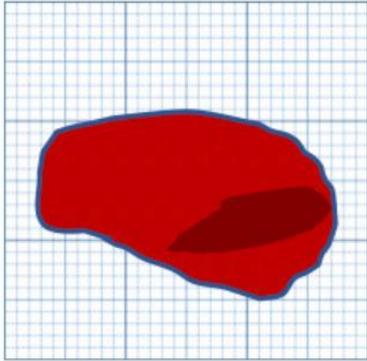


Quantitated blood loss by volumetric technique: The blood loss is determined by observing the total amount of volume containing blood and subtracting the volume represented by amniotic fluid or irrigation.

The method of QBL measurement can be made more accurate and more manageable if workflow observations, such as brief determinations of volumes of amniotic fluid collection before blood suctioning at CS or before shoulders delivered in vaginal delivery.

Terms and Techniques for Describing Blood Loss

QBL
Colorimetric



Quantitated blood loss by COLORIMETRIC technique: The blood loss is determined by a device that scans items or containers and estimates the amount by the size of the spot (pixels) and intensity of color.

The method of QBL measurement requires specialized equipment and training. Workflow adjustments should be made to ease staff work in the OR and postpartum units.

CBL



Cumulative Blood Loss: The ongoing blood loss is determined by adding up the individual EBL or QBL measurements for the events and is used to drive management steps and transfusion.

CBL is the best term to communicate the patient's blood loss and should be visible in the patient's electronic record and verbalized communication between providers during events and handoffs.

QBL Tools

- A. Blood-soaked materials should be placed in a precautionary container system, such as red bagging, but kept accessible to facilitate the resolution of any discrepancies in blood volume loss assessment if needed.



QBL Tools

B. Subtract the materials dry weight from the total weight. Strategies for doing this include:

- i. Zeroing the scale with dry material.
- ii. Weighing blood-soaked material and subtracting known dry weight from the total weight.
 - Facilities should keep an updated list of standard dry weights for materials that are easily accessible.



Dry weight cards

These tables serve as a measurement example for common dry weight items used in most birthing centers. These sample cards can be modified with exact weights and placed on all scales. 1 gram = 1 mL. This tool can be used until a QBL calculator is built into your electronic health record.

Vaginal

Item	Weight, g
Disposable white chux	13
Ice pack	17
4 × 4 sponge	10
Lap sponge	20
Small white peripad	10
Larger blue peripad	70
Blue surgical towel	60
White bath towel	200
Gown	350
Mesh underwear	10
Bath blanket	828
Flat sheet	494
Fitted sheet	756
Baby blanket	124
Face cloth	20

Cesarean

1 pack of lap pads (5 pads)	100
Blue surgical towel	60
Disposable white chux	17
1 blue lap bag	29
Red biohazard bag	25
Disposable white chux	13

QBL Tools

2. Use under-buttocks calibrated V-drapes with measurement marks on collection pouches.

After Delivery of Infant



After Delivery of Placenta



QBL Tools

3. Sample Paper Calculators for Quantifying Blood Loss

Vaginal QBL	
Volume	Calculations/Totals
Total Drape Volume (Completion of Delivery)	
Volume before Placenta Delivery (mostly amniotic fluid)	(Subtract amniotic fluid)
Drape QBL #1	=
Additional Drape Volumes:	
Bloody Lap Sponges, Total weight in grams	
Number of lap sponges _____ x _____ grams	(Subtract dry weight)
Lap Sponges QBL	=
Other bloody item, weight in grams	
Dry item, weight in grams	(Subtract dry weight)
Other item QBL	=
(From above: Drape QBL + Lap Sponge QBL + Other item QBL) Total Delivery QBL	
Bloody Standard Postpartum Perineal Pack in grams (Peripad + quilted blue under pad)	
Dry weight in grams	(Subtract dry weight)
Hospital Standardized Dry Weights in Grams	
Item	Dry Weight in Grams
Lap Sponge	
Standard Postpartum Perineal Pack (peripad + quilted blue under pad)	
Peripad	
Quilted blue under pad	
Blue Towel	
Baby Blanket	
Sheet	
Gown	

QBL Tools

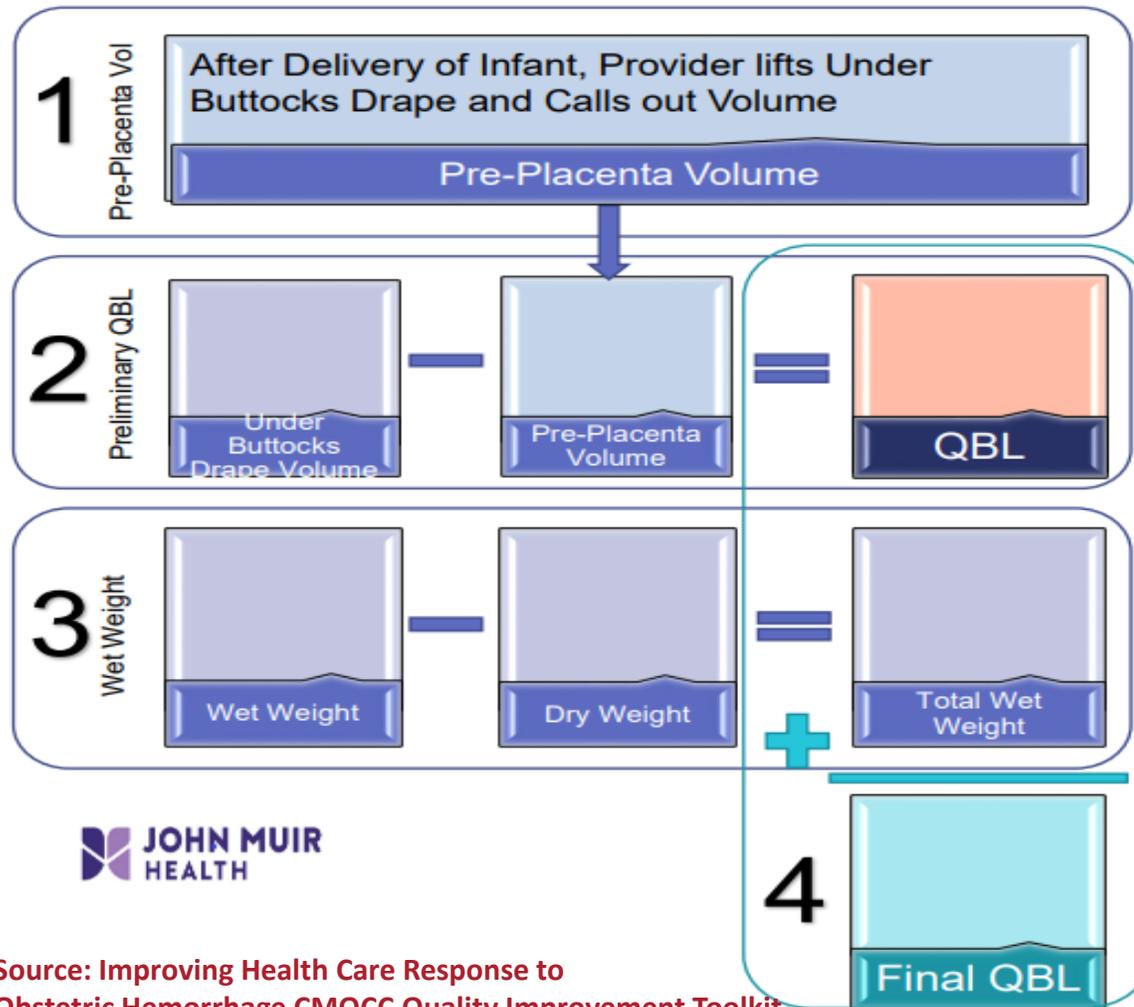
3. Sample Paper Calculators for Quantifying Blood Loss

Cesarean Section QBL	
Volume in Canister (before irrigation preferably)	Calculations/Totals
Volume in Canister before Placenta Delivery (mostly amniotic fluid)	(subtract amniotic fluid)
Irrigation (IF included in canister volume)	(subtract irrigation)
Canister QBL #1	=
Additional Canister Volumes:	
Bloody Lap Sponges + sponge bag holders, Total weight in grams	
Number of lap sponges weighed _____ x ____ grams	(Subtract dry weight)
Number of sponge counter bag weighed _____ x _____ grams	(Subtract dry weight)
Lap Sponges QBL	
Dry item, weight in grams	(Subtract dry weight)
Other item QBL (If applicable)	
(From above: Canister QBL + Lap Sponge QBL + Other item QBL)	
Total Delivery QBL	
Bloody Standard Postpartum Perineal Pack, weight in grams. (Peripad + quilted blue under pad)	
Dry standard postpartum perineal pack, weight in grams	(Subtract dry weight)
Recovery QBL	

Hospital Standardized Dry Weights in Grams	
Item	Dry Weight in Grams
Lap Sponge	
Sponge Counter Bag	
Standard Postpartum Perineal Pack (peripad + quilted blue under pad)	
Peripad	
Quilted blue under pad	
Blue Towel	
Baby Blanket	
Sheet	
Gown	

QBL Tools

4. Sample QBL Worksheet: Vaginal Delivery



Step 1: Determine pre-placenta volume in under buttocks drape
Step 2: At end of repair, when patient is stable, determine under buttocks drape volume and subtract pre-placental volume for preliminary QBL
Step 3: If 4x4's, laps, towels etc. were saturated, weigh them and subtract dry weight for Total Wet Weight.
Step 4: Add Total Wet Weight to Preliminary QBL

Miscellaneous Dry Weights (grams)	
Under Buttocks Drape (UBD)	130
Blue Chux	10
Peripads	10
Large White Underpad	120
Mesh Underpants (Large)	10
Blue towel	55
Plastic kidney basin	20
Vaginal Packing (2"x 15')	30
4 X 4 Sponge	3
Perineal Ice Pack	180
Lap	20
Bath blanket	560
Bath towel	440
Fitted sheet	170

Source: Improving Health Care Response to Obstetric Hemorrhage CMQCC Quality Improvement Toolkit

QBL Tools

4. Sample QBL Worksheet: C-Section

1 Fluid Total

3 Preliminary QBL

2 Wet Weight

4 Final QBL

Kidney Basin Volume (subtract 20 gm for kidney basin dry weight)	
Preliminary QBL	
Final QBL	

Weighed Items: the table to the right is the most commonly used items in a C/S, be sure to add in dry weights from the Miscellaneous Dry Weights table if applicable

Item (commonly use in C/S)	Dry Weight (gm)	Total Weight
Lap holder #1 + 10 laps	220	
Lap holder #2	20	
Lap (1)	20	
4 x 4	3	
Sub Total	263	

Miscellaneous Dry Weights (grams)

Under Buttocks Drape (UBD)	130
Blue Chux	15
Peripads	10
Large White Underpad	120
Mesh Underpants (Large)	10
Blue towel	55
Plastic kidney basin	20
Vaginal Packing (2"x 15')	30
4 X 4 Sponge	3
Perineal Ice Pack	180
Lap	20
Blue lap holder	20
Blue lap holder w/ 10 dry laps	220
Bath blanket	560
Bath towel	440
Fitted sheet	170

Tips for Quantification of Blood Loss During Vaginal Delivery

QBL should be a nurse-led team effort and is within nursing's scope of practice. It doesn't need a provider order or signature.

1. Create a list of dry weights for delivery items that may become blood-soaked with directions on calculating blood loss.
2. Begin quantifying blood loss immediately after the infant's birth (before delivery of the placenta) and assess and record the amount of fluid collected in a calibrated under-buttocks drape. Remember that most of the fluid collected before delivery of the placenta is amniotic fluid, urine, and feces. If irrigation is used, subtract the amount of irrigation from the total fluid that was collected.
3. Record the total volume of fluid collected in the under-buttocks drape.
4. Subtract the preplacental fluid volume from the post-placenta fluid volume to more accurately determine blood loss. Remember that most of the fluid collected after the birth of the placenta is blood.

Tips for Quantification of Blood Loss During Vaginal Delivery

5. Add the fluid volume collected in the drapes to the blood volume measured by weighing soaked items to determine the cumulative volume of blood loss or quantification of blood loss.

6. Weigh all blood-soaked materials and clots to determine cumulative volume.

1 g weight=1 mL blood loss volume

7. The equation* used when calculating blood loss of a blood-soaked item is

Wet items (g) – Dry items (g) = Blood Loss (mL) = QBL in mL

*Although a gram is a unit of mass and a milliliter is a unit of volume, the conversion from one to the other is a simple 1-to-1 conversion.

Tips for Quantification of Blood Loss During Cesarean Births

QBL should be a nurse-led team effort and is within nursing's scope of practice. It doesn't need a provider order or signature.

Begin calculating after delivery of baby but before delivery of placenta

Identify non-blood-related fluids from blood loss:

- Record amniotic fluid in suction canister before delivery of placenta
- Measure and record canister volume after delivery of placenta
- Scrub team communicates when irrigation begins. Irrigation fluid can be suctioned into existing or separate canister.
- Calculate total volume in canisters and deduct amniotic fluid and irrigation amounts to determine blood loss

Tips for Quantification of Blood Loss During Cesarean Births

Weigh saturated items:

- Weigh blood-soaked items and clots. Calculate $g = 1 \text{ mL}$
- **$Wet \text{ items (g)} - Dry \text{ items (g)} = Blood \text{ Loss (mL)} = QBL \text{ in mL}$**

Calculate QBL:

- Add blood volume from canister to saturated items calculation to determine QBL

Blood loss staging

Stage	Blood Loss	Vital Signs	Intervention	Clinical Picture
Stage 0	<500 mL (VB) <1000 mL (C/S)	Stable	Oxytocin	Normal
Stage 1	>500 mL (VB) >1000 mL (C/S)	>15% change HR or HR \geq 110 bpm or BP \leq 85/45 mm Hg O ₂ saturation <95%	Additional measures as outlined in care guidelines (e.g., administer additional uterotonic agents)	Increased bleeding
Stage 2	500-1500 mL (VB) 1000-1500 mL (C/S)	Continued vital sign instability	Blood products considered or initiated	Continued bleeding
Stage 3	>1500 mL	Vital signs unstable	>2 units packed red blood cells transfused	Suspicion for disseminated intravascular coagulation

Adapted from California Maternal Quality Care Collaborative. OB hemorrhage toolkit V3.0 - Appendix C: Obstetric hemorrhage care guidelines: Table format. 2022.
www.cmqcc.org/content/ob-hemorrhage-toolkit-v30-appendix-c-obstetric-hemorrhage-care-guidelines-table-format

Sample Scenario: History of Maternal Death

A 24 year old patient, Gravida 2 Para 1 at 38-week gestation was induced for “tired of being pregnant.”



Sample Scenario (cont.)

- After an 8hr active phase and 2hr 2nd stage, she gave birth (spontaneous vaginal delivery) to an 8 pound, 6 ounce infant.
- After placental delivery, she had an episode of uterine atony that firmed with massage.
- A second episode of uterine atony responded to intramuscular methylergonovine (Methergine) and the physician went home at 1 AM.
- The nurses called the physician 30 minutes later to report more bleeding and further methylergonovine was ordered.
- 60 minutes after the call, the physician performed a dilatation and curettage (D&C) with minimal return of tissue.
- The woman received more methylergonovine.
- 45 minutes later a second D&C was performed, again with minimal returns.
- **Estimated blood loss (EBL) at this point was >2,000 ml.**

Sample Scenario (cont.)

- Further delays in blood transfusion occurred because of inability to find proper blood administration tubing.
- Anesthesia was delayed, but a second IV started for more crystalloid.
- **Abnormal Vital Signs:**
 - HR: 144 bpm
 - BP: 80/30 mm Hg
- One further dose of methylergonovine was given and the woman was taken for a 3rd D&C.
- She had received 2 units of packed red blood cells by this point.
- After the D&C she had a cardiac arrest from hypovolemia and hypoxia, and was taken to the ICU, where she died 3 hours later despite intensive supportive care and resuscitative efforts.

Sample Scenario (cont.): Quality Improvement (QI) Opportunities and Learning Points

- No medical indication for the induction of labor
- No documentation of actual blood loss, e.g., *what does “more bleeding” mean?*
- Only a few treatments tried, e.g., Methergine and D&C, and these treatments were repeated several times, even when they were ineffective
- Underestimation of blood loss
- Delay in administration of blood
- Lack of working equipment
- Delay in response from other team members
- Delays in adequate resuscitation
- Lack of an organized standardized team approach

Key Barriers To QBL and Treating The Patient:

- Inadequate assessments
- Lack of accurate and consistent estimation of blood loss
- Problems with communication and teamwork
- Negative attitudes
- Poor staff buy-in
- Lack of champions and support from hospital administrators



Team Review and Debriefing Form: Postpartum Hemorrhage

READINESS

	Yes/No	Opportunity for Improvement
Hemorrhage cart stocked with all needed supplies		
Hemorrhage medications immediately available		
Emergency response team established		
Massive transfusion protocol available		
Emergency blood release protocol available		

RECOGNITION & PREVENTION

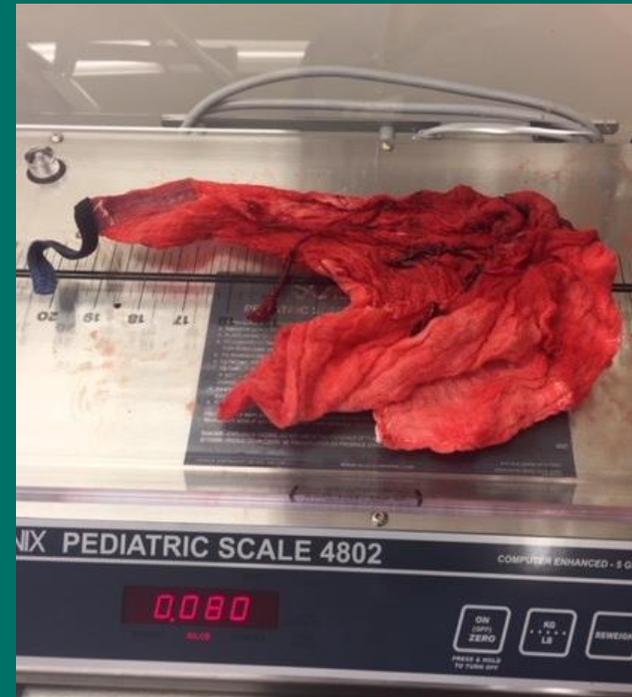
Review risk factors for hemorrhage in this patient: (list factors)

RESPONSE

ASSESSMENT/ACTION	EVALUATION				Notes
	Done	Not Done	Improvement Opportunity	N/A for Scenario	
Provider/Team recognizes PPH in timely manner					
Team calls for hemorrhage cart					
Provider/Team calls for additional assistance					
Team inspects for lacerations					
Provider checks for retained products of conception					
Team diagnoses etiology of hemorrhage accurately					
Team administers uterotronics					
Team communicates about ongoing blood loss					
Team places second IV					
Team orders labs (CBC/PR/PTT)					
Team considers placements of Foley catheter to monitor urine output					
Team considers administering TXA					
Team places uterine balloon or uterine packing					
Team recognizes need for operative management of PPH in timely manner					
Team counsels the patient/family on the need for operative management, including potential need for hysterectomy					
Team considers transfer to other facility					

Healthcare Team Members Should Receive Consistent Training to Recognize and Respond to OB Hemorrhage. This education should include:

- ✓ Use standardized items to calculate blood loss regardless of patient location.
- ✓ Ensure every labor and postpartum room and operative suite has access to scales and postpartum hemorrhage carts.
- ✓ Attach laminated dry weight cards to all scales to accurately measure items that may become blood-soaked.



Healthcare Team Members Should Receive Consistent Training to Recognize and Respond to OB Hemorrhage. This education should include:

- ✓ Ensure electronic charting systems automatically deduct dry weights from wet weights whenever possible.
- ✓ Provide laminated staging algorithms in each patient room or on each PPH cart.
- ✓ Practice simulation drills for postpartum hemorrhage with all members of the interprofessional team.
- ✓ Debrief after every postpartum hemorrhage to identify additional areas of education needed.

Flowsheets

File | Add Rows | Add LDA | Cascade | Add Col | Insert Col | Data Validate | More

Vag Recovery | QBL Calculator | QBL Calculator

Accordion | Expanded | View All | [Icon]

1m | 5m | 10m | 15m | 30m | 1h | 2h | 4h | 8h | 24h | Based On: 0700 | Reset | Now

MB L&D	
4/11/18	
1300	

Blood Loss Calculator

Calculator assistance?	No
Calculated QBL (gm)	[Icon]

Total Quantitative Blood Loss

Total Quantitative Blood Loss (mL)	
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The Importance of QBL for Recognition and Response to OB Hemorrhage:

- QBL is an objective measurement recommended for the early identification of hemorrhage for all births.
- Implementing OB hemorrhage bundles that include QBL has significantly reduced maternal morbidity.
- QBL helps increase the timely escalation of clinical care and can thus influence outcomes.
- QBL offers a means by which the clinician can use objective measurement to support early response to and management of postpartum hemorrhage.
- QBL is recommended to reduce inaccuracies that can cause delays in decision-making and response to postpartum hemorrhage.

The Importance of QBL for Recognition and Response to OB Hemorrhage:

- Real-time completion of QBL may reduce the need for additional interventions, such as the administration of uterotonic medication, which may lead to potential side effects, unnecessary procedures, and blood transfusions.
- QBL is a valuable tool for the appropriate surveillance and rescue of women who experience postpartum hemorrhage.
- QBL promotes increased team awareness of patient emergencies, which provides more time to mobilize additional resources.
- QBL contributes to earlier use of uterotonics when indicated and reduced blood transfusions, leading to improved patient outcomes.

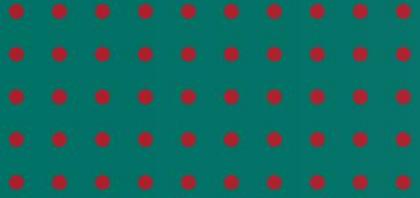
Quantification of Blood Loss



Every Birth

CONCLUSION

Accurately measuring blood loss is crucial for effective clinical evaluation of a patient's condition, which can lead to early detection of clinical deterioration. QBL is a valuable tool for healthcare professionals as it objectively measures blood loss. It helps to improve clinician vigilance and team awareness and promotes timely and strategic responses to the clinical situation. Studies have demonstrated that incorporating QBL as part of a standardized process in an OB hemorrhage bundle has improved outcomes and cost reduction. Therefore, integrating QBL as a routine practice can improve patient safety, reduce healthcare costs, and save lives.



THANK YOU!

"Nothing worth it comes easy."

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