

# Recognizing Obstetric Hemorrhage using Quantitative Blood Loss

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# Disclosures:

- **Nothing to disclose**



# Objectives

- Discuss the effect of obstetric hemorrhage on maternal morbidity
- Describe the difference between estimated blood loss (EBL) and quantitative blood loss (QBL)
- Identify tools needed to perform QBL
- Discuss implementation of QBL at your institution
- Discuss ways to overcome barriers to implementation

# Background: “The Why” Hemorrhage is...



- Cumulative blood loss greater than 1000mL or any amount of blood loss with hypovolemia related symptoms (ACOG, 2017).
- The leading cause of maternal morbidity and mortality on days 0-6 postpartum (AWOHNN, 2015).
- Accounts for 11% of maternal deaths in the US (ACOG, 2019).
- 54-93% of these deaths preventable (ACOG, 2019).
- 20% of women have no risk factors (JC, 2019).

Quantification of Blood Loss

# WOMEN DIE

FROM POSTPARTUM HEMORRHAGE  
BECAUSE THEY **DO NOT** RECEIVE

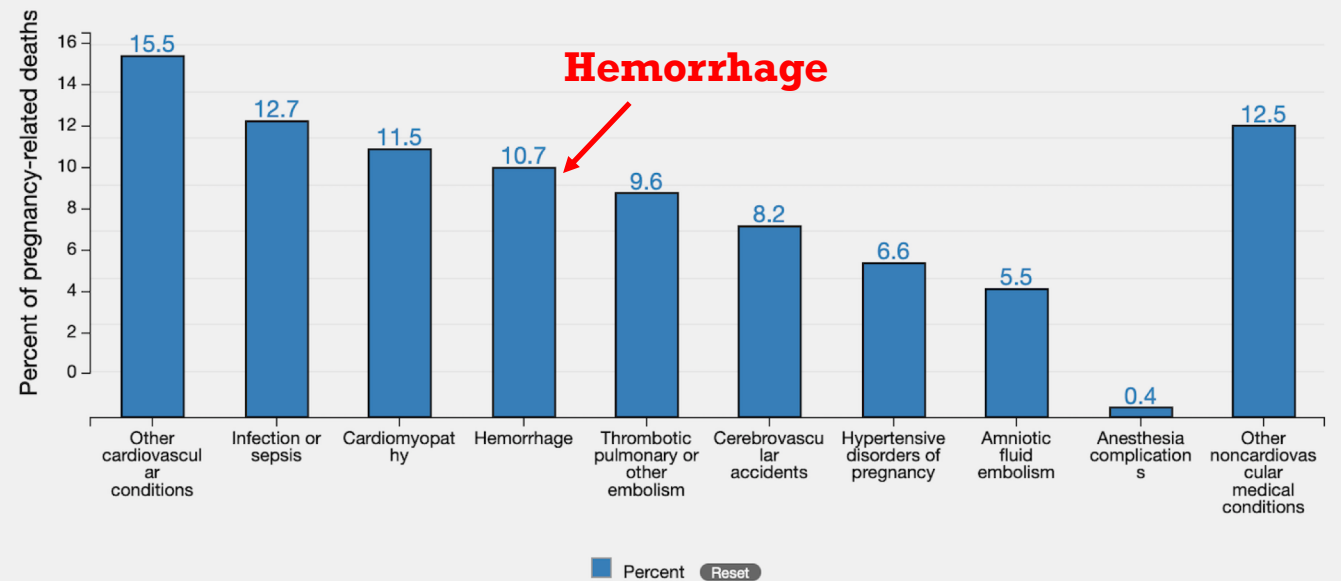
# EARLY INITIATION

OF **EFFECTIVE** INTERVENTIONS

[Awhonn.org](http://Awhonn.org)

# National Data:

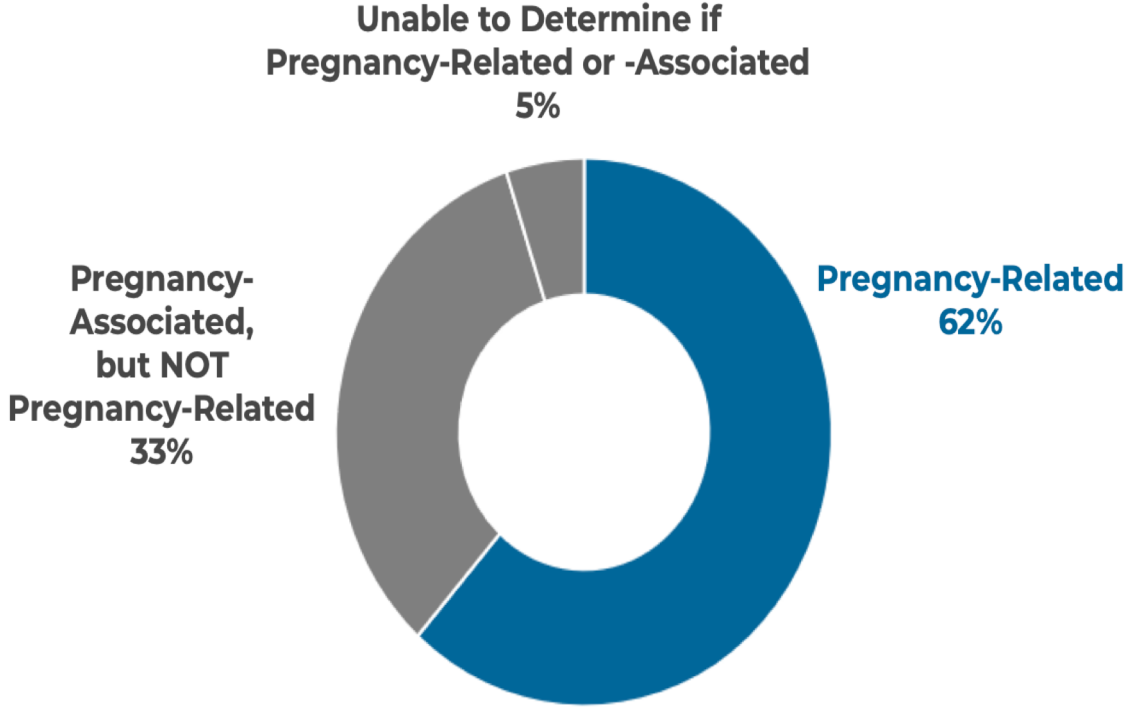
## Causes of pregnancy-related death in the United States: 2014-2017



SC Data:

1

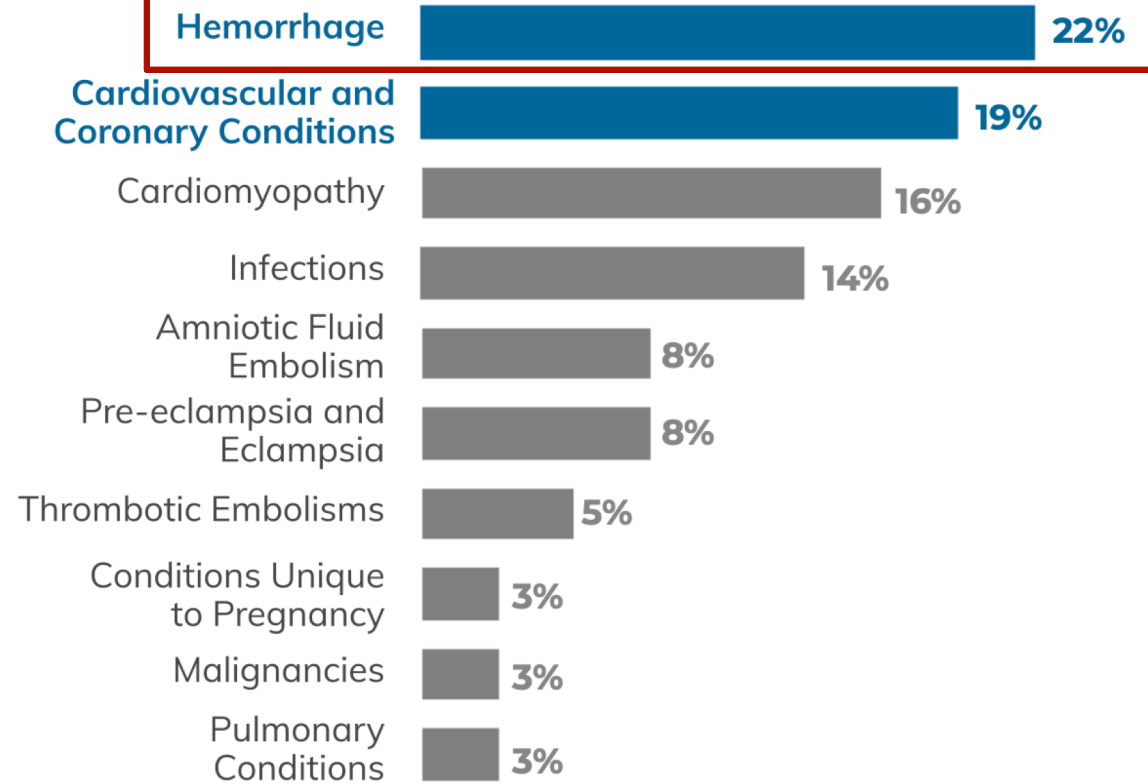
62% of maternal deaths reviewed by the Committee were determined to be pregnancy-related (n=37).



## SC Data:

2

**Hemorrhage and cardiovascular and coronary conditions were the leading causes of pregnancy-related deaths.**



SC Data:

3

**68% of pregnancy-related deaths were determined to be preventable (i.e., there was at least some chance to alter the outcome).**



Preventable  
**68%**



Not Preventable  
**30%**

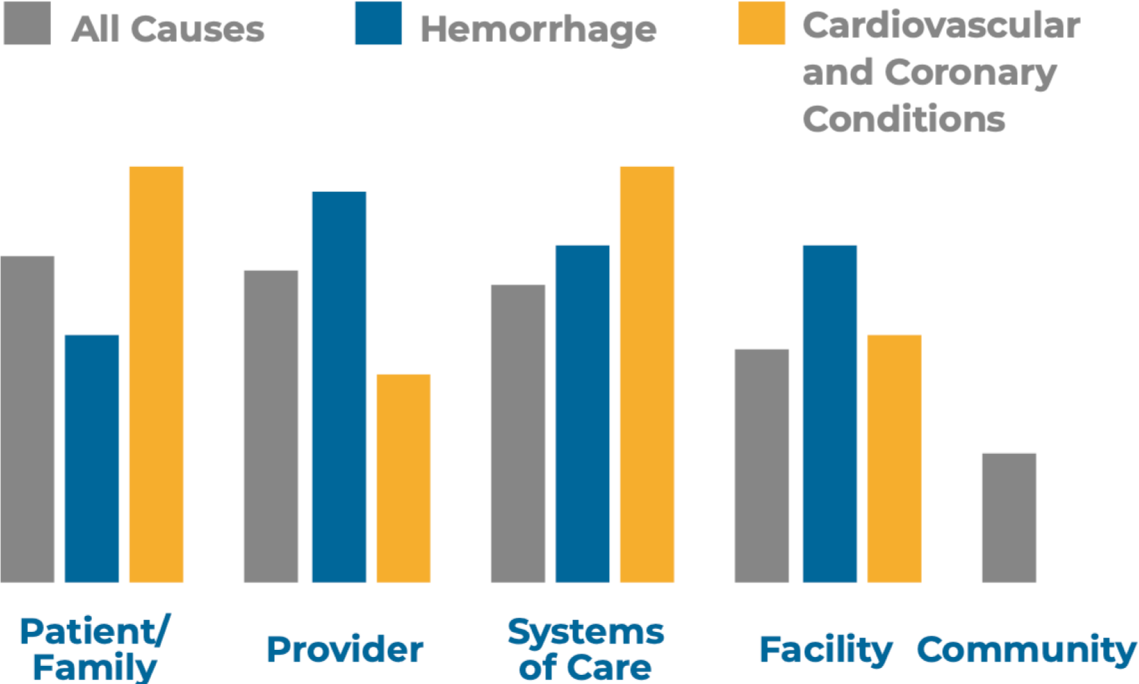


Unable to Determine  
**3%**

SC Data:

4

Contributing factor classifications vary in their distribution within the leading causes of pregnancy-related death.







- The Alliance on Innovation on Maternal Health (AIM) purpose is to “equip, empower and embolden every state, perinatal quality collaborative, hospital network/system, birth facility and maternity care provider in the U.S to significantly reduce severe maternal morbidity and maternal mortality through proven implementation of consistent maternity care practices.”

## READINESS

### Every unit

- Hemorrhage cart with supplies, checklist, and instruction cards for intrauterine balloons and compressions stitches
- Immediate access to hemorrhage medications (kit or equivalent)
- Establish a response team - who to call when help is needed (blood bank, advanced gynecologic surgery, other support and tertiary services)
- Establish massive and emergency release transfusion protocols (type-O negative/uncrossmatched)
- Unit education on protocols, unit-based drills (with post-drill debriefs)

## RECOGNITION & PREVENTION

### Every patient

- Assessment of hemorrhage risk (prenatal, on admission, and at other appropriate times)
- Measurement of cumulative blood loss (formal, as quantitative as possible)
- Active management of the 3rd stage of labor (department-wide protocol)

## RESPONSE

### Every hemorrhage

- Unit-standard, stage-based, obstetric hemorrhage emergency management plan with checklists
- Support program for patients, families, and staff for all significant hemorrhages

## REPORTING/SYSTEMS LEARNING

### Every unit

- Establish a culture of huddles for high risk patients and post-event debriefs to identify successes and opportunities
- Multidisciplinary review of serious hemorrhages for systems issues
- Monitor outcomes and process metrics in perinatal quality improvement (QI) committee

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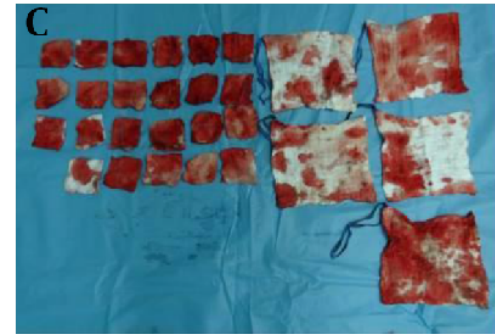
Standardization of health care processes and reduced variation has been shown to improve outcomes and quality of care. The Council on Patient Safety in Women's Health Care disseminates patient safety bundles to help facilitate the standardization process. This bundle reflects emerging clinical, scientific, and patient safety advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed. Although the components of a particular bundle may be adapted to local resources, standardization within an institution is strongly encouraged.

The Council on Patient Safety in Women's Health Care is a broad consortium of organizations across the spectrum of women's health for the promotion of safe health care for every woman.

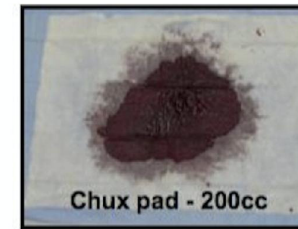
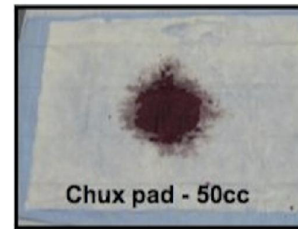
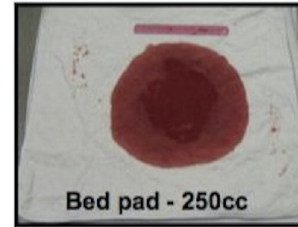
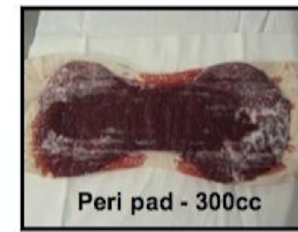


- **Estimated Blood Loss (EBL)**
  - Common practice of measuring and documenting blood loss at delivery.
  - Underestimation – delayed or missed treatment.
  - Overestimation – unnecessary treatment.
  - Estimates can be 30-50% less than actual volume (AWHONN, 2015).
- **Quantitative Blood Loss (QBL)**
  - Objective method to measure and document blood loss at delivery.
  - Collection drapes and weights of blood-soaked items.
  - 15% error rate (AWHONN, 2015; ACOG, 2019).
  - ***Accurate recognition and treatment of PPH leads to improved maternal outcomes.***

What is your best  
“guess-timation”  
of blood loss?



# Old school vs new school



# Hemorrhage: How Much is too Much?

- > 500 mL for vaginal delivery and > 750 mL for C/S
  - BUT 500 mL for NSVD is the **average**
  - 750 mL for C/S is **average**
  - And for most women well tolerated
- WHO defines
  - EBL of > 500 mL an “alert line”
  - > 1000 mL an “action line”
- ACOG (reVITALize)
  - Cumulative EBL > 1,000 mL for either vaginal or cesarean birth with enhanced surveillance and early interventions, as needed, for 500-1000 mL
- 4-5% of women > 1000 mL - A clinically significant amount!!

**1/3 of women  
with > 1000 ml  
NO risk factors**



# Maternal Physiology: Cool Facts

- Blood volume
  - 60 kg gravid women about 6 L by 30 weeks
- Uterus weight
  - Pre pregnancy: 40 – 70 grams
  - Third trimester: 1,200 grams
- Uterine cavity capacity
  - Pre pregnancy: 10 mL
  - Third trimester: 5,000 mL
- **Blood Flow**
  - **Pre pregnancy: 2% cardiac output**
  - **Third trimester: 17% cardiac output: 600 – 800 mL/min**





# Trauma Assessment of Blood Loss

Class	Blood Loss Volume	Total Deficit	Signs/Symptoms
I	<1000 mL	15%	Orthostatic Tachycardia
II	<1500 mL	15-25%	Resting tachycardia, orthostatic hypotension
III	<2,500 mL	25-40%	Resting hypotension, oliguria
IV	>2,500 mL	>40%	Obtunded, Cardiovascular collapse





- Measuring QBL from delivery through any potential PPH gives a more complete picture of blood loss.
  - Example:
    - Delivery - 700mL blood loss
    - PPH – 800mL blood loss
    - This patient is now a stage 3 on the obstetric hemorrhage algorithm
  - Quantification of blood loss contributes to earlier use of uterotonics, reduction of blood transfusions and improved outcomes (AWHONN, 2021)
- Hypovolemia is a **LATE SIGN** of blood loss.
- Failure to recognize PPH blood loss is the *leading cause* of maternal M&M.
- **Women die due to delayed initiation of effective interventions.**



# Does a postpartum hemorrhage patient safety program result in sustained changes in management and outcomes?

Brett D Einerson<sup>1</sup>, Emily S Miller<sup>2</sup>, William A Grobman<sup>2</sup>

- After the introduction of the program there was a significant **increase in the use of uterotonic medications** ( $P < .001$ ), **intrauterine balloon tamponade** ( $P = .002$ ), **B-Lynch suture placement** ( $P = .042$ ), **uterine artery embolization** ( $P = .050$ ), and **cryoprecipitate use** ( $P = .0222$ ). Concomitantly, the number of days between admissions to the intensive care unit for PPH increased.



- Implementation of obstetric hemorrhage bundles are associated with improved clinical outcomes
- Further research is needed to evaluate QBL efficacy on reducing maternal hemorrhage-related morbidity

# Performing QBL

## **QBL Vaginal delivery**

[https://www.youtube.com/watch?v=F\\_ac-aCbEn0](https://www.youtube.com/watch?v=F_ac-aCbEn0)

<https://www.youtube.com/watch?v=jjy2Uevf7MM>

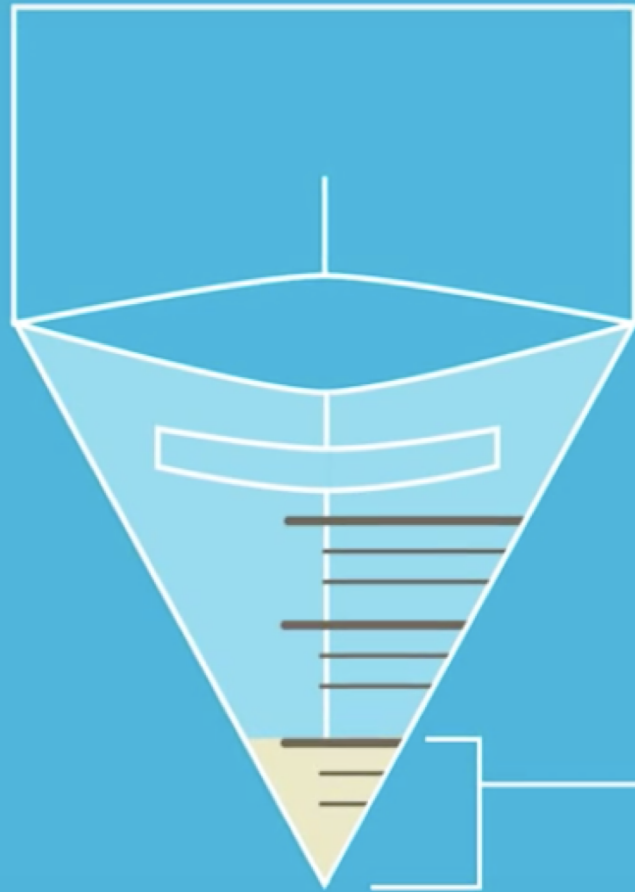
## **QBL Cesarean Section**

<https://www.youtube.com/watch?v=og9F'Tq9ZuQM>

Performing QBL  
for vaginal  
deliveries...



## Quantification of Blood Loss



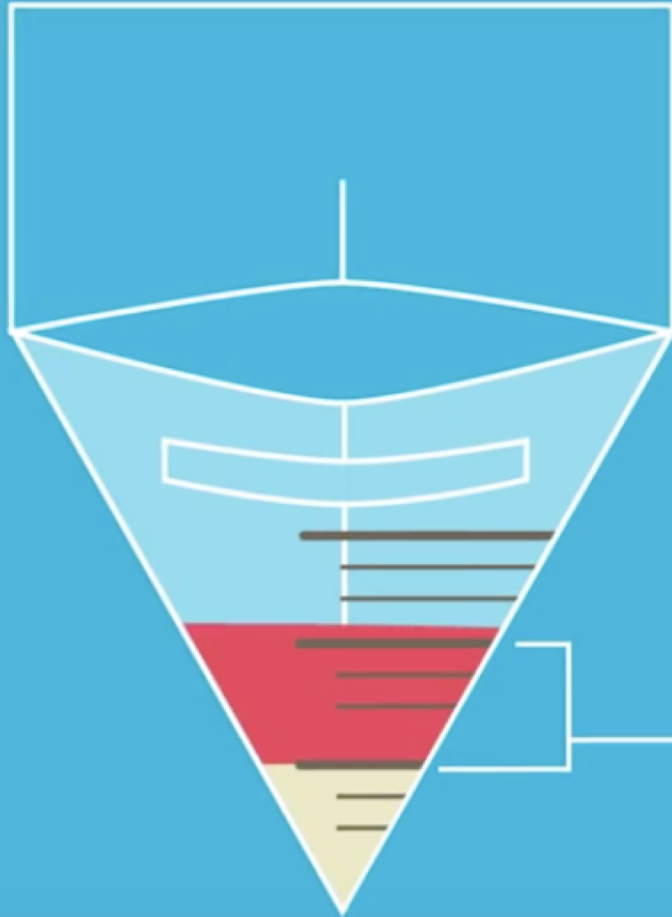
before  
the placenta

**CHECK FLUID IN  
UNDER  
BUTTOCKS  
DRAPE AFTER  
BABY BEFORE  
PLACENTA.**

**MOST OF THIS  
WILL BE  
AMNIOTIC  
FLUID, URINE,  
STOOL**

Awhonn.org

## Quantification of Blood Loss



**RECORD  
VOLUME AFTER  
THE PLACENTA**

**SUBTRACT  
VOLUME FROM  
BEFORE  
PLACENTA**

after  
the placenta

Quantification of Blood Loss

WEIGH ALL  
blood soaked  
materials & clots



[Awhonn.org](http://Awhonn.org)



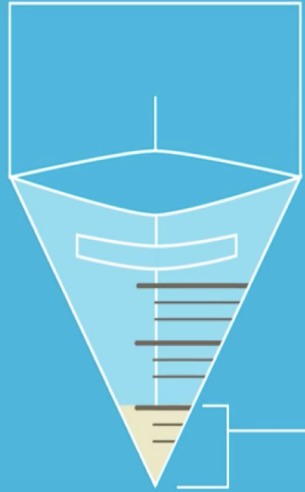
- BRING SCALE INTO ROOM BEFORE BABY OR SUPPLY EACH ROOM WITH ITS OWN SCALE
- PUT ON A CHUCKS PAD TO KEEP IT CLEAN
- DON'T FORGET TO ZERO SCALE
- REMEMBER TO PUT ALL CLOTS & USED SPONGES ONTO SCALE





# THE QBL PROCESS IS EASY AS....

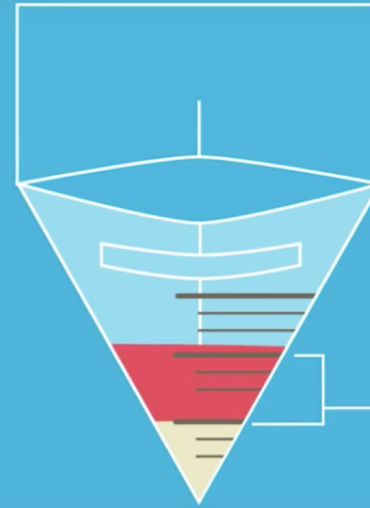
Quantification of Blood Loss



before  
the placenta

1

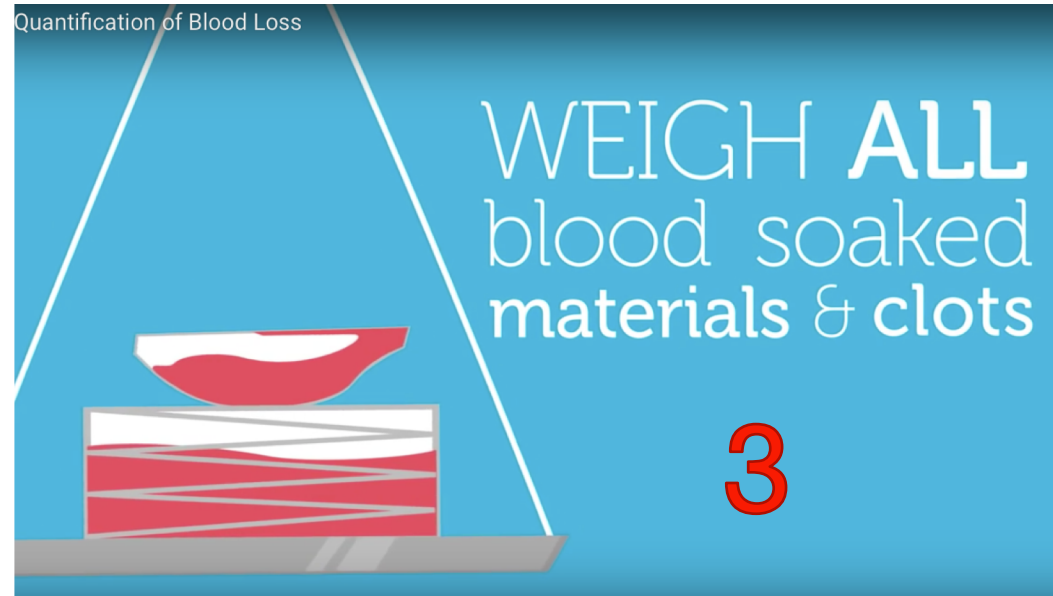
Quantification of Blood Loss



after  
the placenta

2

Quantification of Blood Loss



WEIGH ALL  
blood soaked  
materials & clots

3



**Subtract  
Dry Weight**

## Quantification of Blood Loss

**1ml**



=

**1g**

**Measure**

[Awhonn.org](http://Awhonn.org)

**140g** wet weight

— **40g** dry weight

---

**100ml** BLOOD LOSS

Don't forget  
to...

- COMMUNICATE
- **COMMUNICATE!!**
- **COMMUNICATE!!!!!!!!!!**

The doctors and nurses must communicate for QBL to be a *success!*

START SMALL  
and  
*PRACTICE*

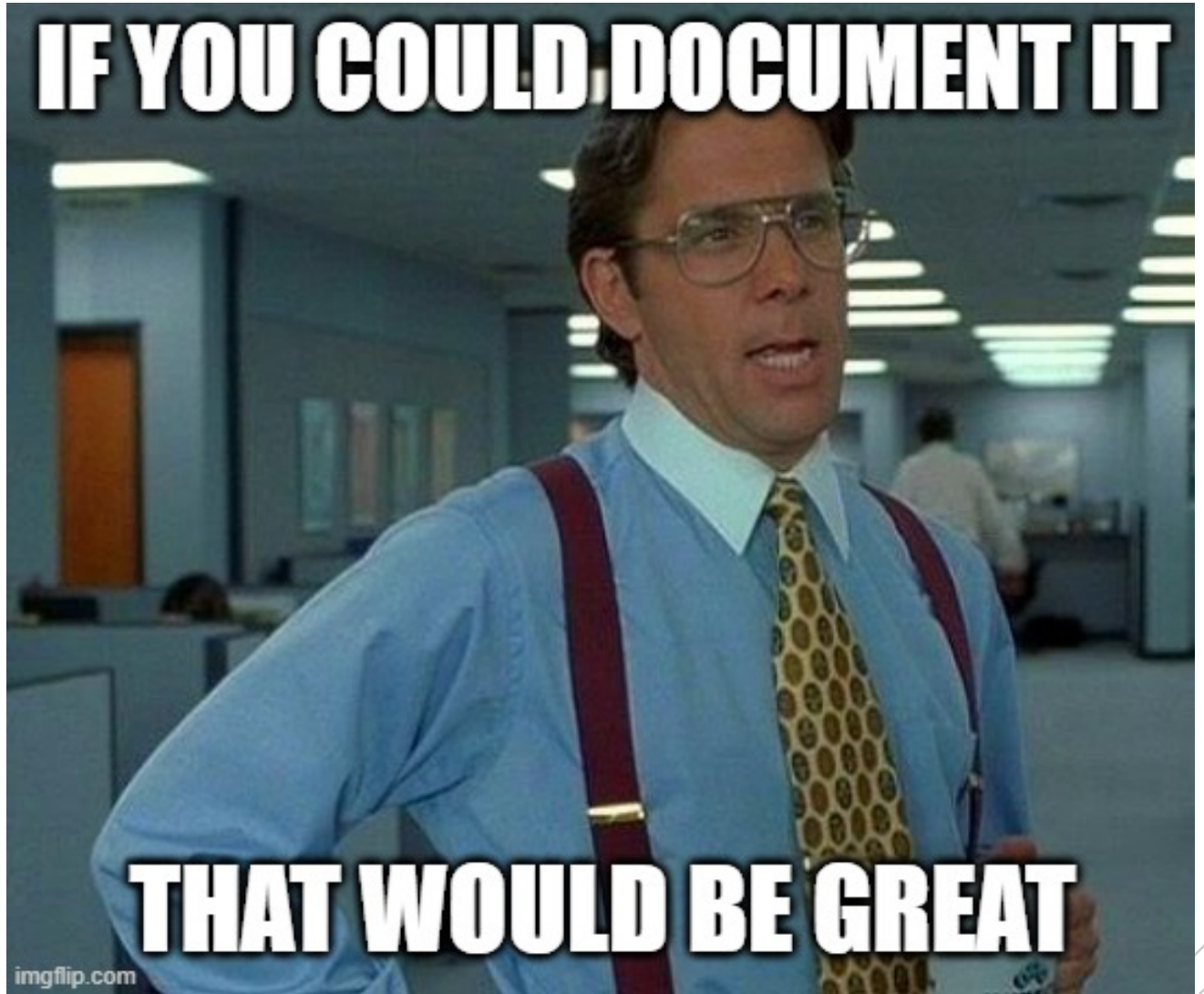
- Pick 1 expected vaginal delivery patient in a shift to start
- Discuss with the team-
  - “ We are going to do QBL for Lr4, let’s quickly go over the steps”
- Do it, ( Buddy System, use support system to do the math)
- Debrief: “ Hey team... how did that go?”
- Plan for next patient
- Share your recommendations with champions

Quantitative  
blood loss at the  
time of cesarean  
section

Coming  
Soon!

DOCUMENTATION...  
the “who, what,  
when and where..”

**IF YOU COULD DOCUMENT IT**



imgflip.com



Drape Volume at Newborn Delivery (Ask MD to Call Out) \_\_\_\_\_ mL

Drape Volume at Completion of Delivery (Pt Stabilized) \_\_\_\_\_ mL

Zero scale before placing items on scale

Item Name	Item Count
Fitted Sheet	
Flat Sheet	
<u>Pillow Case</u>	
White Bed Spread	
Baby Blanket	
White Blanket (in warmer)	
Blue Chux	
Covidien Chux Pad	
Green Chux	
White Cloth Chux Pad (reusable)	
Yellow Chux Pad	
Blue Under-Buttocks Drape	
Calibrated Under-Buttocks Drape	
Clear Under-Buttocks Drape	
OR Gauze Count Bag	
Sponge counter in the OR	
Pink Peripad	
White Peripad	
4x4 Gauze Pad	
Boston Roll	
Lap Pad/Sponge	
Gauze Pad (X-Ray Detectable)	
Mesh Panties	
Bath Towel	
Blue Towel	
Wash Cloth	
Supplies	
Cardboard Tub*	
Emesis Basin	
Fetal Monitor Strap (each)	
Gown	
Ice pack	
Sage Bath Wipe	

Weight \_\_\_\_\_g

Weight \_\_\_\_\_g

Weight \_\_\_\_\_g

Weight \_\_\_\_\_g

Weight \_\_\_\_\_g

Total Weight \_\_\_\_\_g

Record total weight in EPIC along with Item Count to calculate QBL

**1g = 1mL blood loss**

An example of our QBL worksheet present in all L&D rooms worksheet

\*Use cardboard tub to place large items in for weight

OB QBL Calculator

Time taken: 4/27/2020 1600 + Add Group More Show Row Info Show Last Filed Value

### Delivery Blood Loss

Canister/Drape at Newborn Delivery (mL)

150

Enter the volume in the canister/drape at newborn delivery to determine QBL.

Canister/Drape at Completion of Delivery (mL)

446

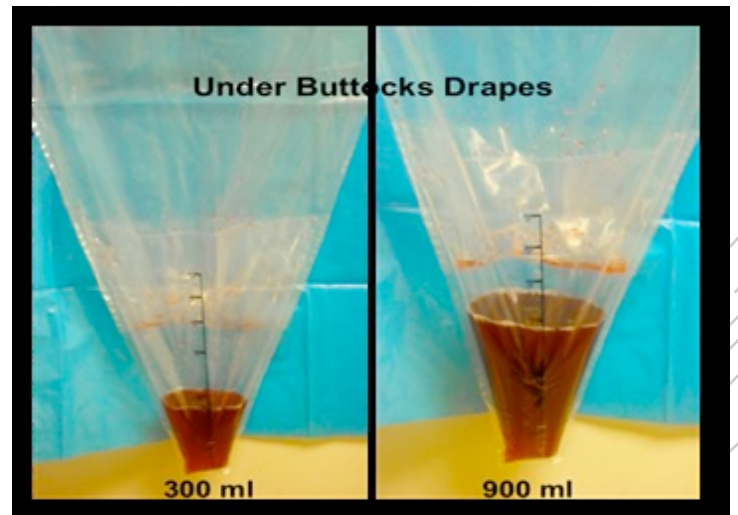
Enter the volume in the canister/drape at completion of delivery to determine QBL.

Canister/Drape- Blood Loss (mL)

296

Blood loss determined between the Membrane Fluid volume and the Canister/Drape Volume to determine QBL.

Auto-calculated behind the scenes.



**Flowsheets**

File Add Rows LDAAvatar Add Col Insert Col Data Validate Hide Device Data

Labor OB Physical Assessment Daily Care/Nsg Quality IV Documentation **Intake/Output** Checklist

Search (Alt+Comma) Expanded View All

Hide All Show All

WEIGHTS

INTAKE

PUMP RATE VERIFY

MAINTENANCE

URINE

STOOL

EMESIS

BLOOD

**Blood Output**

TYPE OF LDA

OTHER OUTPUT

1m 5m 10m 15m 30m **1h** 2h

Admission (Current) fr...	
4/27/20	
1600	

Intermittent/Straight Cath (mL)

\$ Intermittent Cath Charge

Bladder Scan Volume (mL)

\$ Bladder Scan Charge

Diaper Weight (mL)

Unmeasured Urine Occurrence

Urinary Incontinence

Urine Amount

Urine Color

Urine Appearance

Urinary cath replaced prior to urine

Additional Urine Volume Rows

**Stool Output**

Unmeasured Stool Occurrence

Stool (mL)

Bowel Incontinence

Stool Amount

Stool Characteristics (Bristol)

Stool Color

**Emesis Output**

Emesis

Unmeasured Emesis Occurrence

Emesis Amount

Emesis Color/Appearance

**Blood Output**

Est. Blood Loss

**Quantitative Blood Loss (mL)** 296

Type of LDA

Type of Drain (LDA)

- Cumulative QBL will automatically flow to the intake/output activity tab and flowsheet

**Intake/Output**

Table Graph Cumulative Refresh I/O Flowsheet

4/27/2020 Shift Expand All Collapse All  Daily Running Totals

	Apr 26 - Apr 27			Apr 27 - Apr 28		
	0701 - 1900	1901 - 0700	Daily Total	0701 - 1900	1901 - 0700	Daily Total
<b>Blood</b>						
Out <b>Blood Output: Quantitative Blood Loss (mL)</b>				296		296
<b>Total Output</b>				<b>296</b>		<b>296</b>
<b>I/O</b>						
Net				<b>-296</b>		<b>-296</b>
Since Admit	0	0	0	-296	-296	-296

# Cumulative QBL documentation with continued PPH

**Flowsheets**

File Add Rows LDAAvatar Add Col Insert Col Data Validate Hide Device Data Last Filled Reg Doc Graph Go to Date Value

Checklist Recovery Mag Sulfate Fetal/Pediatric Berea... Screenings OB OR Pregnant Recovery OB OR Recovery Antepartum **OB QBL Calc**

Search (Alt+Comma) Hide All Show All

Delivery Blood Loss  Items (Quantity being weighed)  Quantitative Blood Loss

Accordion Expanded View All

1m 5m 10m 15m 30m 1h 2h 4h 8h 12h 24h Based On: 0700 Reset Now

Admission (Current) from 5/5/2020 in...  
5/5/20

	1400	1457
Canister/Drape at Placenta Delivery (mL)	200	
Canister/Drape at Completion of Delivery (mL)	700	
Canister/Drape- Blood Loss (mL)	500	

Items (Quantity being weighed)

Bedding- Fitted Sheet (# used)		
Bedding- Flat Sheet (# used)		
Bedding- Pillow Case (# used)		
Bedding- White Bed Spread (# used)		
Blanket- Baby (# used)	2	1
Blanket- White (# used)		
Cardboard Tub (# used)		
Chux- Blue (# used)		
Chux- Green/Covidien (# used)	1	
Chux- White Cloth (# used)		
Chux- Yellow (# used)		
Drape- Calibrated Under-Buttocks (# used)		
Drape- Clear Under-Buttocks (# used)		
Emesis Basin (# used)		
Fetal Monitor Strap-each (# used)		
Gown (# used)	1	
Ice Pack (# used)		1
OR Sponge counter- Greenville (# used)		
OR Sponge counter- Columbia (# used)		
Peripad- Pink (# used)		
Peripad- White (# used)	1	1
Pad- 4x4 Gauze (# used)	4	
Pad- Boston Roll (# used)		
Pad- Lap/Sponge (# used)		
Pad- Raytec (# used)		
Panties- Mesh (# used)		
Panties- White (# used)		
Towel- Bath (# used)	1	
Towel- Blue Sterile (# used)		
Towel- Wash Cloth (# used)		
Wipe- Sage Bath (# used)		
Total Wet Weight of all items (g)	1500	600
Weighed Items Blood Loss (mL)	431	272

Quantitative Blood Loss

Quantitative Blood Loss (mL)	931	272
------------------------------	-----	-----

Barriers to  
implementation



easy  
BL  
difficult  
can't  
hard  
help  
busy  
forgot  
tasks  
BL  
safety  
uncomfortable

DOESN'T THIS  
TAKE TOO  
LONG?

- On average, once the process is fully implemented it takes...

**2 MINUTES**

[Cmqcc.org](http://Cmqcc.org)



Overcoming  
barriers... and  
*lessons learned*

- Practice and remember to **COMMUNICATE**
- Engage all team members by assigning multidisciplinary team leads/champions for QBL (nursing, residents, attendings, etc)
- Recognizing that EVERYONE on the team is key to driving change
- Set **realistic goals** and be **flexible** in your timeline while team members adjust to this new process
- Analyze and publish outcomes showing the process measures and improved clinical outcomes

**Bottom line: Quick recognition and treatment can save your patient's life**

# References

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- Berg, C., Danel, I., Atrash, H., Zane, S., & Bartlett, L. (2001). Strategies to reduce pregnancy-related deaths. from identification and review to action, 2001.
- **2** Petersen, E. E., Davis, N. L., Goodman, D., Cox, S., Mayes, N., Johnston, E., ... & Barfield, W. (2019). Vital signs: pregnancy-related deaths, United States, 2011–2015, and strategies for prevention, 13 states, 2013–2017. *Morbidity and Mortality Weekly Report*, 68(18), 423.
- **3** South Carolina Vital and Morbidity Statistics 2019. (2020, November). Retrieved from [https://scdhec.gov/sites/default/files/media/document/Vital-Morbidity-Statistics\\_2019.pdf](https://scdhec.gov/sites/default/files/media/document/Vital-Morbidity-Statistics_2019.pdf).
- **4** Building U.S. Capacity to Review and Prevent Maternal Deaths. (2018). Report from nine maternal mortality review committees. Retrieved from [http://reviewtoaction.org/Report\\_from\\_Nine\\_MMRCS](http://reviewtoaction.org/Report_from_Nine_MMRCS)

**WHO CAN DO IT?**



**YOU CAN DO IT!**



**thanks for  
listening!**