

# Quantifying postpartum blood loss:

## Best-practice approach to identify hemorrhage

What are the recommendations to identify postpartum hemorrhage? Use this step-by-step process to minimize barriers and build confidence to efficiently quantify excessive blood loss postpartum.

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Childbirth can be emotionally intimidating and distressing for some, which can lead to lasting ill effects, including difficulties breastfeeding and bonding, as well as long-term problems with emotional health such

as posttraumatic stress disorder or postpartum depression (PPD).<sup>1</sup> Postpartum hemorrhage (PPH) is an obstetric emergency that has been linked to psychological and emotional distress among birthing parents



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and their partners. Maternal hemorrhage is defined as cumulative blood loss that exceeds 1,000 mL or is accompanied by symptoms of hypovolemia or unstable vital signs within the first 24 hours following birth.<sup>2</sup> However, blood loss over 500 mL in a vaginal delivery is abnormal, and should be investigated and managed (see *Blood loss staging*).<sup>3</sup>

Between 3% and 5% of birthing parents will experience a hemorrhage during childbirth; this complication accounted for 10.7% of maternal deaths in the US from 2014 to 2017.<sup>4,5</sup> The number of blood transfusions involving pregnancy-related mortality and severe maternal morbidity is unacceptably high in the US,<sup>6</sup> which creates urgent ethical implications for maternity staff who must quickly recognize, respond to, and treat PPH with standardized, evidence-based practice methods.<sup>6</sup>

State and national initiatives offer guidelines for a PPH response to help obstetric providers and nurses recognize and treat hemorrhage.<sup>7</sup> Curiously, despite reports of debilitating physical and psychological trauma following a hemorrhage and recommendations to use objective tools to measure PPH blood loss, visual estimation (VE) of blood loss continues, and hemorrhages persist as the leading preventable cause of

postpartum morbidity and mortality.<sup>8</sup> Traditional VE remains common practice on labor and delivery units and grossly underestimates blood loss by 33% to 50%, leading to delay of life-saving hemorrhage interventions.<sup>9</sup> Approximately 54% to 93% of maternal hemorrhage-related deaths could have been prevented with improved clinical response.<sup>10</sup> The purpose of this article is to help nurses with a procedural resource guide to quantify blood loss (QBL) postpartum and improve care quality with a best-practice change on their birthing unit. This step-by-step approach to QBL is meant to empower nurses to become confident team leaders who can sponsor others to achieve competency and sustain QBL implementation for all deliveries.

### Best practices

Labor and delivery providers must remain vigilant for the possibility of hemorrhage, recognize active bleeding, and promptly report situations that require further evaluation for a strategic hemorrhage response and treatment.<sup>11</sup> Measuring or quantifying obstetric-related blood loss is the current best-practice standard of care and accurately detects PPH better than VE by 31%.<sup>12</sup> Some birthing facilities may find QBL implementation

### 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 ≥110 bpm or BP ≤ 85/45 mm Hg O <sub>2</sub> 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](http://www.cmqcc.org/content/ob-hemorrhage-toolkit-v30-appendix-c-obstetric-hemorrhage-care-guidelines-table-format)

challenging due to various barriers. Hardwiring the process will prepare nurses to recognize and report excessive blood loss, then quickly manage numerous maternal hemorrhage tasks with a well-coordinated team effort.

### **From the eyes of those involved**

Noise and confusion can interfere with the team's response during a PPH emergency response. Chaos and losing track of the amount of bleeding creates challenges to efficiently provide treatments so that nurses can evaluate, intervene, and manage a hemorrhage.<sup>13</sup> Maintaining a calm, controlled, and organized environment during a PPH is challenging, but when done, the patient, partner, and healthcare team have reported a less traumatic experience.<sup>14</sup>

From the patient's point of view, postpartum bleeding is a nightmare. Imagine a hypothetical case study in which a woman is experiencing postpartum blood loss. It's 30 minutes after her delivery and the nurse explains to the patient that her bleeding is excessive. Doctors and nurses quickly enter the room with serious faces and proceed through interventions without explanation. Her wide-eyed partner may become terrified as the new mother lies in blood-saturated sheets—shaking, pale, and feeling faint.

The doctor reaches an arm up into the uterus and manually scrapes out melon-sized gelatinous clots followed by a continuous stream of blood. An unfamiliar woman with a nursing badge appears at the bedside and binds the patient's arm with a tourniquet to draw more blood and starts a second I.V. site. A third nurse begins infusing two units of packed red blood cells. Nurses call out vital signs to the doctor with raised voices. Several medications are administered, including oxytocin, methylergonovine maleate, carboprost, and tranexamic acid, but don't control the bleeding. Five minutes after administration and aggressive fundal massage, the bleeding persists. The medical team tells the

patient that she's going to the OR for a procedure that will require general anesthesia, and her partner must stay in the room.

In the postanesthesia care unit, the doctor notifies the patient that uncontrollable uterine atony was the cause of her postpartum hemorrhage. She received six units of blood and blood products. An obstetrical balloon was placed into her uterus to temporarily control and reduce the bleeding. She will need to extend her hospitalization for close monitoring, remaining in bed for 1 day with a urinary catheter and receiving frequent vital sign assessments and antibiotics.

Estimated blood loss for this delivery was 400 mL, and QBL isn't standard practice at this hospital. If postpartum QBL had been monitored every 15 minutes following delivery, prevention and management could have started earlier.

### **Barriers and facilitators**

Nurses need to provide high-quality and safe patient care. Unfortunately, VE of postpartum blood loss is still used in many birthing units, leaving nurses unsure when and how to intervene and perform the necessary steps to respond to a maternal hemorrhage. Recent initiatives in hemorrhage prevention aim to heighten awareness and improve care with readiness response to prevent PPH morbidity; however, challenges such as educational resources, protocols, and proper equipment may stand in the way of nurses providing the safest care for their obstetric patients.<sup>15</sup>

New practice change recommendations are often followed by resistance and barriers that challenge the ingrained practice patterns nurses may have developed over the years. Changing practice takes time, and new methods must prove practical and feasible to gain the positive attitudes necessary for sustainability and ultimately, standardization. Barriers to QBL include negative attitudes, poor staff buy-in, and a lack of champions and support from hospital administrators.

## Vaginal QBL calculation

- Note conical drape volume after baby and prior to placenta \_\_\_\_\_ mL
- Note volume in drape after fundal massage before removing \_\_\_\_\_ mL

**What's the difference?**

- Weight of bloody sponges/4x4's \_\_\_\_\_ mL
- Dry weight of items \_\_\_\_\_ mL

**What's the difference?**

A. \_\_\_\_\_ mL  
 B. \_\_\_\_\_ mL  
 A + B \_\_\_\_\_ = QBL  
 (Document this value)

**Place large disposable pad under patient and measure blood loss through RECOVERY**

- Weight of bloody linens/pads through recovery \_\_\_\_\_ mL
- Dry weight of items through recovery \_\_\_\_\_ mL

**What's the difference?**

**Recovery QBL** \_\_\_\_\_ mL

(Document the RECOVERY QBL separately)

## Cesarean QBL calculation

- Note canister volume after baby and *prior to placenta* \_\_\_\_\_ mL
- Note canister volume *prior to irrigation* \_\_\_\_\_ mL

**What's the difference?**

- Weight of bloody laps in blue bags and soiled linens in red biohazard bag \_\_\_\_\_ mL
- Dry weight of items in red biohazard bag \_\_\_\_\_ mL

**What's the difference?**

A. \_\_\_\_\_ mL  
 B. \_\_\_\_\_ mL  
 A + B \_\_\_\_\_ = QBL in OR  
 (Document this value)

Some birthing units have limited educational and training opportunities and use unclear or outdated guidelines, causing nurses to feel discouraged, disappointed, and insecure about their PPH management skills. Along with administrative support, successful implementation of QBL requires preparation, persistent leaders, committed nurse and physician champions, and a willingness to provide a culture of safety.<sup>10</sup> When healthcare providers are adequately trained and have the resources to facilitate practice change, nursing confidence and competency in QBL will increase.<sup>16</sup> With successful QBL implementation, nurses can provide high-quality patient care in a safer work environment, which evidence shows will improve nurse satisfaction, and provide a sense of team collaboration and accomplishment.<sup>10</sup>

Resource education and tools that can offer a more straightforward method to measure and calculate blood loss are important when addressing common QBL barriers. Minimizing additional stressors during a chaotic hemorrhage event and empowering nurses can improve obstetrics hemorrhage recognition and treatment response. A simplified process to quantify blood loss with a "QBL cheat sheet" makes measurement manageable throughout postpartum recovery or until the patient is stable (see *Vaginal QBL calculation* and *Cesarean QBL calculation*). The key is standardizing QBL practice on all deliveries so that nurses can quantify effectively during any emergency. QBL competence will improve maternal safety and prevent a traumatic birth experience.

## Assess hemorrhage risk on admission

	Low Hold Specimen	Medium Type and Screen	High Type and Cross
<b>Antepartum</b>	<ul style="list-style-type: none"> <li>• No previous uterine incision</li> <li>• Singleton pregnancy</li> <li>• Four or fewer previous vaginal births</li> <li>• No known bleeding disorder</li> <li>• No history of PPH</li> </ul>	<ul style="list-style-type: none"> <li>• Prior cesarean birth(s)</li> <li>• Prior uterine surgery</li> <li>• Multiple gestation</li> <li>• More than four previous vaginal births</li> <li>• Hypertension-associated conditions</li> <li>• History of previous PPH</li> <li>• Large uterine fibroids</li> <li>• Platelets between 50,000 mcl and 100,000 mcl</li> <li>• Hematocrit &lt; 30%; hemoglobin &lt;10 g/dL</li> <li>• Gestational age &lt;37 or &gt;41 weeks</li> <li>• Morbid obesity</li> <li>• Polyhydramnios</li> </ul>	<ul style="list-style-type: none"> <li>• Placenta previa</li> <li>• Low-lying placenta</li> <li>• Suspected placenta accreta</li> <li>• Hematocrit less than 24%; hemoglobin &lt;8 g/dL</li> <li>• Platelets less than 100,000 mcl</li> <li>• Active bleeding at admission</li> <li>• Known coagulopathy</li> <li>• Abruptio placenta</li> <li>• Fetal demise</li> <li>• Two or more medium risk factors</li> </ul>
<b>Intrapartum</b>		<ul style="list-style-type: none"> <li>• Induction or augmentation of labor</li> <li>• Protracted labor or arrest disorder</li> <li>• Chorioamnionitis</li> </ul>	

Adapted from California Maternal Quality Care Collaborative. OB hemorrhage toolkit V3.0 - Appendix K: Obstetric hemorrhage risk factor assessment screen. 2022. [www.cmqcc.org/content/ob-hemorrhage-toolkit-v30-appendix-k-obstetric-hemorrhage-risk-factor-assessment-screen](http://www.cmqcc.org/content/ob-hemorrhage-toolkit-v30-appendix-k-obstetric-hemorrhage-risk-factor-assessment-screen).

### Risk factors and PPH prevention

Advanced care planning is the first strategy to identify individuals at risk for hemorrhage. A risk assessment should be performed at the first prenatal visit, on admission to labor and delivery, immediately before birth, and throughout postpartum. Although uterine atony accounts for 80% of PPH, 20% of cases occur in patients with no known risk factors, and therefore, it's essential to maintain constant readiness.<sup>2</sup> Advanced care planning for individuals at risk prepares the obstetric team before admission and as labor progresses for unexpected times when a PPH might occur (see *Assess hemorrhage risk on admission*). The unpredictable nature of maternal hemorrhage requires nurses to be familiar with hemorrhage protocols and toolkits focusing on the 4 Rs: Readiness, Recognition (QBL), Response, and Reporting and to maintain efforts to proactively practice QBL with every delivery to recognize excessive blood loss.<sup>4,10</sup>

### Tips for quantifying blood loss

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.<sup>6</sup> There are slight differences between the QBL processes for vaginal and cesarean births. An under-buttocks drape is used to collect all fluids, such as amniotic fluid, during a vaginal birth, whereas a calibrated suction canister is used for a cesarean delivery. To determine blood loss after birth in either setting, the amount of fluid collected before delivery of the placenta, such as urine and amniotic fluid, is subtracted from blood loss that follows delivery of the placenta. Although there is no specific time frame to QBL, it is generally recommended to obtain a QBL measurement immediately after birth and a second QBL measurement at the end of recovery, 2 hours following delivery. QBL should continue for the duration that active bleeding persists, or the patient is medically unstable in the setting of more than 1,000 mL blood loss.<sup>12</sup>

What equipment is required to implement QBL? Use what you already have on your labor and delivery unit! Items include a calibrated under-buttocks drape, an infant scale to weigh blood-soaked linens after

delivery, and laminated cards listing dry linen weights affixed to each scale (see *Dry weight cards*). See also *QBL tips with a vaginal delivery* and *QBL tips with a cesarean delivery*.

After delivery, PPH prevention continues with frequent postpartum assessments. Labor and delivery nurses routinely assess the patient's fundal height and lochia flow every 10 to 15 minutes for 2 hours during the recovery phase. Immediately after delivery, the bladder should be emptied, which facilitates the fundus to remain firm, midline, and below the level of the umbilicus. Fundal deviation could otherwise suggest that uterine atony or a blood clot may be interfering with normal uterine involution.<sup>15</sup>

During a vaginal delivery, QBL is measured with a graduated conical under-buttocks drape so that nurses can measure blood before the placenta and after bleeding is controlled. After the placenta's delivery and blood loss is quantified, the conical drape is removed and replaced with a large, clean disposable under-buttocks pad and perineal pad. The used perineal pad is weighed and replaced with a clean one every 15 minutes during the fundal check, and excessive blood loss is evaluated. Although scales measure in grams, which is a unit of mass, the conversion to milliliters (a unit of volume) is a simple 1-to-1. Therefore, 1 gram equals 1 milliliter of blood.

At the end of recovery, all soiled linens and the disposable under-buttocks pad are placed in a red biohazard bag, weighed, and known dry weights are subtracted from the total wet weight, revealing the cumulative QBL measurement. If blood loss volumes are high ( $\geq 200$  mL) at any point during recovery, immediate recognition and management will escalate clinical care to influence outcomes.

### Implications for nursing practice

QBL should be performed at every birth. Careful planning and training are important to successful implementation. Measurement improves provider awareness

of excessive bleeding to quickly identify a hemorrhage situation. Nurses who receive education and toolkits to QBL will be viewed as strong change leaders in obstetrics and will help create a culture of safety. Teaching labor and delivery nurses effective QBL methods with strategic tips and cheat sheets enhances situational awareness and response time in patients with excessive bleeding.<sup>17</sup> QBL competency facilitates early hemorrhage staging diagnosis, which drives the interventions needed to mediate blood loss. Providing nurses with

### 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 tips with a vaginal delivery

1. Create a list of dry weights for delivery items that may become blood-soaked with directions on how to calculate blood loss.
2. Begin QBL of blood loss immediately after the infant's birth (before delivery of the placenta) and assess and record the amount of fluid collected in the calibrated under-buttocks drape. Keep in mind 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 postplacenta fluid volume to more accurately determine the actual blood loss. Keep in mind that most of the fluid collected after birth of the placenta is blood.
5. Add the volume collected in the drapes to the blood volume measured by weighing soaked items to determine the QBL.
6. Weigh all blood-soaked material and clots to determine QBL: wet items (g) – dry items (g) = blood loss (mL)

Adapted from Association of Women's Health, Obstetric and Neonatal Nurses. Quantification of blood loss: AWHONN practice brief number 13. *J Obstet Gynecol Neonatal Nurs*. 2021;50(4):503-505.

### QBL tips with a cesarean delivery

- 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

Weigh saturated items:

- Weigh blood-soaked items and clots. Calculate g = 1 mL
- WET item gram weight minus DRY item gram weight = QBL in mL

Calculate QBL:

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

Adapted from American College of Obstetricians and Gynecologists. Quantitative blood loss in obstetric hemorrhage. December 2019. [www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2019/12/quantitative-blood-loss-in-obstetric-hemorrhage](http://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2019/12/quantitative-blood-loss-in-obstetric-hemorrhage).

evidence-based, standardized strategies to foster learning can reduce practice variations, increase nursing confidence, and improve the quality of patient care.<sup>18</sup> ■

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## On the web

### CMQCC – California Maternal Quality Care Initiative Collaborative: Toolkit 2.0

[www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit](http://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit)

### Quantified Blood Loss during Cesarean Delivery

[www.youtube.com/watch?v=og9FTq9ZuQM](https://www.youtube.com/watch?v=og9FTq9ZuQM)

### Council on Patient Safety in Women's Health Care

<https://safehealthcareforeverywoman.org/wp-content/uploads/2017/02/February-13-2017-Calculating-Cumulative-Blood-Loss-Safety-Action-Series-UPDATED.pdf>

### Florida Obstetric Hemorrhage Initiative (OHI) Tool Kit

<https://health.usf.edu/~media/Files/Public%20Health/Chiles%20Center/FPQC/FLOHIToolkitv2015updated2.ashx?la=en>

### Better Health for Mother and Babies

[www.aha.org/better-health-for-mothers-and-babies](http://www.aha.org/better-health-for-mothers-and-babies)

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