

# Nurses Reduce Epidural-Related Urinary Retention and Postpartum Hemorrhages

Jill Downey, MS, RN, IBCLC, Donna Kruse, MSN, RN, CCRN, SCRN,  
Donna J. Plonczynski, PhD, APRN

**NEARLY THREE WOMEN** die every day in the United States because of birth complications.<sup>1</sup> National statistics suggest 17.3 maternal deaths occur per 100,000 live births each year with 11.4% of these caused by postpartum hemorrhage (PPH). PPHs occur 200,000 times in the United States each year, and this rate has been increasing during the past decade.<sup>2</sup> A California statewide assessment revealed a range of vaginal PPH rates from 1.6% to 4.9%.<sup>3</sup> At Advocate Sherman Hospital, a chart review demonstrated a 5.8% hemorrhage rate for 1,839 women with vaginal deliveries in 2016, which exceeded the national rate of 2.9% and exceeded the high range of the California statewide survey.<sup>4</sup>

In addition to maternal death, PPH may lead to an increased morbidity, which results in delayed hospital discharge, prolonged recovery, antibody reactions—if a blood transfusion is needed, delayed bonding with the newborn, and increased cost.<sup>1</sup> It is estimated that between 54% and 93% of maternal PPH-related deaths could have been prevented. Development of more care practices is needed to address risk factors that are comprehensive in preventing PPH; although work has been done on identifying and treating PPH.<sup>5,6</sup>

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*Jill Downey MS, RN, IBCLC, Coordinator of Lactation, Advocate Sherman Hospital, Elgin, IL; Donna Kruse MSN, RN, CCRN, SCRN, Magnet Coordinator/Stroke Coordinator, Nursing Administration, Advocate Sherman Hospital, Elgin, IL; and Donna J. Plonczynski, PhD, APRN, Research Nurse Consultant LLC (researchnurse@comcast.net or 918-891-2001).*

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*Address correspondence to column editor Laura Cullen, Office of Nursing Research and Evidence-Based Practice Department of Nursing Services and Patient Care, 200 Hawkins Drive, University of Iowa Hospitals and Clinics, Iowa City, IA 52242; e-mail address: [laura-cullen@uiowa.edu](mailto:laura-cullen@uiowa.edu).*

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## Purpose

The purpose of this evidence-based practice project was to decrease the risk of hemorrhage related to urinary retention in postpartum women after epidural anesthesia.

## Synthesis of Evidence

Urinary retention is a risk factor for hemorrhage during the first hours after delivery.<sup>7</sup> Postpartum urinary retention (PUR) is defined as the inability to empty the bladder within 6 hours after vaginal delivery.<sup>8</sup> The definition of PPH is vaginal blood loss of greater than 500 mL for vaginal deliveries. Retention may occur because of epidural anesthesia, swelling or trauma to the perineal area, and/or delayed urination after delivery.<sup>8</sup> Increased bladder volume creates pressure on the uterus, which can prevent the uterus from contracting sufficiently to close off open blood vessels where the placenta separated from the uterus at time of delivery. This pressure contributes to increased bleeding and potential hemorrhage. On diagnosing a PPH, an early intervention is to insert an indwelling urinary catheter to remove excess external pressure on the uterus. The subjective nursing assessment of bladder distention by palpation to identify urinary retention can be particularly inaccurate in the postpartum period, especially in women with a high body mass index.

## Process

In the development of this evidence-based practice project, the Iowa model was followed.<sup>9</sup> The facility's institutional review board determined that this project did not require its approval. The project was supported through the Family Birthing Center nursing and medical leadership teams and the facility's annual Evidence-Based Practice Fellowship Workshop program. The Evidence-Based Practice Fellowship Workshop offers

clinical nurses, through an application process, a mechanism to implement evolving health care knowledge into practice for the benefit of hospitalized patients.<sup>10</sup> The selected fellows are educated on the steps of implementing nursing science into practice and guided using a combined classroom/workshop approach coupled with individual mentored implementation and evaluation strategies in support of the new practice. The fellowship spans a 5-month time frame and includes 100 dedicated hours allotted to each project from the generation of an idea through implementation, outcome measurement, and poster and podium presentations.

### Evidence-Based Practice Change

The change in practice evolved from asking the postpartum woman if she has the sensation to void and manually palpating the bladder if she does not, to obtaining objective urine volume in the bladder using a bladder scanner.

The bladder scanner was used only if the mother was unable to independently void within 4 hours of birth or after discontinuation of an indwelling catheter with epidural anesthesia. This action is important as the manual palpation of the bladder is not reliable after delivery, and the scanner provides an objective measurement of volume in the bladder.

### Implementation Strategy

A multidisciplinary team work approach was used to assess the need, plan the process for the intervention, implement the process, and review the results. [Figure 1](#) summarizes the implementation strategies.<sup>11</sup>

A modification of the California Maternal Quality Care Collaborative, Obstetric (OB) Hemorrhage Toolkit Pocket Card (available from [https://www.cmqcc.org/Quality Improvement project obstetrical hemorrhage](https://www.cmqcc.org/Quality%20Improvement%20project%20obstetrical%20hemorrhage)) was used for the intervention guidelines.<sup>12</sup> The toolkit includes the diagnostic criteria and the evidence-based interventions with positive outcomes for PPHs. The reference hemorrhage card was used as a summary of the education provided to nurses for reviewing risks for PPH. The modification of the tool for this project

consisted of correlating the risk factors of PUR and early intervention steps with the assessment and treatment of postpartum bleeding.

The first column of the assessment/intervention tool is risk identification for OB hemorrhages from low-to-high risk based on patient history and laboratory values. Added to this stage were the risk factors identified in the literature that contributed to PUR. Stage 0 is the baseline with evaluation of risk factors for PPH. The goal in the education at this phase is for nurses to be able to correlate the risk factors of bleeding with the interaction that can occur between a distended bladder and how that distention can affect bleeding in the newly delivered postpartum mother by pressing on or pushing on an organ that is actively attempting to contract.

The next step was to create a nurse-driven protocol in cooperation with the OB providers. The protocol provided an objective measurement of the volume of urine in the bladder using bladder scanning at the appropriate time with corresponding interventions. The nurse-driven protocol is included in stage 0 of the modified hemorrhage pocket tool card. Stage 0 provides assessment and management guidelines to monitor postpartum bleeding and provides criteria for when to progress to stage 1 (management of PPH).

Active management for bladder emptying included encouraging voiding after delivery, offering assistance with bedpan or bedside commode if not walking independently, and assessing the mother's perception of a bladder fullness sensation. If the newly delivered mother was not voiding at 4 hours from discontinuation of the indwelling catheter before pushing or delivery of the baby, then interventions within the protocol progress. A bladder scanner was used on the mother for an objective measure of the bladder volume. If urine volume was between 300 and 500 mL, then the patient was straight catheterized once for relief of pressure on the uterus. If the urine volume was more than 500 mL, then the provider was contacted for orders, which usually included the insertion of an indwelling catheter. The risk stage 1 begins when a hemorrhage is recognized and requires interventions that include insertion of an indwelling catheter to decrease pressure on the uterus.

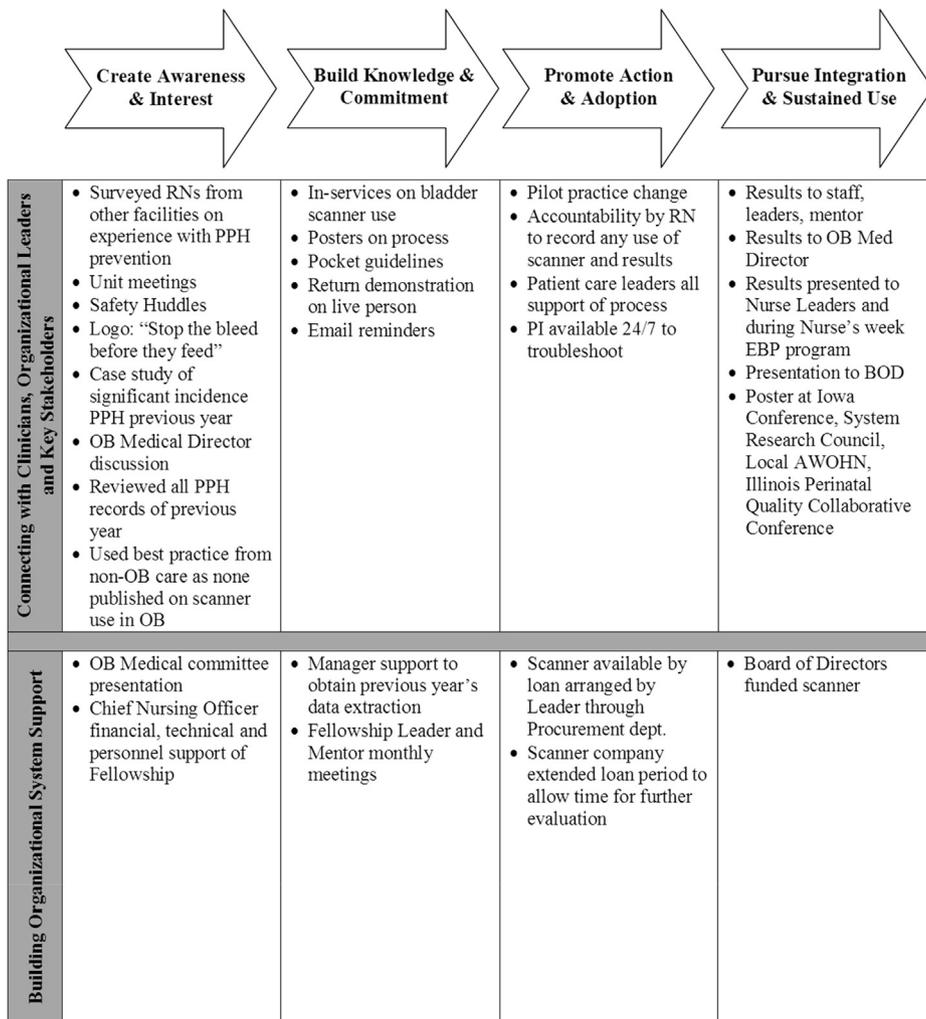


Figure 1. Implementation strategies preventing PPH project. Dept, department; PPH, postpartum hemorrhage; OB, obstetric; RN, registered nurse; PI, principal investigator; EBP, evidence-based practice; BOD, Board of Director; AWHONN, Association of Women’s Health, Obstetric and Neonatal Nurses. Adapted with permission from the University of Iowa Hospitals and Clinics and Laura Cullen, DNP, RN, FAAN.

All nurses were educated about the nurse-driven protocol, which included a review of PPH. Nurses were given a 5-question pre- and postsurvey to assess knowledge on the following: Identification of patients at high risk for PPH, risks for urinary retention, methods to assess for urinary retention, methods to promote voiding after delivery, and benefits of a nurse-driven protocol. Nursing education was done during safety huddles and change of shifts during 1 week. Bladder assessment protocols were displayed via poster next to the bladder scanner. Demonstration and return demonstration of Verathon BVI 9400 portable bladder scanner use was performed on both an artificial bladder and a

live model. Case reports of PPH in which urinary retention may have been a large contributing factor were included for review on the poster. Education included posters in the nurse’s station where the bladder scanner was stored. A nurse leader was available to nursing staff either in house or by phone during the 7-week pilot period to answer questions or concerns.

**Evaluation**

Post-test after the education demonstrated that learning had occurred when compared with the pretest. Survey results indicated that nurses were

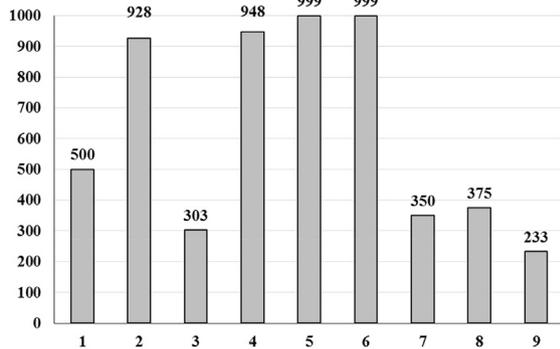


Figure 2. Bladder scanner results in postpartum women 2017.

highly aware of methods to promote voiding in patients after delivery. In addition, there was an increased understanding of risk factors for PPH, PUR, accuracy of bladder scanner versus palpation, as well as knowledge of the nurse-driven protocol.

During the pilot period, the bladder scanner was used nine times with six patients (Figure 2). No PPHs occurred with these women. Significant asymptomatic PUR was identified eight of the nine times the scanner was used. Bladder volumes were measured between 300 and >999 mL between 4 and 6 hours postpartum or after discontinuation of the indwelling urinary catheter. Bladder scanning was accurate within 75 mL of straight or indwelling catheter findings.

The comparison between the hemorrhage incidences and amount of blood losses between 2016 and 2017 is displayed in Figure 3. In 2016, during the same 7-week period, three women experienced PPHs. The blood losses for these

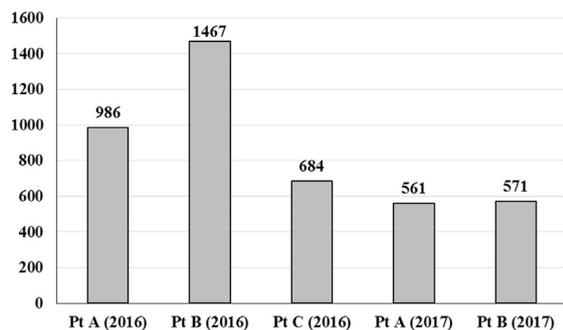


Figure 3. Postpartum blood losses between 2016 and 2017. Pt, patient.

three women ranged from 684 to 1,467 mL. For the two women who experienced PPHs during the pilot in 2017, the blood losses were considerably less at just 561 to 571 mL. The use of the bladder scanner is associated with fewer instances of PPHs and less blood loss. In addition, the financial cost associated with the care of one woman with a PPH is greater than the cost of one bladder scanner.<sup>13</sup>

### Limitations

The project was limited by the low number of woman who qualified to use the bladder scanner during the Evidence-Based Practice Fellowship's time frame. There is a need for more studies with adequate sample sizes and standardized criteria for the diagnosis of PUR in association with PPH.

### Conclusion

Bladder scanning in the postpartum period was associated with fewer hemorrhages and less blood loss. In addition, scanning was accurate within 75 mL of straight catheterization or indwelling catheter immediate output. Three women experienced PPHs in 2016 during the same weeks as the pilot study period on the postpartum unit. Those women experienced blood losses of 684 to 1,467 mL. Following the modified protocol, two women experienced PPHs in 2017, with blood losses just meeting criteria to be considered a hemorrhage at 561 to 571 mL. PUR may have impacted all three of the previous year's hemorrhages.

Preventing PPH is important to maternal life, well-being, and bonding with the newborn. The cost associated with the care of one PPH is greater than the cost of one bladder scanner. A 10% reduction of PPH was shown to save California hospitals \$10.6 million annually, and 50% reduction would increase the savings to \$53 million annually.<sup>13</sup>

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## References

1. AWHONN. The AWHONN postpartum hemorrhage project. Available at: <http://www.pphproject.org/>. Accessed June 5, 2018.
2. Kramer MS, Berg C, Abenheim H, et al. Incidence, risk factors, and temporal trends in severe postpartum hemorrhage. *Am J Obstet Gynecol*. 2013;209:449.e1-449.e7.
3. Lu MC, Fridman M, Korst LM, et al. Variations in the incidence of postpartum hemorrhage across hospitals in California. *Matern Child Health J*. 2005;9:297-306.
4. Callaghan WM, Kuklina EV, Berg CJ. Trends in postpartum hemorrhage: United States, 1994-2006. *Am J Obstet Gynecol*. 2010;202:353.e1-353.e6.
5. Oyelese Y, Ananth CV. Postpartum hemorrhage: epidemiology, risk factors, and causes. *Clin Obstet Gynecol*. 2010;53:147-156.
6. Shields LE, Wiesner S, Fulton J, Pelletreau B. Comprehensive maternal hemorrhage protocols reduce the use of blood products and improve patient safety. *Am J Obstet Gynecol*. 2015;212:272-280.
7. Kekre AN, Vijayanand S, Dasgupta R, Kekre N. Postpartum urinary retention after vaginal delivery. *Int J Gynaecol Obstet*. 2011;112:112-115.
8. Mulder FE, Schoffemeer MA, Hakvoort RA, et al. Risk factors for postpartum urinary retention: a systematic review and meta-analysis. *BJOG*. 2012;119:1440-1446.
9. Iowa Model CollaborativeBuckwalter KC, Cullen L, et al. Iowa Model of evidence-based practice: revisions and validation. *Worldviews Evid Based Nurs*. 2017;14:175-182.
10. Plonczynski DJ, Kruse D. Tailoring an evidence-based practice fellowship to meet learning needs of bedside nurses. *J Nurs Care*. 2014;3:200.
11. Cullen L, Adams SL. Planning for implementation of evidence-based practice. *J Nurs Adm*. 2012;42:222-230.
12. Lyndon A, Lagrew D, Shields L, Melsop K, Bingham B, Main E. Improving health care response to obstetric hemorrhage. In: Collaborative CMQC, ed. *California Maternal Quality Care Collaborative Toolkit to Transform Maternity Care*. Sacramento, CA: California Department of Public Health: Maternal, Child and Adolescent Health Division; 2010. Developed under contract no.: 08-85012.
13. Pourat N, Martinez AE, McCullough JC, Gregory KD, Korst LM, Kominski GF. *Costs of Maternal Hemorrhage in California*. Los Angeles, CA: UCLA Center for Health Policy Research; 2013.

### Calendar of Events

March 2, 2019. The Illinois Society of PeriAnesthesia Nurses (ILSPAN) will hold their Spring Conference at Meridian Banquet & Conference Center, 1701 Algonquin Road, Rolling Meadows, IL 60008. Schedule: Full day conference with agenda TBA. For more information regarding contact hours, please contact the Nurse Planner Alexis Nicpon, MSN, RN, CPAN at [ajnicpon@comcast.net](mailto:ajnicpon@comcast.net). For more general conference information contact Lorena Manalansan, BSN, RN, CAPA at [lmanalansa@nch.org](mailto:lmanalansa@nch.org) or 847-809-9484.