ELECTRONIC HEALTH RECORD TEMPLATE CUSTOMIZATION AND THE IMPACT ON NURSING SATISFACTION AND DOCUMENTATION COMPLIANCE

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Abstract

Documentation is a crucial component of safe and effective patient care. A priority for health care organizations is to ensure their electronic health record (EHR) systems are used safely and effectively. They should be clinically operational, user-friendly, and suit the needs of the end user (HealthIT.gov, 2017). If EHR templates do not exist, are not customized to the needs of the user, or are not user-friendly, risks of failing to maintain proper documentation exist (Mosher, Lose, Leslie, Pennathur, & Kaboli, 2015). The purpose of this project was to develop and implement an EHR template for obstetrical and postpartum nurses to document postpartum hemorrhages (PPH) that progress to Stages 2 and 3. A customized template did not exist in the EHR to document this type of event. The template was created using information from the California Maternal Quality Care Collaborative (CMQCC, 2015) obstetric hemorrhage emergency management plan checklists. These checklists are evidence-based guidelines and are included in a policy at the project site. Everett Rogers’s diffusion of innovations theory served as the theoretical framework to guide the change. Data were collected from a researcher-designed survey and chart reviews. A convenience sample of nurses (N = 30) participated, and eight completed the survey. After template implementation, eighteen Stage 2 and 3 PPHs occurred, and the template was used twice. The template compliance rate was 11%. The project yielded several significant findings. Though not expected, a decrease occurred in the mean quantitative blood loss for Stage 2 and 3 PPHs post-template implementation. Results suggested that the creation of a customized EHR template had a favorable effect on nursing satisfaction and documentation compliance of an evidence-based obstetric hemorrhage care guideline. Substantial benefits can result when EHR technology is used to its fullest extent.

Key words: customization, electronic health record, template, postpartum hemorrhage
Electronic Health Record Template Customization and the Impact on Nursing Satisfaction and Documentation Compliance

Emerging technologies, such as electronic health record (EHR) systems are a major focus in health care and are significantly changing the way health care professionals practice today. Patients receive improved care coordination, and providers have greater access to a patient’s medical records, which can help them make better clinical decisions and provide the best possible care (Rodriguez, 2011). The adoption and meaningful use of EHR systems among health care organizations have been on the rise in recent years, partly influenced by the passage of the Health Information Technology for Economic and Clinical Health Act in 2009 (Centers for Disease Control and Prevention [CDC], 2017). In 2015, 96% of non-federal acute care hospitals had certified EHR technology (Henry, Pylypchuk, Searcy, & Patel, 2016). Certified EHRs meet the functionality, technological capabilities, and security requirements set out by the Department of Health and Human Services (Henry et al., 2016). To receive incentive payments, health care organizations need to focus on meeting meaningful use criteria (HealthIT.gov, 2017). Meaningful use involves using certified EHRs to improve patient care, efficiency, clinical outcomes, and safety (HealthIT.gov, 2017). To meet meaningful use requirements, a priority for health care organizations is to ensure EHR systems are well-designed, fully operational, and used effectively. When used properly, substantial benefits can result from EHR technology.

Despite the many benefits, countless organizations encounter challenges when operating EHR technology and trying to use it meaningfully. Research suggests that many health care providers are increasingly dissatisfied with EHR technology. Researchers conducted a survey that consisted of 14,000 registered nurses across the nation who had utilized EHR systems in the previous six months. Results indicated that 92% were dissatisfied with EHR systems, and 84% reported EHRs negatively impacted their job satisfaction, workflow, and productivity (Perna,
These results are startling because a well-functioning EHR system should positively benefit both patients and providers, rather than act as a hindrance.

Health care organizations need to focus on identifying challenges that come with EHR technology and discover practical solutions. One challenge is when EHR templates do not exist, are not customized to the needs of the user, or are not user-friendly. Consequently, this problem creates the potential for patient safety, quality, and documentation compliance concerns (AHIMA Work Group, 2013). Since nurses provide the largest portion of direct patient care, they are in key positions to assist in making EHR systems more efficient and user-friendly (Nursing License Map, n.d.). In the workplace, the nursing staff can collaborate with stakeholders such as their information technology department and provide valuable input on what does and does not work for user workflow. Optimizing EHR systems through the creation of customized EHR templates can support meaningful use requirements and contribute to end-user satisfaction, improved documentation compliance, enhanced patient safety, and higher quality health care (AHIMA Work Group, 2013).

Problem Description

An inpatient obstetrical unit was chosen for the project setting because it is prone to emergent situations that often necessitate rapid coordination, team effort, and excellent communication. An emergent situation that occurs far too often in the obstetrical setting is a postpartum hemorrhage (PPH). A PPH is an obstetrical emergency that can occur immediately after delivery or be delayed by several hours, days, or even weeks (The American College of Obstetricians and Gynecologists [ACOG], 2006). A PPH that occurs within the first 24 hours after giving birth is considered a primary PPH and will be discussed in this manuscript (ACOG, 2006). The American College of Obstetricians and Gynecologists (2006) has defined a PPH as greater than 500 ml of blood loss after a vaginal birth or greater than 1000 ml of blood loss after
a cesarean birth. In the United States, a woman dies every ten minutes from complications related to pregnancy (Association of Women’s Health, Obstetric and Neonatal Nurses [AWHONN], 2014). The United States is also ranked 47th in the world for maternal mortality and morbidity, with PPHs being a leading cause (AWHONN, 2014). These statistics are alarming for a country that is well-developed from a global standpoint, which emphasizes the disparities in women's health and obstetric outcomes for this nation.

The hospital has a policy on obstetrical hemorrhage care, which incorporates the California Maternal Quality Care Collaborative (CMQCC, 2015) obstetric hemorrhage emergency management plan checklists. These checklists are part of an obstetric hemorrhage toolkit and are evidence-based guidelines that offer clinicians guidance in the management of PPHs. They discuss Stages 0, 1, 2, and 3 of a PPH after childbirth and the recommendations for managing each stage. This project focuses on Stage 2 and 3 PPHs due to their severity in nature. A Stage 2 PPH refers to continued bleeding or vital sign instability and 1000-1500 ml cumulative blood loss (CMQCC, 2015). A Stage 3 PPH refers to cumulative blood loss greater than 1500 ml, greater than two units of packed red blood cells given, unstable vital signs, or suspicion of disseminated intravascular coagulopathy (CMQCC, 2015). Postpartum hemorrhages that have a cumulative blood loss greater than 1000 ml often require numerous interventions, a team response, and thorough documentation. A PPH that has a cumulative blood loss greater than 1500 ml may require the activation of a hospital-wide massive transfusion protocol (MTP) which encompasses numerous critical steps. This protocol is activated when the bleeding patient needs massive hemorrhage blood replacement and a multidisciplinary team response.

Postpartum hemorrhages, especially those that progress to Stages 2 and 3, place health care team members under high amounts of stress, in multitask situations, and in environments
where poor and unclear communication can occur (Institute for Healthcare Communication [IHC], 2011). Breakdowns in communication, both written and oral, foster environments where medical errors occur more frequent (IHC, 2011). Communication has been listed by the Joint Commission (TJC, 2015) as the most common root cause for many sentinel events. Sentinel events result in a permanent loss of functioning or death (TJC, 2015). Maternal events are listed as one of the sentinel event categories from 2005 to the second quarter of 2016 (TJC, 2016).

After an emergent situation such as a PPH, it is essential for the nurse to thoroughly and completely document the event. Ideally, this information should be consistently documented in the same location. Since the facility was transitioning from paper to electronic documentation, the nurses were either documenting these events in free text notes on paper or in one of the various notes in the EHR. Post-event documentation can be hard to locate when needed by other healthcare professionals if it is not consistently done in the same place (AHIMA Work Group, 2013). This can compromise the communication of critical information between nurses and providers, which has the potential to put patient safety at risk.

The impetus for this project arose after the researcher reviewed the hospital’s obstetrical hemorrhage care policy, PPH statistics on the obstetrical unit, and nursing documentation practices for PPHs. A gap was identified between the current state and the desired state for nursing documentation of Stage 2 and 3 PPHs. While there was compliance with providing appropriate care, current documentation practices by the nurses could be improved. Nursing documentation summaries for Stage 2 and 3 PPHs were found to be inconsistent. Two key factors were identified that contributed to the inconsistencies in the nursing documentation. First, the obstetric hemorrhage emergency management plan checklists from the CMQCC (2015) were on paper and were not included in the patient’s medical record. These paper checklists act as guides for the health care team to follow when managing the PPH event. This meant that the
nurse would need to transcribe the interventions that were completed from the checklists into the patient’s medical record after the event. Second, no customized template existed in the EHR system for the nurses to chart this obstetrical emergency. Without a structured template in the EHR, the quality and completeness of clinical documentation may be at risk (Mosher et al., 2015). These two factors may have contributed to nursing documentation that was incomplete, inaccurate, illegible, or missing pertinent information from obstetric hemorrhage management guidelines (CMQCC, 2015). Poor nursing documentation is a critical issue that can translate into unsafe patient care, poor outcomes, and increased risk of litigation (AHIMA Work Group, 2013). This problem was determined to be a need at the site because no uniformity existed in the way nurses were documenting Stage 2 and 3 PPHs. The unit was in need of a customized EHR template with a structured format to capture all relevant data for Stage 2 and 3 PPHs.

**Available Knowledge**

A comprehensive search of the literature was performed to identify and evaluate existing studies related to EHR template customization and efficiency. The five electronic databases included Medline, CINAHL, PsycInfo, PubMed, and Summon. Search terms included *communication, electronic health records, templates, nurses, barriers, obstetrics, hemorrhage, postpartum hemorrhage, outcomes, patient safety, customized, and acute care*. The search was restricted to scholarly and peer-reviewed full-text nursing and health care articles published in the English language from 2011 to the present. Articles that were excluded included those that were with expert opinion, did not meet the inclusion criteria, and were not studies. Reference lists were examined from the relevant studies. The PICOT question was as follows:

For nurses caring for postpartum patients in the obstetrical and postpartum wards (P), how does a customized postpartum hemorrhage electronic health record template (I)
affect nursing satisfaction and documentation compliance for Stages 2 and 3 postpartum hemorrhages (O) over an eight-week period (T)?

This format allows for a more comprehensive search to research the question. The following is a summary of the most relevant research studies.

**Electronic Health Record Template Customization**

Customized EHR templates can improve documentation compliance and the overall EHR documentation experience. Mosher et al. (2015) conducted a study on two inpatient units to evaluate and improve the documentation rates of interdisciplinary rounds (IDR) in the EHR. They found inconsistent documentation of IDRs. In the inpatient setting, IDRs need to be properly documented. An identified problem was how to best document IDRs in the EHR. This quality improvement (QI) project incorporated Plan-Do-Study-Act (PDSA) cycles and structured observations of the IDRs on the units. Several ideas arose from the PDSA cycles, one of which was to redesign the current template for IDRs in the EHR (Mosher et al., 2015). The original template was noted to be a long, cumbersome checklist with excessive content. This contributed to the low documentation rates. Using data from observations of IDRs and interviews, the researchers created a new IDR note in the EHR. The implementation of the new template improved IDR note completion rates from 27% over an 85 day observation period to 69% over 119 days post-template implementation. A Likert scale questionnaire was used to assess team satisfaction. Data suggested a high level of satisfaction among IDR team members with the new EHR note. Redesigning the template to one that better met the needs of the end-users and was more user-friendly allowed for improved compliance of IDR documentation (Mosher et al., 2015). This study provides valuable information on the benefits of customized EHR note templates and how they can be utilized to improve documentation compliance and user satisfaction.
When multiple EHR templates exist for similar conditions, documentation can become timely and complicated; consolidating several templates can prove to have many benefits. In the following QI project, five history of present illness (HPI) templates for upper respiratory complaints were combined into one HPI template for use in primary care clinics in a small health care system (Briggs & Carter-Templeton, 2014). The researchers used a pretest, posttest questionnaire to evaluate the project. It was composed of information from the technology acceptance model questionnaire. Participants were recruited from three primary care clinics and were health care providers who used EHR systems ($N = 16$). Though the questionnaire showed no significant change for ease-of-use and usefulness, the open-ended questions indicated perceived ease-of-use (Briggs & Carter-Templeton, 2014). Two responses stated, “simplicity and clarity for the clinical situation" and "the new URI combined several templates, making it more streamlined. I am able to confirm several symptoms without having to open up and fill out 3 different notes" (Briggs & Carter-Templeton, 2014, results heading, para. 3). With the growing complexity of patient care and electronic charting, steps need to be taken to ensure that EHR systems support efficient practices.

Garder and Pearce (2013) conducted a study to gain a better understanding of the attitudes health care providers have towards using EHR technology. They used the technology acceptance model and PDSA cycles to guide their project. They found that many providers were unsatisfied with their current EHR system and were not using it to its fullest capacity. They created user-friendly, customized documentation templates and implemented them into practice. User satisfaction was measured pre- and post-template implementation. The sample was small and consisted of one nurse practitioner, one physician, and one physician assistant in the practice. These providers were mostly using free text, narrative charting instead of the existing EHR templates, which were not applicable in many situations. Templates were customized
based on provider documentation preferences. These three providers used the new templates during twenty patient encounters. Data were evaluated using the Questionnaire for User Interaction Satisfaction (QUIS) measurement tool. This instrument has a high reliability, with a Cronbach’s alpha of .95. The QUIS short form was used and demonstrated improved learning, positive satisfaction, and positive perceptions of the new, customized EHR templates (Garder & Pearce, 2013). This study provides valuable insight for nurses and for nurse informatics specialists because nurses spend a significant amount of time on documentation. It stresses the importance and need for user-friendly, customized templates in the EHR to improve workflow and efficiency in this digital age.

**Efficiency in Electronic Health Record Systems**

A lack of efficiency in EHR documentation practices is a significant concern with EHR technology. Mamykina, Vawdrey, Stetson, Zhang, and Hripcsak (2012) conducted a time-and-motion study on documentation practices for resident physicians. They found that a large amount of transitions occurred during documentation processes, such as when one gathers and reviews patient data or updates the patient’s plan of care. It was found that many documentation episodes involved a synthesis of steps, yet most EHR systems work most optimally when documentation occurs in one continuous session. This mismatch led to fragmentation in workflow, which led to inefficient processes and workarounds. The authors recommended tools that supported more efficient and optimal clinical documentation in electronic systems. One recommendation was to improve note composition through processes such as structured data entry or the creation of templates (Mamykina et al., 2012). Interventions aimed at preventing workarounds due to inefficiencies in EHR systems can save time and reduce the cognitive workload caused by fragmented workflow (Mamykina et al., 2012).
Rationale

The AHIMA Work Group (2013) reports that EHRs can improve the efficiency and legibility of documentation, improve documentation practices, and enhance communication between health care providers by increasing access to and providing complete and accurate documentation. These factors can contribute to improved patient outcomes, patient safety, and a reduction in errors (U.S. Department of Health and Human Services, 2010). In contrast, if EHR systems are not used effectively, risks for suboptimal documentation and poor outcomes are created. Lavin, Harper, and Barr (2015) report that compromises may occur when an individual works with an inefficient EHR system. When given a choice, it makes sense to choose appropriate and safe patient care at the expense of proper documentation, rather than less optimal patient care to ensure that documentation is accurate and complete. A priority for health care organizations is to ensure EHR systems are well-designed, fully operational, and used effectively. Developing and implementing an EHR documentation tool such as a customized template has the potential to improve end-user satisfaction and overall documentation practices by health care providers.

The American Academy of Professional Coders (AAPC, 2013) suggests that EHR systems work best when they are customized. One example of customization is the use of pre-filled templates, which can make the system more user-friendly. Template customization and development is often the responsibility of the information technology department in an organization; however, it can be done in conjunction with the end-users to help ensure documentation is compliant and to facilitate ease of use (AAPC, 2013). This collaborative effort supports the Institute of Medicine’s 2010 report, The Future of Nursing: Leading Change, Advancing Health. Key messages included for opportunities to be extended to nurses to lead collaborative improvement efforts, lead change, and advance health. Customized EHR templates
support more thorough and accurate documentation and can reduce the amount of time the nurse spends typing a note (AHIMA Work Group, 2013). They allow the end-user to document specific conditions or events in a structured template with options such as text entry boxes, check boxes, and drop-down lists. When a customized template is in place to guide documentation practices, workflow and productivity can be enhanced.

Implementing evidence-based practice changes can be quite complex; therefore, the use of a theoretical framework can be beneficial. Rogers’s diffusion of innovations theory is a practical framework that was used for guiding the change. Rogers (1995) reports, “Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system” (p. 10). This theory helps to explain how, why, and at what rate the new template would diffuse among the members of the social system.

Rogers’s diffusion of innovations theory is a process that consists of four essential elements: the innovation, communication channels, time, and members of the social system (Rogers, 1995). These four elements impact whether an innovation is adopted or fails to be adopted. The first element is the innovation itself. Since the facility is transitioning from paper to electronic documentation, having the nurse document in the EHR is the ideal state. The innovation was the development and implementation of an EHR template for Stage 2 and 3 PPHs. If this template is perceived as being new to one of the nurses, then it is considered an innovation (Rogers, 1995). Documenting Stage 2 and 3 PPHs in a new EHR template rather than on paper or in another note in the EHR will be a change for the social system.

The second element involves the communication of the innovation through communication channels (Rogers, 1995). Here, the message travels from the sender to a receiver. Rogers (1995) stressed the importance of molding the attitudes of individuals. An effective way of doing so is through interpersonal channels like face-to-face exchanges. The
proposed template was communicated to the nurses via email and at an inpatient staff meeting. The nurses should have already been familiar with the PPH stages and the CMQCC’s guidelines, since these were already part of a hospital policy and had been utilized by the health care team on the unit during PPH events. Reaching a mutual understanding among members of the social system is the goal with diffusion (Rogers, 1995). Communicating the change effectively through communication channels was imperative to the successful adoption of this innovation.

The third element involves the period in which the innovation gets communicated through the communication channels (Rogers, 1995). The diffusion process includes the dimension of time in three ways. First, the innovation-decision process occurs when the decision is made to accept and use the innovation (White & Dudley-Brown, 2012). During this process, the obstetrical nurses are made aware of the change, form attitudes, make decisions whether or not to accept or reject the change, use the innovation, and decide if they want to use the innovation (Rogers, 1995). Some nurses will have a positive attitude toward the change, others will be neutral, and others will have a negative attitude toward the change. Initial and continuous education on the importance of complete and accurate documentation of the CMQCC’s guidelines in the EHR is necessary for reducing uncertainty and achieving sustainability. Rogers (1995) reports that the second dimension of time revolves around adopter categories and innovativeness. Innovativeness is described by Rogers (1995) as “the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than the other members of a system” (p. 22). Members of the social system are classified into five adopter categories based on how they adapt to a new idea. White and Dudley-Brown (2012) report that these categories and their percentage of members include (a) the innovators (2.5%), (b) the early adopters (13.5%), (c) the early majority (34%), (d) the late majority (34%), and (e) the laggards (16%). The researcher needed to understand these five adopter categories and consider them
during the planning and implementation process because it takes a different amount of time for each member to adopt the new idea. One strategy was to identify the early adopters and discover ways in which they could positively influence others (White & Dudley-Brown, 2012). The third dimension of time involves the rate of adoption, which is directly influenced by the adopter categories (Rogers, 1995). It is measured by the length of time it takes the members to adopt the change. These three factors, which describe the dimension of time each contribute to the period of time it takes the innovation to get communicated through the communication channels.

In the fourth element, the innovation is communicated through communication channels over time among members of a social system (Rogers, 1995). Rogers (1995) defines a social system as “a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal” (p. 23). The social system is comprised of the nursing staff from the obstetrical unit and other key stakeholders such as the information technology department and the administration team. The diffusion of an innovation can be significantly impacted by the social structure of the organization since the norms, opinions, and behaviors of the nurses and leadership directly influence one another (Rogers, 1995). Gaining an understanding of the culture of the unit and the organization was essential, since it can be both a facilitator and a barrier to the diffusion of the innovation. Strong leaders are necessary to motivate and encourage organizational change while creating a shared vision. Countless organizations have already adopted or are currently in the process of adopting EHR systems. Active participation by all members of the social system is necessary for the successful implementation of the new EHR template. Rogers’s diffusion of innovations theory provided a strong framework to help facilitate and guide the change.
Specific Aims

Several outcomes were anticipated as a result of this project. First, the purpose of the project was to develop, implement, and evaluate a customized EHR template for obstetrical and postpartum nurses to document Stage 2 and 3 PPHs. Outcomes included improved nursing satisfaction with how Stage 2 and 3 PPHs were documented and improved nursing documentation of the CMQCC (2015) obstetric hemorrhage emergency management plan checklists. The facility is transitioning from paper to electronic documentation; therefore, the ideal change was an intervention that would facilitate complete and accurate nursing documentation of these guidelines in the EHR. It was essential to introduce an intervention that supported the merge to paperless charting, since this was an organizational priority. The researcher invited the sample of nurses to participate in a voluntary, non-identifiable survey after the eight-week implementation period for the template. They had the opportunity to provide feedback on the template and recommend suggestions for future templates. This project was grounded on best practices and demonstrated interprofessional collaboration, teamwork, and practicality of implementing a quality improvement project of this nature. This manuscript will help inform and encourage nurses to intervene and lead EHR design efforts to help meet the challenges and demands that come with implementing EHR technology.

Methods

Context

The process of change was introduced in an inpatient obstetrical unit at a Joint Commission accredited hospital in an urban setting. The hospital is small, with less than 150 beds. The obstetrical unit has a level one nursery, several labor and delivery rooms and eight postpartum rooms. There are approximately 40-60 deliveries each month. The nursing staff consists of a minimum of five nurses each shift. The project participants included thirty labor
and delivery and postpartum nurses. The organization is on a journey toward achieving Magnet status, the highest designation a hospital can receive for nursing excellence (American Nurses Credentialing Center, 2011). Through the Magnet premises, an organization should encourage shared governance, transformational leadership, and a commitment to lifelong learning through professional development (American Nurses Credentialing Center, 2011). This journey helps increase the degree of leadership support from both senior and middle management. The site chose the improving patient care through relationships model to improve patient care and to support the journey to Magnet status. The Agency for Healthcare Research and Quality (AHRQ, 2015) recommends a systems approach to error prevention. With this method, an emphasis is placed on poorly designed systems as being the root-cause for errors and low productivity. This project supports efforts for optimizing the current EHR system at the organization. Fortunately, with the implementation of a shared governance structure, nurses have more say in their practice and in making the health care system better. The culture of the organization is changing in many positive ways, which greater supports professional nursing practice and the implementation of evidence-based practice projects.

**Intervention**

The intervention involved the creation of a customized EHR template with a structured format to capture all relevant data for Stage 2 and 3 PPHs. It would be a documentation note for nurses to use. The idea for a customized EHR template was chosen based on evidence from previous studies and because a customized template did not exist in the EHR or on paper to document this type of event. Relevant stakeholders at the site included the information technology department, the obstetrical and postpartum nursing staff, and the obstetrical nursing management team to assist in the development and implementation of the template.
The template was created using key steps from the CMQCC (2015) obstetric hemorrhage emergency management plan checklists. These checklists are evidence-based guidelines that discuss stages 0, 1, 2, and 3 of a PPH. They were designed to help guide healthcare organizations and providers with strategies for timely recognition and response to obstetrical hemorrhages (CMQCC, 2015). The CMQCC’s website provides information on their obstetrical hemorrhage toolkit, which contains these checklists. At the site, the checklists are available to the health care team in multiple ways. Each delivery room has a laminated printout of the checklists for the team to reference. They can also be found online through the CMQCC’s website and in the hospital’s policy and procedures manual. The EHR template included check boxes, text entry boxes, and drop-down lists, which allowed the nurses to document the events that pertained to the PPH event. Many elements from the CMQCC’s (2015) checklists were included, such as starting a second intravenous line, activating the MTP, and documenting the total quantified blood loss (QBL). A technique that many health care providers use to estimate blood loss after a delivery is called estimated blood loss or EBL. This practice is no longer recommended because it is a subjective guess, generally done by the delivery provider, which is often inaccurate and underestimated (ACOG, 2006). The Joint Commission (2010) reports if excessive blood loss after childbirth is not promptly recognized, life-saving interventions are not initiated soon enough. Excessive blood loss is one of the leading causes of maternal morbidity and mortality (TJC, 2010). Due to the many consequences of inaccurately estimating blood loss, research recommends QBL in the obstetrical setting. The Association of Women’s Health, Obstetric and Neonatal Nurses (2014) recommends QBL after every birth. Quantifying blood loss consists of a team approach to objectively determine the amount of blood lost. This method works with both vaginal and cesarean births and involves several simple steps. Blood loss is formally measured using calibrated instruments and scales. Formulas are used to calculate the
QBL by adding and subtracting items such as pre-determined dry weights, amniotic fluid, irrigation fluids, and blood-soaked items. One gram of weight is equivalent to one milliliter of blood (AWHONN, 2017). This is the preferred method for accurately determining blood loss after a delivery. In addition to documenting the QBL, a check box was included to document if the MTP was activated. This information is critical and can assist with data tracking (see Appendix for the researcher-developed EHR template). The template was created as a nursing note titled, “Obstetric Postpartum Hemorrhage Summary (Stage 2 or 3),” and it was accessible to the sample of 30 nurses in the EHR system. After multiple revisions, the template was approved by the forms committee at the organization, and the template was implemented into the EHR system for the nurses to use.

**Study of the Intervention**

The justification for the intervention was to create a customized EHR template with a structured format to capture all relevant data for Stage 2 and 3 PPHs. The template would facilitate complete and accurate nursing documentation of an evidence-based guideline. Before the template, nursing documentation summaries for Stage 2 and 3 PPHs were found to be inconsistent. Key issues included unclear documentation on paper progress notes, documentation that was hard to locate, and documentation that was missing relevant clinical information. There was no uniformity in the way nurses were documenting Stage 2 and 3 PPHs. After template implementation, documentation of the guideline was facilitated for the nurses who chose to use it. The template allowed the nurses to document all relevant information in a structured format, which supports consistency in the documentation of this obstetrical emergency. Chart reviews were used to collect hemorrhage statistics and template compliance data. A researcher-developed survey was administered to the sample of 30 nurses after the project time frame. The nurses were given two weeks to respond. The survey included four
closed-ended questions and one open-ended question. These questions were created to best assess the nurses’ response to documentation tendencies regarding the CMQCC’s checklists pre- and post-intervention and their satisfaction with and feedback on the EHR template. The open-ended question would help elicit feedback on the template and recommendations for future templates. The survey helped validate the idea that implementation of the template was the reason for improved nursing satisfaction and documentation compliance of the checklists.

**Measures**

The following is a description of the measures that were employed to collect data to evaluate the impact of the intervention on the proposed outcomes. One source of data included retrospective chart reviews, which were conducted after the project time frame. Data were collected on the total number of PPHs (i.e., 500 ml or greater for vaginal birth, 1000 ml or greater for cesarean birth), the number of PPHs greater than 1000 ml but less than 1500 ml (i.e., Stage 2 PPH), and PPHs greater than 1500 ml (i.e., Stage 3 PPH) two months before and two months after the project start date (ACOG, 2006; CMQCC, 2015). The mean QBL was calculated for all Stage 2 and 3 PPHs that occurred in the pre- and post-template implementation groups. The compliance rate for using the PPH template in the EHR was compared with the number of Stage 2 and 3 PPHs that occurred during the eight-week implementation period.

A second data source was information obtained from the researcher-developed survey. The survey was created by the researcher since no existing survey could be located to assess the intervention. It included four closed-ended questions and one open-ended question. The open-ended question would help elicit feedback on the template and recommendations for future templates. Three of the closed-ended questions included Likert-scale data to include frequency, level of satisfaction, and level of agreement questions. Question 1 used a 5-point Likert scale ranging from never to very frequently and included a neutral option. Question 3 used a 7-point
Likert scale ranging from completely dissatisfied to completely satisfied and included a neutral option. Question 4 used a 7-point Likert scale ranging from strongly disagree to strongly agree and included a neutral option. The survey questions were created to best assess the nurses’ response to documentation tendencies regarding the CMQCC’s checklists pre- and post-intervention and their satisfaction and feedback with the new EHR template. The following are the five survey questions that were created by the researcher.

1. The California Maternal Quality Care Collaborative Obstetrical Hemorrhage Checklist is a standard of care guideline used on the unit. How often do you feel that you thoroughly document the completed steps from the checklist after a Stage 2 and 3 postpartum hemorrhage?
2. Have you been able to use the new postpartum hemorrhage template in the electronic health record?
3. What is your satisfaction on how Stage 2 and 3 postpartum hemorrhages are documented in the electronic health record?
4. Do you feel that customized electronic health record templates such as the one for Stage 2 and 3 postpartum hemorrhages can improve documentation practices by facilitating more accurate and complete documentation by nurses?
5. Any feedback on this customized template? What would you change? What do you like best? Any ideas for future customized electronic health record templates?

The survey helped validate that the implementation of the template was the reason for improved nursing satisfaction and documentation compliance of the checklists. The researcher created the survey through survey monkey, and a link to the survey was sent via email to the sample of 30 nurses. These nurses had the potential to utilize the new template during the project time frame. The survey was voluntary and non-identifiable; it was designed so that the respondents could
only take the survey once from the link provided in their email. Only one response was allowed for each of the closed-ended questions, and a text box was provided for the open-ended question. The respondents were given the option to skip over any questions.

Analysis

The researcher used a mixed methods approach, where both quantitative and qualitative data were collected and analyzed to evaluate the intervention. First, data were extracted from chart reviews in the EHR. Baseline data were collected on the total number of deliveries, the number of MTPs that were activated, PPHs, and Stage 2 and 3 PPHs that occurred two months before and after the template was implemented. To statistically analyze the mean quantitative blood loss (QBL) for all Stage 2 and 3 PPHs that occurred both pre- and post-template implementation, a two-sample assuming equal variances t test was used (Pennsylvania State University, 2017). The project was not intended to change or affect the QBL data. Both qualitative and quantitative data were extracted from the questionnaire. A z test for proportional differences was used for Questions 1 and 3, which had a pre- and post-test design. This was used to test the hypothesis that users would have a more favorable opinion of the template after they had used it (StatTrek, 2017). Here, the inference was that the population of nurses using the template would respond positively to Questions 1 and 3. The z tests compared the pre-template responses to the post-template responses and is a test to see if the proportions were different and if they were statistically different from each other (StatTrek, 2017). The above methods produced the quantitative and qualitative data necessary to analyze and evaluate the intervention.

Ethical Considerations

Appropriate ethical and legal guidelines were adhered to for the duration of the project. After the project proposal had been submitted to Capella University’s Institutional Review Board (IRB), it was determined that the project did not meet the federal regulation’s definition of
human subject research. Review and approval were then obtained from the IRB overseeing the project site. A letter of approval from the chief executive officer at the site was also obtained before the start of the project. For the data collection portion of the project, all data were de-identified and used for statistical purposes only. Data were stored in a password encrypted Excel spreadsheet within the security network of the facility to aid in the protection of patient health information and confidentiality. Access to the Excel spreadsheet was granted only to the researcher conducting the project. At no point during the project was the data set downloaded to any portable or mobile devices. The questionnaire for the nursing staff was voluntary, non-identifiable, and created by the researcher without the use of outside sources.

To ensure the proper permission was obtained to utilize information from outside forms, the following measures were performed. The CMQCC (2015) obstetric hemorrhage emergency management plan checklists were retrieved from the CMQCC obstetric hemorrhage toolkit, which is a toolkit that can be found online through the CMQCC’s website. The toolkit states the following: “Copyright: This document is in the public domain and may be used and reprinted without permission except those copyrighted materials noted for which further reproduction is prohibited without the specific permission of copyright holders” (Bingham, Melsop, & Main, 2010, p. 94). The obstetric hemorrhage emergency management plan checklists were developed by the California Department of Public Health in partnership with the CMQCC Task Force. This copyright information is as follows for these checklists: “Copyright 2015 California Department of Public Health. The material in this toolkit may be reproduced and disseminated in any media in its original format, without modification, for informational, educational and non-commercial purposes only” (Lyndon, Lagrew, Shields, Main, & Cape, 2015, p. 2). The checklists are currently used on the unit and are included in a hospital policy; no modifications to these
checklists were performed. The checklists were solely used to help guide the creation of the customized template in the EHR.

**Results**

Goals of the project included successful template implementation into the EHR, a 100% template compliance rate, and a high survey completion rate. First, the template was successfully implemented into the EHR system for the nursing staff to utilize. Over the course of this project, several changes occurred to the original plan. The original plan was to create two customized EHR templates using information from the CMQCC (2015) obstetric hemorrhage emergency management plan checklists. One template for Stage 2 PPHs, and another template for Stage 3 PPHs. Since a Stage 2 PPH can quickly turn into a Stage 3 PPH, two separate templates did not seem practical. After collaboration with various stakeholders, including the information technology department and the obstetrical management team, one template was created to facilitate ease of use. This one template encompassed steps for both stages since a Stage 2 PPH often develops into a Stage 3 PPH. It was accessible to all the registered nurses on the unit to utilize if their patient experienced this obstetrical emergency.

Next, the template compliance rate was evaluated. Though the goal of 100% compliance was ambitious, it was not met. Eighteen Stage 2 and 3 PPHs occurred after the template was implemented, and the EHR template was used twice. The template compliance rate was 11%. During this time frame, the MTP was activated once for a Stage 3 PPH. This was one case where the template was utilized; the other involved a Stage 3 hemorrhage. In both cases, blood products were transfused, a team response was necessary, and multiple interventions from the CMQCC’s checklists were performed.

A five-question researcher-developed survey was used to assess the nurses’ response to documentation tendencies regarding the CMQCC’s checklists pre- and post-intervention and
their satisfaction and feedback with the EHR template. Despite a low response rate, with eight of the possible thirty nurses responding, the results were positive. Questions 1 and 3 were of the most interest as they both showed a very positive increase in how survey respondents felt about the template. These were pre- and post-test questions which assessed documentation practices and satisfaction with how Stage 2 and 3 PPHs were documented. Survey Question 1 suggested that the proportion of survey participants who reported they felt they thoroughly documented the completed steps of the checklists frequently or very frequently post-implementation was statistically higher than the proportion before the template was implemented. For Survey Question 3, satisfaction with the documentation of Stage 2 and 3 PPHs in the EHR was statistically higher than the proportion before the template was implemented. Survey Questions 2, 4, and 5 also had positive results. Seven respondents answered Question 2, and one skipped the question. Results showed that two (i.e., 28.57%) of the surveyed nurses were able to utilize the template and the other six (i.e., 71.43%) were not. Question 4 helped verify that the survey respondents were on board with the template, with 100% either agreeing or strongly agreeing. Three responses were noted for Survey Question 5, which was the open-ended question. Comments included “none,” “good job,” and “I just like templates that guide you through so everyone is charting the same things.” The last response indicated a perceived benefit of using the customized template.

Baseline delivery and hemorrhage data were collected in early spring, eight weeks before and after the template was implemented in the EHR system. Eight weeks before the template was implemented, eighty-seven births occurred. A PPH (i.e., greater than 500 ml for a vaginal delivery and greater than 1000 ml for a cesarean section) occurred in 27 (31%) of these deliveries (ACOG, 2006). Of these 27 PPHs, there were 13 Stage 2 and 3 PPHs (48%). Of these, seven were Stage 2 PPHs (i.e., five vaginal and two cesarean sections) and six were Stage
3 PPHs (i.e., four vaginal and two cesarean sections). This data demonstrates that a significant number of PPHs occurred. The MTP was activated once per the provider’s discretion.

The post-implementation data collection period was eight weeks. During this timeframe, 94 births occurred. A PPH occurred in 36 (38%) of these deliveries. Of these 36 PPHs, there were 18 Stage 2 and 3 PPHs (50%). Of these, twelve resulted in Stage 2 PPHs (i.e., three vaginal and nine cesarean sections) and six resulted in Stage 3 PPHs (i.e., three vaginal and three cesarean sections). The MTP was activated once per the provider’s discretion. Data showed an increase in the number of Stage 2 and 3 PPHs that occurred after the template was implemented. It is essential to note that there were an additional seven births during the template implementation phase.

With the PPH data, the mean QBL was examined for all Stage 2 and 3 PPHs that occurred both pre- and post-template implementation. During this sixteen-week time frame, thirty-one patients yielded a QBL value for a Stage 2 or 3 PPH. Thirteen of these occurred before the template was implemented with a mean blood loss of 1,585 ml. Eighteen occurred after the template was implemented with a mean blood loss of 1,419 ml. A two-sample assuming equal variances t test was used to compare the mean QBL both pre- and post-template implementation. In the analysis, the obtained t-test value of 0.202 was less than the t-test critical value 1.699; based on this comparison, the null hypothesis was accepted, which meant that the mean QBL of the two groups were equal (Pennsylvania State University, 2017). Essentially, this meant that there was no difference in the QBL between the pre- and post-template patients. This data was not strong enough to suggest the null hypothesis was false and that the template had a positive effect in the post-template QBLs.

Regarding these results, the decrease in the mean QBL for the post-template group is noteworthy. The findings suggest the template had a positive (i.e., lower QBL) impact. The
template was not anticipated to affect the number and severity of PPHs that occurred in the unit, but a drop in the mean QBL for the post-template group is what is hoped for and is what matters to the patient and the healthcare providers. The t-test assumption of normalcy is important and may have been violated here. Ideally, the values for both groups would be symmetrically dispersed around the respective mean QBL for each group. A comparison of the mean and median in each group suggests the data are skewed and not normally distributed. The positive skewness values support this concern. Both distributions were positively skewed; that is, the mean was greater than the median, and this is attributable to two unusually large QBL values found in each group (i.e., 3,779 ml and 2,435 ml). These two large deviations threaten the assumption that the data are normally distributed (Pennsylvania State University, 2017). The results reported here, while not statistically significant, are nevertheless positive and suggest the template had a positive impact by reducing the QBL for the patients.

Discussion

Summary

This QI project supported the creation of a customized EHR template with a structured format to capture all relevant data for Stage 2 and 3 PPHs. This template supports uniformity in the documentation of this obstetrical emergency by facilitating complete and accurate nursing documentation of an evidence-based guideline in the patient’s medical record. Overall, despite only eighteen Stage 2 and 3 PPHs and one activation of the MTP during the eight-week project time frame, results were positive. The findings suggest the template had a positive (i.e., lower QBL) impact for Stage 2 and 3 PPHs. The survey participants were on board with the template, with 100% either agreeing or strongly agreeing that a customized template can improve documentation practices by the nurse. The proportion of survey participants who reportedly used the template frequently or very frequently post-implementation was statistically higher than the
proportion before the template was implemented. Furthermore, satisfaction with how Stage 2 and 3 PPHs were documented in the EHR was statistically higher than the proportion before the template was implemented. The template was utilized twice by two different nurses, which supports improved guideline documentation in accordance with the hospital’s obstetric hemorrhage care policy.

**Interpretation**

There are many positive outcomes as a result of this project. Since the facility is transitioning from paper to electronic charting, the new EHR template supports the merge to paperless charting and EHR utilization. Also, the implementation of the new template may have stimulated the nursing staff to further review and educate themselves on the interventions recommended in the guidelines to enhance their response and preparedness during a PPH emergency. In addition, the template had a favorable effect on nursing satisfaction and documentation compliance of an evidence-based obstetric hemorrhage guideline. Without the development and implementation of this template, documentation practices of this obstetrical emergency would have remained as is. Nursing documentation summaries for Stage 2 and 3 PPHs would continue to be inconsistent with no uniformity. When notes are not consistently documented in the same place, post-event documentation can be hard to locate by other healthcare providers. This can compromise the communication of critical information between nurses and providers, potentially placing patient safety at risk (AHIMA Work Group, 2013).

Research demonstrates an abundance of studies on EHR adoption, but few studies have been done on EHR template customization. Of the studies identified in this manuscript, positive outcomes resulted when EHR systems were customized and utilized to their fullest extent. Documentation became more user-friendly in the EHR, and end-user satisfaction and workflow were improved. The AHIMA Work Group (2013) reports that EHRs can improve the efficiency
and legibility of documentation, improve documentation practices, and enhance communication between health care providers by increasing access to and providing complete and accurate documentation. These factors can contribute to improved patient outcomes, patient safety, and a reduction in errors (U.S. Department of Health and Human Services, 2010). For future projects of this nature, an examination of documentation practices and opinions from health care providers on EHR satisfaction and dissatisfaction can help identify what changes need to be made. This simple strategy can be the impetus for change. Nurses are encouraged to intervene and lead EHR design efforts to help meet the challenges and demands that come with implementing EHR technology.

Limitations

The applicability and generalizability of the results may be limited due to the following limitations. The project took place at a small hospital where approximately 40-60 deliveries occur each month. Eighteen Stage 2 and 3 PPHs took place during the eight-week implementation time frame. This short time period in addition to the small number of births affected the overall number of PPHs that occurred. The small sample of Stage 2 and 3 PPHs did not give all of the nursing participants \( N = 30 \) the opportunity to utilize the new template in practice. Of the eighteen opportunities to use the template, it was only used twice. The compliance rate for using the template was 11%. Though it was expected for the nurses to utilize the new template, they still had access to paper documentation and other notes in the EHR system, which may have impacted the compliance rate of the new template. The facility is working towards paperless documentation but is not completely there yet. Another limitation included the low response rate for the survey, with only eight of the possible thirty nurses responding. Not all of the nurses had an opportunity to use the new template, which may have been a factor for them choosing not to complete the survey. Also, since the survey was sent via
email, it is unknown if each nurse in the sample checked their email in the two-week period allotted for the survey responses. In addition, the researcher developed the survey, which may impact its overall validity and reliability. Lastly, when examining the mean QBL both pre- and post-template implementation, the findings were based on a small sample size and therefore should not be considered a conclusive outcome of the project. A repeat analysis addressing these limitations would respond to some of these outlined concerns. Despite these limitations, the project demonstrated that clinical significance exists on EHR template customization.

**Conclusion**

With the growing complexity of patient care and the drive to deliver safer and higher quality care, a priority and challenge for many health care organizations and clinicians is to use EHR technology successfully. Since a substantial portion of a nurse’s time is spent documenting, nurses can provide valuable input on what does and does not work for user workflow. They are in key positions to help make EHR systems more efficient and user-friendly (Nursing License Map, n.d.). They can collaborate with the essential stakeholders such as their information technology department to overcome documentation workarounds and assist with EHR design and implementation. Optimizing EHR systems through the creation of customized EHR templates can support meaningful use requirements, facilitate data tracking and coding, and enhance end-user satisfaction (AHIMA Work Group, 2013). Customized EHR templates can also improve the efficiency and legibility of documentation, improve documentation practices, and enhance communication between health care providers by increasing access to and providing complete and accurate documentation (AHIMA Work Group, 2013). When clinical documentation time is reduced through more efficient documentation processes, the nurse can then spend more time with the patient. These factors can contribute to improved patient outcomes, patient safety, and a reduction in errors (U.S. Department of Health and Human
Services, 2010). The findings from this project are significant. In the event of a Stage 2 or 3 PPH, it is essential that strategies are in place to strengthen the accuracy and completeness of nursing documentation. Results suggested that the creation of a nurse-driven customized EHR template for Stage 2 and 3 PPHs had a favorable effect on nursing satisfaction and documentation compliance of an evidence-based obstetric hemorrhage care guideline. The project also supports the merge to paperless charting. With high hopes, this project will inspire other nurses to intervene and take steps in leading EHR design efforts in their organizations to help to meet the many challenges and demands that come with implementing EHR technology.
References


Appendix

Researcher-Designed Electronic Health Record Template

Template: Obstetric Postpartum Hemorrhage Summary (Lyn last 03/17)

OBSTETRIC POSTPARTUM HEMORRHAGE SUMMARY (Stage 2 or 3)

Stage 2 PPH: Continued bleeding or unstable vital signs, and 1000-1600 ml cumulative blood loss

Stage 3 PPH: Cumulative blood loss greater than 1600 ml, or Greater than 2 units PRBCs given, or Unstable vital signs, or Suspicion for disseminated intravascular coagulopathy

Total Blood Loss: [ ] [ ] [ ] mls
Remarks:

IV ACCESS - INSERTED at [ ] [ ]
Location: [ ] left [ ] antecubital
Size: [ ] 16 gauge [ ] 18 gauge [ ] 20 gauge [ ] 22 gauge [ ] 24 gauge [ ] 25 gauge

IV ACCESS - INSERTED at [ ] [ ]
Location: [ ] left [ ] antecubital
Size: [ ] 16 gauge [ ] 18 gauge [ ] 20 gauge [ ] 22 gauge [ ] 24 gauge [ ] 25 gauge

IV ACCESS - DISCONTINUED at [ ] [ ]
(Select one)
- Foley Catheter - In situ at time of event
- Foley Catheter placed at [ ] [ ] French/size

MEDICATIONS GIVEN
- Cytotec/Misoprostol - Select Route - [ ]
- Pitocin IV
- Pitocin IM [intra muscular]
- Methergine - Select Route - [ ]
- Hemabate - Select Route - [ ]
- Other:

Bakri Balloon placed at [ ] [ ] by
Vaginal Packing Placed at [ ] [ ] by

Massive Transfusion Protocol Activated [ ] [ ]
(Refer to Blood Administration documentation)

Patient transferred to the operating room at [ ] [ ]

Other/Remarks:
STATEMENT OF ORIGINAL WORK

**Academic Honesty Policy**

Capella University’s Academic Honesty Policy (**3.01.01**) holds learners accountable for the integrity of work they submit, which includes but is not limited to discussion postings, assignments, comprehensive exams, and the dissertation or capstone project.

Established in the Policy are the expectations for original work, rationale for the policy, definition of terms that pertain to academic honesty and original work, and disciplinary consequences of academic dishonesty. Also stated in the Policy is the expectation that learners will follow APA rules for citing another person’s ideas or works.

The following standards for original work and definition of plagiarism are discussed in the Policy:

- Learners are expected to be the sole authors of their work and to acknowledge the authorship of others’ work through proper citation and reference. Use of another person’s ideas, including another learner’s, without proper reference or citation constitutes plagiarism and academic dishonesty and is prohibited conduct. (p. 1)

- Plagiarism is one example of academic dishonesty. Plagiarism is presenting someone else’s ideas or work as your own. Plagiarism also includes copying verbatim or rephrasing ideas without properly acknowledging the source by author, date, and publication medium. (p. 2)

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- Research misconduct includes but is not limited to falsification, fabrication, plagiarism, misappropriation, or other practices that seriously deviate from those that are commonly accepted within the academic community for proposing, conducting, or reviewing research, or in reporting research results. (p. 1)

Learners failing to abide by these policies are subject to consequences, including but not limited to dismissal or revocation of the degree.
Statement of Original Work and Signature

I have read, understood, and abided by Capella University’s Academic Honesty Policy (3.01.01) and Research Misconduct Policy (3.03.06), including the Policy Statements, Rationale, and Definitions.

I attest that this dissertation or capstone project is my own work. Where I have used the ideas or words of others, I have paraphrased, summarized, or used direct quotes following the guidelines set forth in the APA Publication Manual.

Learner name and date  Autumn Nicole Engstrom. 09/13/2017.