

Summer 8-2017

# Understanding the Experience of Interprofessional Team Members after Participating in Comprehensive Obstetric Hemorrhage Training

Frances Kelly

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EXPERIENCE OF INTERPROFESSIONAL TEAM MEMBERS AFTER  
PARTICIPATING IN A COMPREHENSIVE OBSTETRIC  
HEMORRHAGE TRAINING PROGRAM

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A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN NURSING

THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT HOUSTON

SCHOOL OF NURSING

BY

FRANCES C. KELLY, MSN, RNC-OB, CPHQ, CPPS

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AUGUST, 2017

The University of Texas Health Science Center at Houston  
School of Nursing  
Houston, Texas

July 5, 2017

Date

To the Dean for the School of Nursing:

I am submitting a dissertation written by Frances C. Kelly and entitled "Understanding the Experience of Interprofessional Team Members after Participating in Comprehensive Obstetric Hemorrhage Training." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Nursing.

*Diane Wardell*

Diane Wardell, PhD, WHNP-BC, Committee Chair

We have read this dissertation and recommend its acceptance:

*Dr. Hayden Fisher, MD*

*Joan Engebretson*

*Lynnda Burt Feder*

Accepted

*Lorraine Gray*

Dean for the School of Nursing

## Acknowledgements

First and foremost I wish to acknowledge the boundless blessings that God has bestowed upon me during my entire doctoral program. He has never left me during this or any other circumstance. Without my gracious and merciful God, I would not have been able to complete this program. And to Him, I will be eternally grateful.

Next, I wish to express my deep gratitude to my family and friends. I could not have finished without the steadfast support and encouragement from my husband, Jeff Kelly; and our children Ben and Eden Kelly; Katy and Tyson Young; and Wynn, Clay, Joseph, and Luke Kelly. Thank you to Dona Creech, my mother, for being there into the wee hours listening to my hopes and fears, and to my sisters Dona Kemp and Julia Davis. Thank you Shirley Kelly, my mother-in-law, for always believing in me. Thank you dear friends Cathy Robertson, Vicki Christie, Madelene Ottosen, Leslie Miles, Leisa McMullen, Susan Swart, Charley Elliott, and Suzanne McMurtry Baird. If it had not been for the support and encouragement that I received from my family and friends, I would not have successfully completed this program.

I also wish to acknowledge and thank Dr. Diane Wardell, my advisor, and the chairperson of my dissertation committee. Dr. Wardell has supported and encouraged me throughout this doctoral program, and for that I will be forever grateful. Drs. Joan Engebretson, Wycke Baker, and Lynda Tyer-Viola provided invaluable insight and support as members of my dissertation committee. Thank you also to Dr. Nancy Hurst who served as a co-facilitator during my research. They have all helped me to develop as a novice researcher, and to them I extend my thanks.

And last, but not least, I want to thank Texas Children's Hospital for allowing me to conduct my research there. I also wish to thank the team members from the Pavilion for Women who trusted me and were willing to share their experiences after participating in the obstetric hemorrhage program. Their feedback is precious, and will be used to improve the care for obstetric patients.

**Frances C. Kelly, PhD(c), MSN, RNC-OB, NEA-BC, CPHQ, CPPS**

**August, 2017**

**Understanding the Experience of Interprofessional Team Members after  
Participating in Comprehensive Obstetric Hemorrhage Training**

**Abstract**

**Purpose:** The obstetric hemorrhage rate has risen steadily in the U.S. accounting for 11.4% of maternal deaths between 2011 and 2013, and remains a leading cause of maternal morbidity. Improving the quality and safety of care could prevent much of the morbidity and potential mortality associated with obstetric hemorrhages. An interprofessional obstetric team developed, tested, and implemented obstetric hemorrhage and massive transfusion protocols. Multi-modal team training occurred before service-wide implementation of the protocols, including didactic, skills stations, on-line educational modules, and in situ simulation team training. Early quantitative results were promising. **Methods:** To augment understanding of the quantitative results and to understand the experience of interprofessional team members after participating in obstetric hemorrhage training; an exploratory, medically-focused, ethnographic qualitative study was conducted in a five-year old obstetric service within a large, metropolitan, tertiary, free-standing pediatric hospital. Participants were purposively sampled from interprofessional obstetric team members who cared for obstetric hemorrhage patients and participated in hemorrhage training. Data was generated during field observations, and individual and focus group interviews. **Results:** Twenty (n = 91 participants) semi-structured interviews were conducted. An inductive, descriptive thematic analysis of the data revealed two central themes: Knowing, and Teaming. Knowing was influenced by training and experience with obstetric hemorrhages, and was

further influenced by interactions among members of the interprofessional obstetric team within the complex, non-linear environment. Teaming was reported as a compelling benefit of engaging the interprofessional obstetric team in simulation team training. Simulation training helped the team know how to use the protocols, and improved team functioning during obstetric hemorrhages. **Conclusions:** Similar to Benner's model, training and experience influenced the knowing that obstetric team members applied during an obstetric hemorrhage event. Simulation team training promoted teaming, which helped the interprofessional obstetric team to effectively and efficiently manage an obstetric hemorrhage.

*Keywords:* obstetric hemorrhage, training, simulation, knowing, teaming



## Summary of the Study

Despite a focus on reducing maternal mortality and morbidity, the rate of obstetric hemorrhages has risen steadily in the U.S. accounting for 11.4% of maternal deaths between 2011 and 2013, and remains a leading cause of maternal morbidity. An exploratory, medically-focused, ethnographic qualitative approach was applied to achieve the aim of this dissertation project, which was to understand the experience of the interprofessional team members after participating in a comprehensive obstetric hemorrhage training program. This dissertation is comprised of two sections: 1) the research proposal and 2) an initial manuscript including the findings.

The specific aim of the study proposal was to understand the experience among interprofessional obstetric team members who provide care to obstetric hemorrhage patients, and at least some of whom have participated in comprehensive obstetric hemorrhage training. It took longer than anticipated to navigate the preliminary research study proposal review process at the study site. Once this preliminary approval was secured, the study proposal was approved at both relevant institutional review boards (Appendices A and B). Data collection began in February of 2017 and concluded in June of 2017 (Appendices C-G). Iterative analysis began soon after data collection began that incorporated peer debriefing sessions, and concluded in early July 2017.

The initial manuscript includes the results which address the aim of the dissertation project. The results were derived through an inductive, descriptive, thematic analysis of the data, supported by coding of the study data. The two central themes of Knowing and Teaming were supported by numerous participant exemplars. Similar to Benner's model, training and experience influenced the knowing that obstetric team members applied during an obstetric hemorrhage event. As illustrated in a derived

conceptual framework, knowing was further influenced by the interactions among members of the interprofessional obstetric team within the complex, non-linear health care environment in which obstetric hemorrhages occurred. Teaming was reported to be a result of communication, team cohesion, role clarity, resource availability, and leading among members of the interprofessional obstetric team; knowing and trusting members of the interprofessional team; and taking prompt actions during an obstetric hemorrhage. Simulation team training helped the team know how to use the obstetric hemorrhage and massive transfusion protocols, and promoted elements of teaming which helped the interprofessional obstetric team to effectively and efficiently manage an obstetric hemorrhage. The results of this dissertation study are transferrable to other interprofessional obstetric teams who are working to reduce mortality and morbidity associated with obstetric hemorrhage. Recommendations for further research were included.

Understanding the Experience of Interprofessional Team Members after Participating in  
Comprehensive Obstetric Hemorrhage Training

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Submitted in Partial Fulfillment of

PhD in Nursing Program

June 1, 2016

## **Introduction and Specific Aim**

Despite the Healthy People 2020 goal to decrease the rate of maternal mortality to no more than 11.4 maternal deaths for every 100,000 live births, this rate has risen steadily in the United States from 7.2 to 17.8 maternal deaths for every 100,000 live births from 1987 to 2011 respectively (Centers for Disease Prevention and Control, 2014). Obstetric hemorrhage is one of the leading causes of maternal mortality and morbidity. A recent population study reported an alarming 184% increase in the rate of blood transfusion for obstetric patients during their delivery hospitalization from 1998 to 2009 (Callaghan, Creanga, & Kuklina, 2012). Based on a review of more than one million obstetric patient records from the Hospital Corporation of America system, Clark and his colleagues (2008) reported that approximately 73% of the maternal deaths due to hemorrhage were potentially preventable. It has been suggested that from 28% (Clark et al., 2008; Clark, Belfort, Dildy, & Meyers, 2008) to 40% (Berg et al., 2005) of maternal deaths may have been prevented by improving the quality and safety of patient care.

Obstetric patients and their families expect safe, quality care, and a positive experience (Institute of Healthcare Improvement, 2008; Pettker, 2014). To achieve these expectations, numerous professional organizations have renewed the call to improve the quality and safety of obstetric patient care including The Joint Commission (2010); the American Academy of Family Physicians (AAFP), American Academy of Pediatrics (AAP), American College of Nurse Midwives (ACNM), American College of Obstetricians and Gynecologists (ACOG), American College of Osteopathic Obstetricians and Gynecologists (ACOOG), Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN), and Society of Maternal-Fetal Medicine (SMFM)

(Association of Women's Health Obstetric and Neonatal Nurses, 2011); and the National Quality Forum (2014). Improving teamwork and communication among interprofessional obstetric team members are recurring recommendations to improve care quality and patient safety (Berg et al., 2005; Clark, Belfort, Byrum, Meyers, & Perlin, 2008; Kohn, Corrigan, & Donaldson, 1999). Suggested strategies for improving teamwork, communication, and patient level outcomes include implementation of protocols and checklists, conducting simulation drills on obstetric emergencies, and regularly reviewing cases of severe maternal morbidity and mortality (Clark, 2012; Gawande, 2009; Kohn et al., 1999; The Joint Commission, 2010).

To reduce severe maternal morbidity and variation in recognizing and managing an obstetric hemorrhage, an interprofessional team at a tertiary women's hospital developed obstetric hemorrhage and massive transfusion protocols. To identify potential latent (unrecognized) safety threats and to test for 'real-world' use before wide-spread team training ensued, the team conducted an innovative series of rapid-cycle Plan Do Study Act (PDSA) cycles (Langley et al., 2009) of in-situ obstetric hemorrhage simulations. All members of the interprofessional obstetric team who would routinely respond and manage a hemorrhage were represented. Available quantitative measures of the impact of implementing these protocols are promising. In order to understand, sustain, and further improve these results, soliciting the perspective of front-line interprofessional obstetric team members who participated in training and currently respond to and manage obstetric hemorrhages in this setting is vital.

**Specific Aim** Understand the experience among interprofessional obstetric team members who provide care to obstetric hemorrhage patients, and at least some of whom have participated in comprehensive obstetric hemorrhage training.

### **Research Strategy**

#### **Maternal Mortality and Morbidity**

The maternal mortality rate has risen steadily in the United States from 7.2 to 17.8 maternal deaths for every 100,000 live births from 1987 to 2011, respectively, alarmingly above the Healthy People 2020 goal to decrease the rate of maternal mortality to no more than 11.4 maternal deaths for every 100,000 live births (Centers for Disease Prevention and Control, 2014). Hemorrhage, or excessive bleeding before, during, or after delivery, is a leading cause of maternal mortality, accounting for over 11% of the reported maternal deaths in 2011 (Centers for Disease Prevention and Control, 2014). Maternal morbidity may include both physical and psychological conditions or complications associated with pregnancy. Defined conceptually by Callaghan and his colleagues, "maternal morbidity includes a broad spectrum of severity and can include complications and conditions associated with any pregnancy outcome" (Callaghan, Grobman, Kilpatrick, Main, & D'Alton, 2014, p. 978). Based upon an evaluation of 377,869 deliveries in 2005, the overall rate of obstetric morbidity was reported to be 28% (Korst et al., 2014). In this same study, severe maternal morbidity (SMM) was estimated to be 0.5% and 1.4% in low and high-risk pregnancies respectively. In a subsequent population study in 2010, the reported rate of SMM, identified by the researchers as a life-threatening condition or the performance of a life-saving procedure, was 2.4% among 115,742 deliveries (Howell, Zeitlin, Hebert, Balbierz, & Egorova, 2014).

Maternal morbidity occurs much more often than does maternal mortality. For every one reported maternal death, there are an estimated 80 to 100 obstetric patients who experience maternal morbidity (Callaghan, Creanga, & Main, 2014; Callaghan, et al., 2012). Callaghan and his colleagues (2012) identified an increase in the rate of SMM from 73.82 to 129.08 per 10,000 delivery hospitalizations from 1998-1999 to 2008-2009 respectively. Hemorrhage is proving to be an increasingly serious challenge for providers of obstetric health care, and is recognized as one of the leading causes for this increase in the rate of severe maternal morbidity (Callaghan et al., 2012; Clark, 2012; Clark & Hankins, 2012). The rate of blood transfusion for obstetric patients during their delivery hospitalization is reported to have risen 184% (Callaghan et al., 2012). Despite the increasing age and the presence and number of concomitant obstetric and medical conditions of modern-day obstetric patients, the rate of severe obstetric hemorrhage is disproportionately high, reported to have risen from 1.9 to 4.2 per 1000 deliveries from 1999 to 2008 respectively. (Kramer et al., 2013). Reasons for these increases are thought to be rooted in the diversity and complexity (Edmondson, 2012; Engebretson & Hickey, 2011; Pettker & Grobman, 2015) of modern-day obstetric practice environments and challenges to teamwork of the members.

### **Influence of Contemporaneous Obstetric Practice Environments on SMM**

**Contemporaneous obstetric patients.** Contemporaneous obstetric patients possess different characteristics than their counterparts from five decades ago. Modern-day obstetric patients tend to be older. They may also be more likely to have one or more obstetric or medical complications, which may increase their risk of morbidity and

mortality (Clark, Belfort, Byrum, et al., 2008; Clark, Belfort, Dildy, et al., 2008; Grobman, 2012).

**Hazardous obstetric care environment.** A description of the health care environment in which obstetric patient care takes place will assist in better understanding the context in which maternal morbidity and mortality occurs. As opposed to more traditional, mechanistic health care environments of the past, in which each member of the team focused primarily on his or her own tasks and obstetric care delivery may have been more linear; the current environment in which interprofessional obstetric teams provide care is increasingly complex and hazardous (Hughes, 2008; Pettker & Grobman, 2015). The Institute of Medicine (Ingersoll & Schmitt, 2004) identified various aspects of the hospital work environment that may result in medical errors, such as busy, stressful units; multiple, manual processes; over-reliance on memory; prioritizing multiple, simultaneous patient needs; distractions and interruptions; poor communication and teamwork among team members (Kohn et al., 1999); working long hours resulting in fatigue (Rogers, Hwang, Scott, Aiken, & Dinges, 2004); and inadequate numbers of staff (Tourangeau, Cranley, & Jeffs, 2006; Tourangeau et al., 2007).

**Impact of inefficient and ineffective teamwork.** Providing safe, quality care to obstetric patients requires an effectively functioning interprofessional team (Berg et al., 2005; Clark, Belfort, Byrum, et al., 2008; Edmondson, 2012; Firth-Cozens, 2001; Guise & Segel, 2008; Ingersoll & Schmitt, 2004; Knox & Simpson, 2004; Kohn et al, 1999; Salas, Sims, & Klein, 2004). A team is interprofessional, dynamic, fluid, and absolutely essential for safe obstetric patient care (Edmondson, December 12, 2013, personal communication). Teams make fewer mistakes than do individuals (Association of



Healthcare Research and Quality, 2005; Merry & Brown, 2002; Salas et al., 2004).

Emerging research suggests that effectively functioning health care teams may improve patient safety more so than individual health care workers would alone (Edmondson, 2012; Merry & Brown, 2002; Rosen et al., 2008).

For the purposes of this study, an obstetric team is operationally defined as being representative of the roles routinely involved in providing or supporting contemporaneous obstetric patient care. The members of a contemporary obstetric team include representatives from various health care disciplines. A contemporary obstetric team is an interprofessional team, often comprised of obstetric, newborn, and perioperative nurses; obstetric, anesthesia, neonatal, intensive care, adult, transfusion medicine, and radiology physicians; mid-level providers such as certified nurse midwives, certified registered nurse anesthetists, and neonatal nurse practitioners; respiratory therapists and technicians; ancillary team members from the pharmacy, laboratory, and blood bank; and supportive, unlicensed, assistive personnel such as anesthesia and surgical technicians or patient care assistants.

Effectively functioning teams share several observable characteristics.

Observable behavioral markers of effective teams may include aspects of communication such as assertion, briefings, clarification, closed-loop exchanges, and inquiry; clarifying team roles; cooperation; assessing, coordinating, and redistributing the workload as necessary; and leadership (Thomas, Sexton, & Helmreich, 2004). Guise and colleagues (2008) describe effective teamwork in obstetrics as communication, situational awareness, decision making, role clarity, and focus on the patient.

Teaming is more about the active processes and activities inherent in complex health care organizations and among members of diverse, interprofessional teams who must not only understand their role, but the role of everyone else on the team in order to function optimally and support a culture of safety (Edmondson, 2012). For the purposes of this proposed research study, teamwork is considered a key element of a nurse practice environment (Lake, 2007). It is defined conceptually as communication, monitoring, feedback, coordination, and leadership that occurs among team members (according to Dickinson and McIntyre, as reported in Thomas et al., 2004).

Central to teamwork is clear, concise, and effective communication (Kohn et al., 1999; Nance, 2011). Clear and effective communication involves orienting team members using a structured format such as situation, background, assessment, and recommendations (SBAR). It also involves inquiry (Minehart et al., 2012) and transparent thinking, such as when team members say aloud what they believe is occurring and what actions they believe should be taken. And finally, effective communication among members of interprofessional obstetric teams involves directed communication, such as when the team leader gives orders; and closed loop communication, such as when team members acknowledge hearing the order by repeating it back, affirming their intention to carry it out, and when the order has been completed (Guise & Segel, 2008).

Delayed, ineffective, or absent communication among members of an interprofessional obstetric team increases the risk of preventable mortality and morbidity for both the obstetric patient and her unborn baby (Grobman, 2012; Kendall & Salas, 2004; Manojlovich & Talsma, 2007; Simpson, 2007; Simpson, James, & Knox, 2006).

Nance (2011) asserts that one half to three quarters of patient safety issues occur because something is perceived in a way by one or more people that is different from the way something was intended to be perceived. The Joint Commission (2004) substantiated these assertions, reporting that communication failures were the primary root cause of 72% of the total, reported perinatal-related sentinel events that were reviewed. The most recent Joint Commission (2015) data indicate that human factors, communication, assessment, and leadership failures have remained the same top four root causes of all reported maternal (N = 125) and perinatal (full term infant 2500 grams or larger without obvious congenital abnormality, N = 274) sentinel events from 2004 to 2014.

### **Challenges for Teams, Teamwork, and Teaming**

While efficiently and effectively functioning interprofessional teams are recognized as an optimal means by which obstetric quality and patient safety may be improved (Edmondson, 2012), there are factors that may negatively influence a team's efficiency and effectiveness, such as the inherent fluid and dynamic state of most modern-day obstetric teams (Baker, Day, & Salas, 2006). The same people do not consistently work with one another from day to day, or shift to shift. Additionally, members of obstetrical teams are historically not trained together (Association of Healthcare Research and Quality, 2005), and often do not practice managing obstetrical emergencies such as hemorrhage together. This creates the need to develop and employ strategies through which this lack of team continuity and preparedness may be overcome, thus improving team function and theoretically, patient safety. Besides the fluidity of contemporary obstetric teams and the inconsistency of practicing how to manage

emergencies, other factors may also influence a team's efficiency and effectiveness, such as culture, role, gender, and perceived power distance.

**Culture.** Organizational culture is the forum and medium in which interprofessional teams provide acute obstetric patient care. According to Gershon and colleagues, organizational culture includes the norms, values, and beliefs of the team members within an organization that may be difficult to measure (MacDavitt, Choe, & Stone, 2007). It has also been defined as a set of deeply ingrained ideas and experiences which serve as a framework upon which decisions and their subsequent actions are based, that tends to reflect leadership decisions in an organization over a period of time (Clarke, 2006). According to Schein (2010), culture is the product of shared values, attitudes, perceptions, and beliefs among members of an organization that tend to influence the perceived safety culture (Kohn et al., 1999). As such, an organization's culture and its influence on its safety culture, impacts team members' predispositions and dispositions, observations, orientation, actions, and ultimately, the consequences of actions carried out by interprofessional obstetric team members regarding communication and teamwork (Glimcher, Fehr, Camerer, & Poldrack, 2009). It is important to understand that while organizational culture is a powerful influence, this culture differs from one organization to the next. What influences organizational culture in one health care facility may not influence it in another. Considering an organization's culture is an important step when setting out to reduce severe maternal morbidity and mortality through quality and safety initiatives.

**Impact of role and gender.** The sociological lens through which the role and gender of interprofessional obstetric team members are perceived in the context of

real-world interactions in the process of care delivery is also relevant and should be explored. While nurses continue to comprise the largest work force in health care (Hughes, 2008; Ingersoll & Schmidt, 2004), structural theories and history have traditionally depicted nurses in a subordinate role to physicians (Carpenter, 1993; Leape et al., 2012a). Traditionally, the physician has been recognized as the leader of patient care teams, giving orders and expecting they will be carried out. In this paradigm, it was not the nurse's role to give voice to her thoughts, especially if they differed from those of the physician (Carpenter, 1993; Leape et al., 2012a). In a classic report, Stein (1967) commented critically on what he termed the doctor-nurse game. The object of the game was for the nurse to hint at what she thought should be done, while allowing the idea to appear to originate from the physician. Other roles that may also be considered subordinate to that of attending physicians include resident physicians and medical students. Interprofessional team members in these and other roles may also be reluctant to speak up about safety related concerns, thus increasing the risk of maternal morbidity and mortality.

Although the proportion of male nurses is increasing, the gender of nurses remains predominantly female (The Henry J. Kaiser Family Foundation, 2016). Historically, nurses were viewed as having the role of caring for the patient, while the physician, often of male gender, mechanistically cured the patient (Carpenter, 1993). In fact, at one time, being a nurse was a role that was relegated primarily to females, and was considered a semi-profession, along with the roles of school teacher, social worker, and librarian (Schwartz, deWolf, & Skipper, 1987). Feminist critics characterized early nurse training, which emphasized demonstrating traits associated with being a 'good

nurse'; and deferring to medical, primarily male, authority and expertise (Carpenter, 1993). Although there has been a surge in professional nursing, remnants remain of the influence of gender on an individual's moral agency (Weiss & Lonquist, 2000).

**Perceived respect and power distance.** Just as role and gender may influence the effectiveness of communication among members of interprofessional obstetric teams, so might a perceived lack of respect (Leape et al., 2012a, 2012b; Maxfield, Grenny, Lavandero, & Groah, 2010), intimidation (Lamontagne, 2010), or large power distance (Kahtri, 2009). Two recent publications by Leape and colleagues (2012a, 2012b) identified a perceived lack of respect as having a significant impact on an organization's culture and efforts to improve patient safety. In recognizing the suggested relationship between behaviors that may be perceived as disrespectful or intimidating and patient safety, The Joint Commission published two related sentinel event alerts. One outlined behaviors that may negatively impact a culture of safety (The Joint Commission, 2008), and another on the expected leadership behaviors to help recognize and address such behaviors (The Joint Commission, 2009). In 2012, The Joint Commission clarified the leadership standard related to addressing behaviors that may undermine a safe care environment for both patients and members of interprofessional teams (Wyatt, 2013).

### **Reducing Maternal Morbidity and Mortality: A Call to Action**

Despite the strong emphasis on patient safety since *To Err is Human* (Kohn et al., 1999) was published, experts have lamented the slow progress in reducing preventable patient deaths in health care (Leape & Berwick, 2005), and in obstetrics specifically (Clark, 2012; Clark & Hankins, 2012; Clark, Meyers, Frye, McManus, & Perlin, 2012; Grobman, 2012; Pettker & Grobman, 2015; Pronovost, Holzmueller, Ennen, & Fox,

2011; Simpson, 2011; The Leapfrog Group, 2014). Although many obstetric patients successfully compensate for excessive blood loss before, during, or shortly after delivery because of the increased blood volume associated with the physiologic changes of pregnancy (Pettker, 2014), not all can or do. And while some failures to prevent or reduce maternal morbidity and mortality may be inevitable due to the innate nature of human fallibility and the increasingly complex environment in which health care is provided, obstetric experts have asserted that many obstetric hemorrhages and the associated morbidity and potential mortality are preventable (Bingham, Lyndon, Lagrew, & Main, 2011; Bingham, Melsop, & Main, 2010; Callaghan et al., 2014; Clark & Hankins, 2012; D'Alton, Main, Menard, & Lewy, 2014; Howell et al., 2014; The Joint Commission, 2010).

Based on a review of more than one million obstetric patient records from the Hospital Corporation of America system, Clark and his colleagues (2008) reported that approximately 73% of the maternal deaths due to hemorrhage were potentially preventable. It has been suggested that from 28% (Clark, Belfort, Dildy, et al., 2008; Clark, Belfort, Dildy, & Meyers, 2008) to 40% (Berg et al., 2005) of maternal deaths may have been prevented by improving the quality and safety of patient care. Obstetric patients and their families expect safe, quality care, and a positive experience (Institute of Healthcare Improvement, 2008; Pettker, 2014). Numerous professional organizations, such as the AAFP, AAP, ACNM, ACOG, ACOOG, AWHONN, and the SMFM, have partnered to renew the call to improve the quality and safety of the care provided to obstetric patients (Association of Women's Health, Obstetric, and Neonatal Nurses, 2011; National Quality Forum, 2014; The Joint Commission, 2010).

Recurring recommendations to improve the quality and safety of patient care have emphasized the importance of improving non-technical skills such as teamwork and communication among members of interprofessional teams (Berg et al., 2005; Clark, Belfort, Byrum, et al., 2008; Kohn et al., 1999). However, achieving clear communication and establishing effective, interactive, collegial teams has not been easy in health care. Suggested strategies to reduce maternal mortality and morbidity also include implementing protocols and checklists (Clark, 2012; Gawande, 2009), conducting drills on obstetric emergencies such as hemorrhage (The Joint Commission, 2010), and performing regular review of cases of severe maternal morbidity (Atallah, Kilpatrick, & McCalla, 2015).

Simulation team training has been recognized as positively impacting a broad range of outcomes. Published outcomes of simulation team training reflect a promising mechanism to improve teamwork and communication among members of interprofessional teams, and thus, the quality and safety of patient care (Riley et al., 2008). Although in situ simulation team training has been used extensively in the operating room (Marshall, Parker, Esmaril, Kirsk, & Claridge, 2003; Wolf, Way, & Stewart, 2010), anesthesia (Gaba, Howard, Fish, Smith, & Sowb, 2001), emergency departments (Shapiro et al., 2004), critical care (Berkenstadt et al., 2008), and on medical-surgical units (Maxson et al., 2011), fewer studies have been published about the impact of simulation training of interprofessional teams on patient level outcomes. Fewer still are the number of published studies reporting the impact of training interprofessional obstetric teams on actual patient level outcomes (Kelly, 2013). Moreover, the overwhelming majority of published studies reflected a positivist paradigm



(Institute of Medicine, 2015); employed a quantitative design; and often lacked a sample that truly represented a modern-day obstetric team, and without seeming to consider or honor the team's knowledge, expertise, and awareness of their team's needs for improvement or unique organizational influences.

To reduce the rate of severe maternal morbidity and risk of mortality in a newly opened women's hospital that is part of a large, free-standing pediatric hospital located in the southern part of the United States, an interprofessional team developed and implemented a comprehensive obstetric hemorrhage program. This program addressed the root causes of obstetric and perinatal sentinel events identified by The Joint Commission, and involved three steps. First, to reduce the variation in recognizing and managing an obstetric hemorrhage, a key element of a highly reliable organization (Weick & Sutcliffe, 2007), the interprofessional team developed obstetric hemorrhage and massive transfusion protocols (Clark, 2012). Second, to identify potential latent safety threats and to test for 'real-world' usability before wide-spread team training ensued, an innovative series of rapid-cycle Plan Do Study Act (PDSA) cycles were conducted (Langley, Moen, Nolan, Nolan, Norman, & Provost, 2009; Wallin, Kelly, & Sembera, 2016) of in-situ obstetric hemorrhage simulations. All members of the interprofessional obstetric team who would routinely respond and manage a hemorrhage were represented (Association of Healthcare Research and Quality, 2005; Hamman, Beaudin-Seiler, Beaubien, Gullickson, Gross, et al., 2010; Hamman, Beaudin-Seiler, Beaubien, Gullickson, Orizondo-Korotko, et al., 2010). And third, multi-modal service-wide training on the final obstetric hemorrhage and massive transfusion protocols was conducted, which reflected the process and system revisions the team who tested the

protocols recommended. Early quantitative measures reflecting the impact of implementing the obstetric hemorrhage and massive transfusion protocols are promising.

Because the health care environments in which obstetric hemorrhages occur are increasingly complex, relying solely upon quantitative measurements to determine the success or failure of an obstetric hemorrhage program is likely to be incomplete. Indeed, it is impossible to reduce the reasons for outcomes to the lowest possible denominator. Other factors must be considered (Engebretson, J., personal communication, August 2015). In order to understand, sustain, and further improve these results, soliciting the perspective of front-line interprofessional obstetric team members who participated in training and who manage obstetric hemorrhages in this setting is vital. Therefore an in-depth qualitative approach to understand which components of an obstetric hemorrhage program were perceived to be most impactful to the frontline clinicians who manage maternal hemorrhage is proposed.

### **Innovation**

It is important to understand not only the cognitive learning that may have occurred, but how that learning has been applied in a real-world context (Benner, Sutphen, Leonard, & Day, 2010; Kirkpatrick, 1976). For any effort to substantively improve the quality and safety of obstetric patients experiencing an emergent condition, the interprofessional team members involved in the care must be included in the validation of the problem, the discussion of the factors contributing to and possibly worsening the problem; and arguably the most important, integrally involved and empowered to identify, create, and implement the best solution to the problem (Freire, 1999; Green & Thorogood, 2009c; Hughes & Clancy, 2009). An opportunity to employ

a qualitative means to elicit the perspective from the front-line providers in this setting's culture about the impact of the obstetric hemorrhage program exists. This is important because the culture in the study setting is different from the culture next door, down the street, and across the country and world. This presents an innovative opportunity to unpack the cultural factors leading to success and to sustainability in the study setting. Metaphorically applying the image of 'sifting through river sand as a gold miner might to find a gold nugget', the aim of this study seeks to sift through the thoughts, ideas, and perspectives of the interprofessional team members who must recognize and manage the care of patients experiencing obstetric hemorrhage. This study will help to inform further work in this area by helping to identify what programmatic elements of the obstetric hemorrhage program were worth sustaining; and which should be either adapted or abandoned in order to prepare members of an interprofessional team to anticipate, recognize, and manage an obstetric hemorrhage.

## **Approach**

### **Design and Setting**

To achieve the study's specific aim, a qualitative, exploratory, medically-focused ethnographic design is proposed (Engebretson, 2011; Polit & Beck, 2012b) within an overarching constructivist paradigm (Polit & Beck, 2012a). This study will augment and extend the quantitative knowledge the interprofessional team has gained as a result of implementing the comprehensive obstetric hemorrhage training program within this context and culture. Because of the complexities inherent in modern-day obstetric practice, conducting this study will help the team understand and "unpack" (Green & Thorogood, 2009a, p. 58) how the quantitative results were achieved (Maxwell, 2005).

This understanding will be facilitated by seeking the insight and perspective of the interprofessional obstetric team members who are closest to the actual clinical work during hemorrhage events (Green & Thorogood, 2009a). The study setting is a four year old, large, tertiary, academic women's hospital; which is part of a large, well established, free-standing private, not-for-profit children's hospital in the southern part of the United States. The study setting provides patient care to both low- and high-risk obstetrical patients, and currently performs approximately 5,800 deliveries annually.

### **Population, Sample, and Sampling Procedures**

The study population will include members of interprofessional obstetric and ancillary teams who have cared for patients experiencing obstetric hemorrhage, and some who have also participated in the obstetric hemorrhage training program. The study population includes registered nurses who provide obstetric, newborn, and perioperative care; physicians who provide obstetric, anesthetic, intensive, adult, and transfusion medical care; certified registered nurse midwives; certified registered nurse anesthetists; pharmacists; respiratory therapists; surgical scrub technicians; anesthesia technicians; as well as laboratory and blood bank team members, from hospital departments such as obstetric triage, labor and delivery, high risk perinatal (antepartum), postpartum, perioperative services, laboratory, blood bank, respiratory therapy, and pharmacy. To adequately reflect the emic perspective, the sample will include voluntary informants from the study setting representing each of these diverse interprofessional groups, who share the experience of training for and providing care to an obstetric patient experiencing a hemorrhage (Green & Thorogood, 2009c; Polit & Beck, 2012c).

Once study approval is granted by relevant institutional review boards (Appendices A and B), informants will be recruited through a non-probabilistic, purposive sampling process (Green & Thorogood, 2009b; Polit & Beck, 2012c). To ensure that key interprofessional groups are adequately represented in the study, recruitment and sampling will occur through six mechanisms. Potential informants can learn about the study and will be invited to participate through (1) study flyers posted in team work or conference areas (Appendix C), emphasizing inclusion criteria of providing or supporting care to obstetric patients during a hemorrhage while serving on one of the identified teams, and some who participated in obstetric hemorrhage training and as well as how to contact the researcher; (2) presenting information about the study and an invitation to participate in it at service, faculty meetings, and relevant councils and committees; (3) contacting the interprofessional team members who participated on the safety project, and who tested and finalized the obstetric hemorrhage and massive transfusion protocols; (4) sharing study information with members of obstetric teams during field observations; (5) snowball sampling promoted by an obstetric team member who has either participated in a focus group or interview, then shares the study information with colleagues and encourages them to contact the researcher; and (6) personal invitation from the researcher to members of the interprofessional obstetric team known to the researcher as having participated in the care of an obstetric hemorrhage patient.

There is no pre-determined number of informants to recruit for this study. Depending upon study findings and to ensure adequate representation of the previously identified interprofessional groups, as many as 85 team members may be recruited to participate. The number of informants from select disciplines, such as intensive care, or

transfusion medicine, will likely be small due to fewer overall numbers of these professionals as a proportion of the service's team. However, recruitment is estimated to be maximized at 50 provided that no new ideas or themes emerge during recursive data analysis, indicating that data saturation may have been achieved (Green & Thorogood, 2009b; Polit & Beck, 2012c).

### **Data Collection Procedures**

Data collection methods will include field observations, semi-structured focus group interviews, and semi-structured individual interviews. These three methods will help to ensure adequate representation of the experience of interprofessional team members who directly or indirectly participate in the care of a patient experiencing an obstetric hemorrhage. Informants participating in the focus group and individual interviews will be consented (Appendix D), and will be asked to complete a brief demographic data form (Appendix E) to aid in describing the study sample when reporting study results (Polit & Beck, 2012c).

### **Field Observations**

Field observations will be conducted by the researcher who is an employee of the institution with access to the units in which observations are planned. She will observe interprofessional obstetric teams in their natural setting, enhancing the description of the real-world context within which these team members interact with one another while providing care to obstetric patients (DeWalt & DeWalt, 2011; Polit & Beck, 2012c). Field observations will allow the researcher to see 'what people do' in day-to-day practice, comparing it to 'what people say they do' (Green & Thorogood, 2009f) during informal conversations and semi-structured interviews. The resulting data will inform the

potential iterative revision or refinement of the focus group and individual interview questions or topical guides, which will be used to elicit data to amplify, confirm, or possibly challenge findings as the study progresses. Data generated during field observations will be derived from detailed notes written down during the observations, or as soon as possible after the observations so important data is not lost or left to the researcher's recall. Although there is no pre-determined number of hours or work shifts that field observations will occur, observations will occur on day and night shifts during weekdays and weekends, up to 100 clock hours. If no new findings, ideas, or themes emerge after field notes are iteratively reviewed and analyzed, field observations may cease at fewer clock hours. Conversely, field observations may continue beyond 100 clock hours if new ideas or themes emerge from the data.

### **Semi-Structured Focus Group Interviews**

Focus groups will be conducted by the primary researcher and a co-facilitator. The focus groups will be comprised of diverse, interprofessional obstetric team members, including obstetric and newborn nurses; perioperative nurses; obstetric physicians and midwives; anesthesia physicians and nurse anesthetists; transfusion medicine physicians; adult and intensive care physicians; representatives from ancillary departments who provide support to obstetric teams during a hemorrhage such as pharmacists, respiratory therapists, laboratory, and blood bank team members; and supportive, assistive, unlicensed personnel including surgical technicians, anesthesia technicians, and patient care assistants. Focus group participation may prompt informants to share hemorrhage related experiences or examples they might otherwise not have recalled had it not been for listening to other informants share their thoughts and experiences (Green &

Thorogood, 2009d). While promoting role homogeneity within each focus group may help informants feel more at ease, facilitating open, rich discussion; and expression of thoughts, feelings, and experiences (Green & Thorogood, 2009c); allowing for the naturalistic heterogeneity within the focus groups will more closely reflect the actual practice setting, and provide opportunities for the researcher to observe communication patterns among informants.

At least one of the focus groups will be purposively sampled to include voluntary informants who participated in testing and finalizing the obstetric hemorrhage and massive blood transfusion protocols. Informants in this focus group will have shared the experience of testing and recommending key revisions to the protocols, resulting in the final versions which were used to train other interprofessional members of the obstetric service. These team members possess a unique perspective that may add rich detail to the findings, especially in being able to compare what recognizing and managing an obstetric hemorrhage was like before and since the training.

Five to eight informants will be invited to each focus group, which will be scheduled at various times during the day and day of the week to maximize participation, and last no longer than two hours. The actual number in each group may vary depending upon availability. Limiting the number of informants in each focus group to this range and time frame will support efficiency of data collection, yet still promote the researcher's ability to carefully observe and assess group dynamics; engage in meaningful dialogue with the informants; listen actively; and allow ample opportunity for each of the informants to fully express their thoughts and perceptions (Green & Thorogood, 2009c). The actual number of focus group interviews that will be conducted has not been



pre-determined, though the goal will be to interview a total of about 15 to 20 informants from each of the representative disciplines (Green & Thorogood, 2009b). The exception to the anticipated number of informants per group is where the total numbers of informants per discipline are small in proportion compared to larger informant groups, such as transfusion, adult, or intensive care medicine; pharmacy, respiratory therapy, or laboratory; surgical or anesthesia technicians; and patient care assistants.

A *co-facilitator* will be present experienced in qualitative research and possesses current CITI training. The purpose of the co-facilitator is to assist the primary researcher in keeping the focus group interviews on track by re-directing the discussion and posing clarifying questions, and supplementing data generation by taking notes (Green & Thorogood, 2009c). The co-facilitator will also help observe group interaction and dynamics, recording notes about observed behaviors and comments among informants. This will allow for a richer description of group interaction, and assist the primary researcher to not miss opportunities to probe.

Data generated during the focus groups will include the verbatim transcription of each audio-recorded focus group interview. Audio recordings will be downloaded and stored on a password protected server, accessible only to primary researcher and to the transcriptionist. All transcriptions will be stored on the same password protected server. All potentially identifying information will be removed by the primary researcher during transcription verification with the audio-recording.

Data generated will also include detailed notes by the co-facilitator about the observed interaction and dynamics among the informants, such as those who dominate the conversation, speaks over, interrupts, rebukes, minimizes, or ignores others; as

compared to those who remain mostly quiet, or appear reluctant to participate or offer any insights, or disagree with other, more dominant informants. Data will also include the degree to which the discussion was balanced, noting the amount of open dialogue among the informants.

A semi-structured interview or topical guide will be used during each focus group to maintain focus, and elicit the sharing of real-world experiences and vivid details, yet avoid thwarting rich discourse among informants (Appendix F). To establish trust and rapport with the informants, the questions will begin with a broad, open-ended inquiries, and narrow as the interview progresses (Green & Thorogood, 2009b; Polit & Beck, 2012d; Schein, 2013). The researcher will focus on facilitating an open discussion among the informants, and be prepared to probe according to the content and direction taken by the informants. Appendix F contains greater detail and a sample script that will be used to guide the focus group interviews.

### **Semi-Structured Individual Interviews**

The informants for the semi-structured, individual interviews will be purposively selected, based upon discussion and observations made during focus group interviews. There is no pre-determined number of individual interviews to conduct. The goal is to continue conducting individual interviews until all individuals who have been identified as possessing additional valuable insight about experiences during obstetric hemorrhages have been exhausted, the individuals agree to participate, and no new ideas, themes, or sub-themes emerge.

To increase the informant's comfort and facilitate open communication, the individual interviews will be scheduled at a time convenient to the informant, and in a

location that is conducive to private discourse (Green & Thorogood, 2009b). Examples of such locations may include a secluded conference seating area away from clinical care activities, in seating proximate to the coffee and snack bar at the research site, or another location of the informant's choice as long as it is deemed safe to the researcher. The individual interviews will last approximately 60 minutes.

Similar to the method in which the focus groups will be conducted, a semi-structured interview or topical guide will be used to guide individual interviews (Appendix G). Interview questions will begin with a broad, open-ended focus, and narrow as the interview progresses. Some of the interview questions may be phrased in such a way to allow for the participant to describe what he or she has heard from colleagues. This approach may be less threatening than asking the participant direct, potentially uncomfortable questions, and may facilitate a more in-depth interview, resulting in richer, thicker data (Green & Thorogood, 2009b).

As described above, data generated during the semi-structured, individual interviews will include a verbatim transcription of each audio-recorded interview by the primary researcher to allow for the most thorough review and reflection on the data being generated (Green & Thorogood, 2009d). To protect the confidentiality of all informants, all identifying information will be excluded from all transcriptions, substituting pseudonyms when needed instead to enable analysis. Like focus group interviews, the interviewer and informant responses will be transcribed to begin on separate lines, with space to note informant tone, inflection, significant pauses or other non-verbal communication. Transcription will occur as soon possible after interviews and field observations and be verified for accuracy against original audio-recordings. Appendix G

contains greater detail and a sample script that will be used to guide the individual interviews.

### **Data Analysis**

A non-mathematical, inductive, descriptive thematic content analysis (Barroso, 2010; Guest, MacQueen, & Namey, 2012) of the study data will occur. Data analysis will begin with review and initial coding of each transcribed interview as they become available. To underpin the study's credibility, an exhaustive coding scheme will not be developed prior to the data analysis, although the use of some high-level codes is anticipated at least at the beginning, such as those related to recognition of or managing a hemorrhage, decision making, and communication among interprofessional obstetrical team members. A computer software program Atlas ti, v. 7 will then be utilized to assist in descriptive and topical coding, which will then be analyzed by the researcher (Richards & Morse, 2007). Based upon an iterative review and analysis of the verbatim transcribed focus group and individual interview data as the transcripts become available, then comparing and contrasting accounts, the codes may be supported, expanded, revised, or contracted as key themes or sub-themes emerge (Appendix E) (Green & Thorogood, 2009g).

To further support the credibility of the study peer debriefing will be utilized. Mentors, advisors, and colleagues who have either an interest in the study topic or expertise in qualitative research, will be asked to participate in regular debriefing meetings during which the topical coding, as well as emerging themes or sub-themes will be discussed, and possibly challenged, revised, or validated (Green & Thorogood, 2009d). The researcher will also use reflexivity to support study credibility (Green &

Thorogood, 2009d), bracketing in field notes and transcribed interviews any impressions, thoughts, or perceptions about the information gleaned, compared against the backdrop of the researcher's professional role and years of experience as an obstetric nurse. To support the study's auditability, the researcher will maintain detailed research notes, memos and documents, as well as all research decisions or changes (Richards & Morse, 2007). A small group of informants representative of the interprofessional teams who recognize and manage obstetric hemorrhage will be invited to review interim study themes or sub-themes. Although member checking will occur during the focus group and individual interviews by clarifying to ensure alignment in the researcher's interpretation of what is being conveyed, it may serve to support, augment, or extend coding of themes or sub-themes during data analysis (Polit & Beck, 2012f).

### **Study Limitations**

There are a number of potential limitations associated with conducting this study, such as generating substantive data and managing the data once it is collected. Although conducting field observations is intended to both develop and inform potential revisions of focus and individual interview questions and probes, there is a possibility that the questions or probes do not yield data that helps address the study's specific aim. In that case, consultation will be sought from the researcher's advisor and committee, and revision of the interview questions or topical guides may occur (Green & Thorogood, 2009b).

Another challenge related to generating rich and descriptive data may be related to the researcher's role within the study setting. The researcher holds a leadership role in quality and safety, and as part of that role, interacts often with a number of the potential

study informants. While none of the potential study informants have a direct or indirect reporting relationship to the researcher, the researcher's role may promote or hinder participation in the proposed study. To promote informant participation, the researcher will emphasize that participation is absolutely voluntary, that withdrawing from an interview can occur at any time without fear of retaliation or retribution of any sort, with the assurance that such withdrawal will not affect the informant's role or position in the study setting in any way (Green & Thorogood, 2009e).

The researcher's years of experience in the obstetric field and being employed at the study setting may lead to the potential for bias. To address this, the researcher will acknowledge thoughts and feelings that arise during field observations and interviews, reflexively capturing them in the appropriate place in transcribed field notes and transcribed interview recordings, and consider them during iterative data review and analysis. Consultation with members of the peer debriefing group to discuss, validate, or refute themes or sub-themes will also reduce the potential for bias.

### **Timeline of Research**

		<b># days</b>	<b>Begin Date</b>	<b>End Date</b>
<b>1.0</b>	<b>Research Plan</b>	<b>334</b>	<b>18-Jan-16</b>	<b>15-Dec-16</b>
<b>1.1</b>	<b>Proposal Revision</b>	131	<b>18-Jan-16</b>	<b>27-May-16</b>
1.1.1	Faculty Advisor Review (2 days), Proposal Revision (107 days)	109	18-Jan-16	5-May-16
1.1.2	Dissertation Committee Review, Incorporate Committee Feedback, Proposal Revision	17	6-May-16	22-May-16
1.1.3	Final Committee Review, Proposal Defense	5	23-May-16	27-Mar-16

<b>1.2</b>	<b>IRB Approval Process (days overlap)</b>	28	<b>28-May-16</b>	<b>24-June-16</b>
1.2.1	Submit to Nursing Research Council at TCH	7	28-May-16	3-June-16
1.2.2	Submit to Baylor IRB	14	4-June-16	17-June-16
1.2.3	Submit to UTHSCH IRB	14	4-June-16	17-June-16
1.2.4	Secure Final Proposal Approvals	7	18-June-16	24-June-16
<b>1.3 Research Phase (days overlap)</b>				
<b>1.3</b>	<b>Research Phase (days overlap)</b>	175	<b>25-June-16</b>	<b>15-Dec-16</b>
1.3.1	Enroll Study Participants	70	25-June-16	2-Sept-16
1.3.2	Data Collection	70	25-June-16	2-Sept-16
1.3.3	Iterative Data Analysis	97	26-June-16	30-Sept-16
1.3.4	Meetings with Advisor/Dissertation Chair	163	7-Jul-16	15-Dec-16
1.3.5	Peer Debrief(s)	12	12-Sept-16	23-Sept-16
1.3.6	Review final analysis w/chair and committee	7	24-Sept-16	30-Sept-16
1.3.7	Defend Dissertation	31	1-Oct-16	31-Oct-16
1.3.8	Revisions to Dissertation	30	1-Nov-16	30-Nov-16
1.3.9	Preparation for Submission of Dissertation for publication	15	1-Dec-16	15-Dec-16

### **Protection of Human Subjects**

#### **Consent**

Prior to beginning focus group or individual interviews, each informant will be provided with detailed information about the study and anticipated processes, emphasizing that participation is completely voluntary. The potential study informants will have the opportunity to ask clarifying questions, be informed of potential risks and benefits of participating, and have time to consider whether or not they will participate or

withdraw without fear of punishment, penalty, retribution, or retaliation of any sort. Prior to conducting any focus or individual interviews, all informants will be consented (Green & Thorogood, 2009e). The study consent (Appendix D) will contain the possibility that study informants may be contacted again following focus or individual interviews should additional information be needed to clarify, augment, extend, or confirm data as part of the iterative analysis process.

### **Risks**

There may be a small amount of risk of harm to the informants as a result of participating in this study. The study informants may fear disclosing extreme or contrary views, patient safety concerns, or discussing their perceptions about the need to improve respect, communication, or teamwork among members of the team (Green & Thorogood, 2009e; Sorra, Famolaro, Dyer, Nelson, & Smith, 2012). If expressed, there is a small risk that the information may be shared outside of focus groups by another informant. The participants may also fear that a response to their identified opportunities for improvement may be result in some form of punitive action or retribution (Sorra et al., 2012).

### **Protection Against Risks**

The researcher will do all that is possible to reduce any actual or potential risks of harm to the informants who agree to participate in the study. The primary researcher will submit the study for review and approval to the University of Texas Health Science Center at Houston's IRB, and to the IRB associated with the organization at which the study will be conducted. To protect study participants, all of the field observations, focus group and individual interviews, memos, and notes collected by the researcher and focus



group co-facilitator will be de-identified. Additionally, the study participants will be assigned pseudonyms to protect their identities in the research report and any written or published case exemplars (Green & Thorogood, 2009d). All field notes and digital recordings will be kept on the researcher's person until safety secured and downloaded onto a password-protected personal computer in the researcher's locked office.

Transcribed interviews will be secured on the researcher's password-protected computer in the researcher's locked office to further protect the integrity of the data and the identity of the study informants (Green & Thorogood, 2009d; Polit & Beck, 2012d). The researcher will refrain from speaking about the study findings except in ways approved by the study proposal (Green & Thorogood, 2009e). Once the study is concluded, the data is analyzed, and the findings have been verified and reported, the digital recordings will be destroyed.

### **Potential Benefits**

The study participants will receive a parking pass for any of the days or nights on which focus groups or individual interviews are scheduled to take place, as well as a meal certificate. Additional potential benefits include that the study participants may come to understand more about the impact of implementing a comprehensive obstetric hemorrhage training program, and their individual contributions to reducing maternal morbidity and mortality. An increase in understanding how they as individuals may have contributed to these results may result in an increased perception of self-efficacy in identifying and participating effectively in managing an obstetric hemorrhage.

### **Importance of the Knowledge**

Findings will be reported in the research report, and will include the demographic characteristics of the study sample, the themes or sub-themes identified from the analysis of the transcribed field observations, focus groups, and individual interviews. Any themes and sub-themes will be supported by including detailed exemplars, and relating them back to published literature. Applicability of the findings to clinical practice will be included in the report, as well as recommendations for future study. The insight gained by conducting this study may help to identify enablers and potential barriers to efficient and effective teamwork among members of interprofessional obstetric teams during maternal hemorrhages or other obstetric emergencies. Enabling teamwork may improve obstetric patient safety.

### **Practice Implications and Further Research**

As previously articulated, the environments in which obstetric hemorrhages occur are increasingly complex, and relying solely upon quantitative measurement to determine the success or failure of programs designed to reduce harm among obstetric patients who experience hemorrhage is likely to be incomplete. By understanding what components of the obstetric hemorrhage training, or the context in which either the training or the activation of hemorrhage protocols, has impacted the perceived ability to recognize and manage obstetric hemorrhages. Seeking to understand the perspective of front-line interprofessional obstetric team members has several benefits. Perhaps the most important benefit is to understand and sustain current improvements. Another benefit is the potential to inform further work and additional improvements, especially those that may be applied to similar obstetric settings (Green & Thorogood, 2009b) and perhaps to

guide or develop hypotheses that can later be tested is warranted. Finally, understanding the experience and perspective of front-line obstetric teams in recognizing and managing obstetric hemorrhages may help inform efforts to successfully manage other obstetric emergencies, consistent with the call to action in reducing preventable maternal harm.

### **Alternative Approaches/Potential Difficulties**

In order to facilitate a successful research study, a number of potential difficulties must be anticipated with a plan to mitigate the impact in place. To secure and sustain access to the field, study site, and voluntary informants, it will be necessary to secure and maintain buy-in from senior level leaders in the organization. The researcher will maintain close contact with formal leaders at the study site, offering information about the study and soliciting support. In the event of data collection process variability or challenges, the primary researcher will regularly monitor the data collection processes. She will maintain contact with her advisor and research committee, most of whom have had experience in qualitative research. Other potential difficulties are regarding informant candor and trust (Guest et al., 2012; Polit & Beck, 2012g). Decreased informant comfort or candor may be a barrier to effective data generation. The researcher may promote trust by ensuring privacy, anonymity, confidentiality, and comfort. Maintaining the homogeneity of the focus group composition, may help decrease feelings of perceived power imbalance or discomfort of discussing thoughts and perspectives in front of members from other disciplines by ensuring homogeneity of focus groups (Green & Thorogood, 2009c) and offering individual interviews.

The primary researcher's inexperience in field observations, and facilitating focus group and individual interviews may impact data generation. To compensate for the lack

of experience the researcher has successfully completed two qualitative research courses. Additionally, she will pay particular attention to the environmental context, describing in detail what is going on. Field notes about observations will be taken and maintained throughout the study, leaving an area to note interpretations, thoughts, and feelings in transcribed field notes and interviews so that reflexivity may be applied and potential researcher bias is recognized and reduced (Green & Thorogood, 2009f).

There may also be challenges with data collection. To avoid potential loss of valuable data, the researcher will bring two audio-recorders with fresh batteries installed, and extra batteries in the event that both fail. Using two audio-recorders will also allow the researcher to focus intently on the informant, and not having to periodically check the recording device for proper functioning, which can thwart active participation and discussion by the informant (Polit & Beck, 2012g).

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7-21-2017

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Editorial Staff  
Joint Commission Journal on Quality and Safety

Dear Editors,

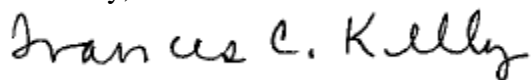
Enclosed is a manuscript entitled, *Understanding the Experience of Interprofessional Team Members after Participating in Comprehensive Obstetric Hemorrhage Training*. Aligned with the Journal's dedication to promoting the quality and safety of health care, the content of this manuscript is consistent with requested topics of interest such as high reliability strategies and detecting and acting upon patient deterioration. Applying a medically-focused, ethnographic, qualitative research approach, data was generated and thematically analyzed from field observations and 22 interviews including representatives from an interprofessional obstetric team in a large, academic women's hospital situated within a large, academic, stand-alone pediatric hospital in the southern part of the United States.

The results reported in this manuscript provide valuable insight about participating in a comprehensive training obstetric hemorrhage program from the perspective of interprofessional team members closest to the clinical care, including which elements of the training program were perceived to be beneficial. The findings from this study are transferrable to other teams, both within and outside of obstetrics, and may help to inform programmatic elements of other comprehensive training programs.

All authors contributed substantively to this research study. The results of this research study have not been presented as an abstract, a poster, or an oral presentation at any professional conferences; described or published in any related manuscripts; or submitted for consideration to be published in another journal. No authors have a real or perceived conflict of interest associated with publishing this manuscript. There was no funding source for this study. All costs associated with the study were paid by the primary author.

Thank you for reviewing and considering publishing our manuscript.

Sincerely,

A handwritten signature in black ink that reads "Frances C. Kelly". The signature is written in a cursive, flowing style.

Kelly, Frances C, PhD(c), MSN, RNC-OB, NEA-BC, CPHQ, CPPS  
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Understanding the Experience of Interprofessional Team Members After Participating in  
Comprehensive Obstetric Hemorrhage Training

Submitted in Partial Fulfillment of NURS 7600 by

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July 11, 2017

### Abstract

**Purpose:** The obstetric hemorrhage rate has risen steadily in the U.S. accounting for 11.4% of maternal deaths between 2011 and 2013, and is a leading cause of maternal morbidity. Improving quality of care could prevent much of the morbidity and potential mortality associated with obstetric hemorrhages. An interprofessional obstetric team developed, tested, and implemented obstetric hemorrhage and massive transfusion protocols. Multi-modal team training occurred before service-wide implementation of the protocols, including didactic, skills stations, on-line educational modules, and in situ simulation team training. Early quantitative results were promising. **Methods:** To augment understanding of the quantitative results and to understand the experience of interprofessional team members after participating in obstetric hemorrhage training; an exploratory, medically-focused, ethnographic qualitative study was conducted in a five-year old obstetric service within a large, metropolitan, tertiary, free-standing pediatric hospital. Participants were purposively sampled from interprofessional obstetric team members who cared for obstetric hemorrhage patients and participated in hemorrhage training. Data was generated during field observations, and individual and focus group interviews. **Results:** Twenty (n = 91 participants) semi-structured interviews were conducted. An inductive, descriptive thematic analysis of the data revealed two central themes: Knowing, and Teaming. Knowing was influenced by training and experience with obstetric hemorrhages, and was further influenced by interactions among members of the interprofessional obstetric team within the complex, non-linear environment. Teaming was reported as a compelling benefit of engaging the interprofessional obstetric team in simulation team training. Simulation training helped the team know how to use the protocols, and improved team functioning during obstetric hemorrhages.



**Conclusions:** Similar to Benner's model, training and experience influenced the knowing that obstetric team members applied during an obstetric hemorrhage event. Simulation team training promoted teaming, which helped the interprofessional obstetric team to effectively and efficiently manage an obstetric hemorrhage.

*Keywords:* obstetric hemorrhage, training, simulation, knowing, teaming

## **Background and Significance**

### **Maternal Mortality and Morbidity**

Contemporaneous obstetric patients tend to be older and more likely to have one or more obstetric or medical complications, which may increase their risk of mortality and morbidity (Clark, Belfort, Byrum, et al., 2008; Clark, Belfort, Dildy, et al., 2008; Grobman, 2012; Grobman et al., 2014). Despite the Healthy People 2020 (HealthyPeople.gov) goal to decrease the rate of maternal deaths to no more than 11.4 per 100,000 live births, this rate has risen steadily in the United States (U.S.) from 7.2 to 17.3 maternal deaths per 100,000 live births from 1987 to 2013 respectively (Centers for Disease Prevention and Control, 2017). The rate of maternal mortality is even higher in Texas compared to most other states (Quinn, 2017). The rate of obstetric hemorrhage, which is excessive bleeding before, during, or after delivery, ranks fourth as a cause of maternal death, accounting for 11.4% of the reported maternal deaths occurring between 2011 and 2013 (Centers for Disease Prevention and Control, 2017).

Obstetric hemorrhage is also one of the leading causes of severe maternal morbidity (Callaghan, Creanga, & Kuklina, 2012; Callaghan, Creanga, & Main, 2014; Kramer et al., 2013; Callaghan, Grobman, Kilpatrick, Main, & D'Alton, 2014; Clark, 2012; Clark & Hankins, 2012; Grobman et al., 2014; Korst et al., 2014). A recent population study reported an alarming 184% increase in the rate of blood transfusion for obstetric patients during their delivery hospitalization from 1998 to 2009 (Callaghan, et al., 2012). The increase in the rate of blood transfusion related to obstetric hemorrhage has continued through 2013 (Centers for Disease Control and Prevention, 2016).

Based on a review of more than one million obstetric patient records from the Hospital Corporation of America system, approximately 73% of the maternal deaths related to hemorrhage were potentially preventable (Clark et al., 2008). It has been suggested that from 28% (Clark, Belfort, Bynum, Meyers, & Perlin, 2008) to 60% (Centers of Disease Control and Prevention, 2016) of maternal deaths may have been prevented by improving the quality and safety of patient care.

### **Contemporaneous Obstetric Teams and Health Care Environments**

A contemporaneous obstetric health care team is comprised of various disciplines such as obstetric, newborn, perioperative, and intensive care nurses; obstetric, anesthesia, neonatal, intensive care, adult, transfusion medicine, and radiology physicians; advanced practice providers such as certified nurse midwives, certified registered nurse anesthetists, and neonatal nurse practitioners; respiratory therapists and technicians; ancillary team members from the pharmacy, laboratory, and blood bank; and supportive, unlicensed, assistive personnel such as anesthesia and surgical technicians, patient care assistants, and clerical support staff. A contemporaneous obstetric team is dynamic and fluid. The composition of the team often varies from day to day and shift to shift. The current environment in which interprofessional obstetric teams provide care is also increasingly complex and hazardous (Hughes, 2008; Pettker & Grobman, 2015), which poses a challenge to effective and efficient care processes. The Institute of Medicine (Ingersoll & Schmitt, 2004) identified various aspects of the hospital work environment that may underpin these challenges and result in medical errors, such as busy, stressful units; multiple, manual processes; over-reliance on memory; prioritizing multiple, simultaneous patient needs; distractions and interruptions; poor communication and

teamwork among team members (Kohn, Corrigan, & Donaldson, 1999); working long hours resulting in fatigue (Rogers, Hwang, Scott, Aiken, & Dinges, 2004); and inadequate numbers of staff (Tourangeau, Cranley, & Jeffs, 2006; Tourangeau et al., 2007).

### **Recommendations to Prevent Maternal Mortality and Morbidity**

Obstetric patients and their families expect safe, quality care, and a positive experience (Institute of Healthcare Improvement, 2008; Martin & Montagne, 2017; Pettker, 2014). To achieve these expectations, numerous professional organizations have renewed the call to improve the quality and safety of obstetric patient care including The Joint Commission (2010); the American Academy of Family Physicians (AAFP), American Academy of Pediatrics (AAP), American College of Nurse Midwives (ACNM), American College of Obstetricians and Gynecologists (ACOG), American College of Osteopathic Obstetricians and Gynecologists (ACOOG), Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN), and Society of Maternal-Fetal Medicine (SMFM) (Association of Women's Health Obstetric and Neonatal Nurses, 2011); the National Quality Forum (2014), and the National Partnership for Maternal Safety (D'Alton, Main, Menard, & Levy (2014). Providing safe, quality care to obstetric patients requires an effectively functioning interprofessional team which is dynamic and fluid (Clark, Belfort, Byrum, et al., 2008; Edmondson, 2012; Guise & Segel, 2008; Ingersoll & Schmitt, 2004; Kohn et al, 1999; Valentine & Edmondson, 2016). Emerging research suggests that effectively functioning health care teams may improve patient safety more so than individual health care workers would alone (Edmondson, 2012; Merry & Brown, 2002; Rosen et al., 2008; Valentine & Edmondson, 2016).

Although achieving clear communication and establishing effective, interactive, collegial teams has not been easy in health care (Valentine & Edmondson, 2016), recurring recommendations to improve the quality and safety of patient care have emphasized the importance of improving non-technical skills such as teamwork and communication among members of interprofessional teams (Association of Women's Health Obstetric and Neonatal Nurses, 2011; Clark, Belfort, Byrum, et al., 2008; Kohn et al., 1999; Lyndon et al, 2015; Singer & Vogus, 2013). Teamwork is considered a key element of a nurse practice environment (Lake, 2007). It is defined conceptually as communication, monitoring, feedback, coordination, and leadership that occurs among team members (according to Dickinson and McIntyre, as reported in Thomas et al., 2004). Central to teamwork is clear, concise, and effective communication (Kohn et al., 1999; Nance, 2011). Clear and effective communication involves orienting team members using a structured format such as situation, background, assessment, and recommendations. It also involves inquiry (Minehart et al., 2012) and transparent thinking or assertion, such as when team members say aloud what they believe is occurring and what actions they believe should be taken. And finally, effective communication among members of interprofessional obstetric teams involves directed communication, such as when the team leader gives orders; and closed loop communication, such as when team members acknowledge hearing the order by repeating it back, affirming their intention to carry it out, and when the order has been completed (Guise & Segel, 2008).

Suggested strategies for improving teamwork and communication which may reduce maternal mortality and morbidity include implementation of protocols and

checklists (American College of Obstetricians and Gynecologists, 2016a; Clark, 2012; Council on Safety in Women's Health Care, 2015; Gawande, 2009; Kacmar, Mhyre, Scavone, Fuller, & Toledo, 2014; Main et al., 2015; Shields, Wiesner, Fulton, & Pelletreau, 2015), conducting simulation drills on obstetric emergencies such as obstetric hemorrhage (Kelly, 2015; The Joint Commission, 2010; Salas, Paige, & Rosen, 2013; Wallin et al, 2016), and regularly reviewing cases of severe maternal morbidity and mortality (American College of Obstetricians and Gynecologists, 2016b; Atallah, Kilpatrick, & McCalla, 2015; Clark, 2012; Clark, Meyers, Frye, McManus, & Perlin, 2012).; Kilpatrick et al., 2014; Kohn et al., 1999; Lyndon et al., 2015; Singer & Vogus, 2013).

Simulation team training has also been recognized as positively impacting a broad range of outcomes. Published outcomes of simulation team training reflect a promising mechanism to improve teamwork and communication among members of interprofessional teams, and thus, the quality and safety of patient care (Riley et al., 2008; Salas et al, 2013; Singer & Vogus, 2013; Wallin et al, 2016). Although in situ simulation team training has been used extensively in the operating room (Marshall, Parker, Esmaril, Kirsk, & Claridge, 2003; Wolf, Way, & Stewart, 2010), anesthesia (Gaba, Howard, Fish, Smith, & Sowb, 2001), emergency departments (Shapiro et al., 2004), critical care (Berkenstadt et al., 2008), and on medical-surgical units (Maxson et al., 2011), few studies have been published about the impact of simulation training of interprofessional teams on patient level outcomes (Kelly, 2013). Moreover, the overwhelming majority of published studies reflected a positivist paradigm (Institute of Medicine, 2015; Singer & Vogus, 2013); employed a quantitative design; often lacked a sample that truly

represented a modern-day obstetric team; and without seeming to consider or honor the team's knowledge, expertise, and awareness of their team's needs for improvement or unique organizational influences.

### **Methods to Improve Outcomes from Obstetric Hemorrhage**

Prior to the conduct of this study, a comprehensive obstetric hemorrhage training program was conducted that sought to address the root causes of obstetric and perinatal sentinel events identified by The Joint Commission (2004). The program involved three steps. First, to reduce the variation in recognizing and managing an obstetric hemorrhage, a key element of a highly reliable organization (Weick & Sutcliffe, 2007), an interprofessional team developed obstetric hemorrhage and massive transfusion protocols as depicted in Figures 1 and 2. Second, to identify potential latent safety threats and to test for “real-world” usability before wide-spread team training ensued, an innovative series of rapid-cycle Plan Do Study Act (PDSA) cycles (Langley et al, 2009; Wallin et al, 2016) were conducted using in situ obstetric hemorrhage simulations. All members of the interprofessional obstetric team who would routinely respond to and manage an obstetric hemorrhage were represented in these simulations. And third, multi-modal service-wide training (i.e. didactic including skills stations, email communication, on-line training modules, and simulation team training) on the final obstetric hemorrhage and massive transfusion protocols was conducted, which reflected the process and system revisions that the team who tested the protocols recommended.

Although quantitative measures of the impact of implementing these protocols were promising, because the health care environments in which obstetric hemorrhages occur are increasingly complex, relying solely upon quantitative measures to determine

the impact of the obstetric hemorrhage program was likely to be incomplete. In order to understand, sustain, and further improve the obstetric hemorrhage program, soliciting the perceived experience and perspective of front-line interprofessional obstetric team members who participated in training and who were closest to the actual clinical work during obstetric hemorrhage events was vital (Green & Thorogood, 2009a; Singer & Vogus, 2013). The interprofessional team members involved in the care must be included in the validation of the problem, the discussion of the factors contributing to and possibly worsening the problem; and arguably the most important, integrally involved and empowered to identify, create, and implement the best solution to the problem (Freire, 1999; Green & Thorogood, 2009a; Hughes & Clancy, 2009; Singer & Vogus, 2013).

It was important to understand not only the experience and learning that may have occurred among the interprofessional obstetric team members as a result of conducting this training program, but how that learning was applied in a real-world, contemporaneous obstetric health care context (Benner, Sutphen, Leonard, & Day, 2010; Kirkpatrick, 1976). An opportunity existed to elicit just such a perspective from the front-line interprofessional obstetric team members. This presented an innovative opportunity to “unpack” (Green & Thorogood, 2009b, p. 58) the factors that may have impacted the interprofessional team member’s experiences after participating in the training, further explicate how the quantitative results were achieved (Maxwell, 2005), and identify what programmatic elements of the obstetric hemorrhage program are worth sustaining; and which should be either adapted or abandoned in order to optimize the



ability of the interprofessional obstetric team members to anticipate, recognize, and manage an obstetric hemorrhage.

## **Study Design and Methods**

### **Study Design and Setting**

To achieve the study's aim, a qualitative, exploratory, medically-focused ethnographic design was employed (Engebretson, 2011; Polit & Beck, 2012a) within an overarching constructivist paradigm (Polit & Beck, 2012b). The study was conducted in a five-year old, academic, tertiary women's hospital that performs approximately 6,000 annual deliveries and provides obstetric, gynecologic, and fetal services. This service is part of a large, academic, tertiary, free-standing, not-for-profit children's hospital which is situated in a large medical center located in the southern part of the United States.

### **Study Sample and Sampling Procedures**

The study population was to include members of the interprofessional obstetric team who directly or indirectly cared for patients experiencing obstetric hemorrhage, and who had also participated in the obstetric hemorrhage training program. An interprofessional obstetric team was operationally defined as being representative of the roles routinely involved in providing or supporting contemporaneous obstetric patient care, including but not limited to registered nurses who provided obstetric, newborn, and perioperative care; physicians who provided obstetric, anesthetic, intensive, adult, and transfusion medical care; advanced practice providers such as certified registered nurse midwives and certified registered nurse anesthetists; pharmacists; respiratory therapists; laboratory and blood bank team members; and unlicensed, assistive personnel such as surgical scrub technicians, anesthesia technicians, patient care assistants, and clerical

team members. To adequately reflect the emic perspective, the sample included voluntary participants from the study setting representing these diverse interprofessional groups (Polit & Beck, 2012c).

Study participants were recruited through a non-probabilistic, purposive sampling process (Polit & Beck, 2012c). Inclusion criteria was staff who provide or support care to obstetric patients during a hemorrhage while serving on one of the identified teams, and someone who participated in some type of obstetric hemorrhage training. To ensure that key interprofessional groups were adequately represented in the study, recruitment and purposive sampling occurred through six mechanisms: (1) posting of research study flyers in team work, conference, or break areas (Appendix C); (2) presentations at service, faculty meetings, and relevant councils and committees; (3) personal contact by researcher of the members of the interprofessional team who participated on the initial safety project, and who tested and finalized the obstetric hemorrhage and massive transfusion protocols; (4) sharing of study information with members of the interprofessional obstetric teams during field observations; (5) snowball sampling facilitated by an obstetric team member who either participated in a focus group or individual interview; and (6) extension of a personal invitation by phone and electronic mail from the researcher to members of the interprofessional obstetric team known to the researcher as having participated in the care of a patient with an obstetric hemorrhage. Recruitment was estimated to be maximized at 50 provided that no new ideas or themes emerged during recursive data analysis, indicating that data saturation may have been achieved (Green & Thorogood, 2009d; Polit & Beck, 2012c).

### **Ethical Considerations**

Study approval was granted by both the Baylor College of Medicine and the University of Texas Health Science at Houston institutional review boards. Written consent was obtained from all participants prior to conducting individual or focus group interviews. Questions about the study were invited from the participants and answered. The researcher emphasized that participation was completely voluntary, and no retaliatory action of any kind would occur should any participant either choose not to participate or decide to withdraw from the study at any time. To protect the confidentiality of study participants, electronic study documents were kept in a password protected computer file accessible only to the researcher and co-facilitator. Consent and demographic forms and interview transcripts were kept in the researcher's locked office at the study site. And all participant identifiers were removed from transcribed interviews (Green & Thorogood, 2009c).

### **Data Collection Procedures**

Data collection methods included field observations, semi-structured focus group interviews, and semi-structured individual interviews. Focus group and individual interview participants were consented, and were asked to complete a brief demographic data form to aid in describing the study sample. All data was collected by the researcher who is an employee of the institution.

### **Field Observations**

Field observations were conducted in their natural setting on the obstetrical unit, enhancing the description of the real-world context within which these team members interact with one another while providing care to obstetric patients

(DeWalt & DeWalt, 2011; Polit & Beck, 2012d). Field observations allowed the researcher to see what people do in day-to-day practice, comparing it to what people say they do (Green & Thorogood, 2009e) during informal conversations and semi-structured focus group or individual interviews. The data generated from field observations informed the iterative revision and refinement of the semi-structured focus group and individual interview questions, which was used to elicit data to amplify, confirm, or possibly challenge findings as the study progressed. Data generated were in the form of detailed notes written down either during the observations or as soon as possible after the observations were completed. Field observations occurred during day and night time hours on weekdays and weekend days. Although there was no pre-determined number of hours that field observations would occur, up to 80 hours of observations were planned, provided no new findings, ideas, or themes were observed and approximately 46 hours were completed to meet these criteria.

### **Semi-Structured Focus Group Interviews**

Members of the interprofessional obstetric team represented the following groups: obstetric and newborn nurses; perioperative nurses; obstetric physicians and midwives; anesthesia physicians and nurse anesthetists; a transfusion medicine physician; blood bank team members; and supportive, assistive, unlicensed personnel including surgical technicians, anesthesia technicians, and patient care assistants. Five to eight informants were invited to participate at a time in each of the 18 focus groups, which were scheduled at various times during the day and day of the week to maximize participation, and lasted approximately one hour. The actual number in each group ranged from two to nine members.

### **Semi-Structured Individual Interviews**

Based upon field observations and observations made during focus group interviews, informants for the semi-structured, individual interviews were purposively identified until all individuals who had been identified as possessing additional valuable insight about experiences after obstetric hemorrhage training had been exhausted; the individuals agreed to participate; and no new ideas, themes, or sub-themes emerged. Of the five team members invited to participate in an individual interview, individual interviews were conducted with an obstetric physician and an obstetric nurse. To increase the informant's comfort and facilitate open communication, the individual interviews were scheduled at a time convenient to the informant and in a location that was conducive to private discourse (Green & Thorogood, 2009f).

### **Data Generation**

Data generated during the focus group and individual interview included the verbatim transcription of each audio-recorded interview (Green & Thorogood, 2009d). To ensure accuracy of the transcribed data, each verbatim-transcribed interview was compared against the audio-recording of the interview. To facilitate data analysis, the interviewer and participants responses were transcribed to allow for informant tone, inflection, significant pauses, or other non-verbal communication.

The same semi-structured interview or topical guide was used during each focus group to maintain focus, and elicit the sharing of real-world experiences and vivid details, yet avoid thwarting rich discourse among informants. It included such questions as: “describe what it was like for you as a member of the team during an obstetric hemorrhage; what helped you to know what to do during the hemorrhage; when an

obstetric hemorrhage went well, what made it go well; when an obstetric hemorrhage did not go well, what do you think made it not go well; what do you believe has impacted or helped you the most as a team to care of an obstetric hemorrhage patient; is managing an obstetric hemorrhage different than managing other obstetric emergencies; and what helps new team members know what to do during an obstetric hemorrhage?" To establish trust and rapport with the informants, the focus group began with a broad, open-ended inquiry, and narrowed as the interview progressed (Green & Thorogood, 2009b; Polit & Beck, 2012d; Schein, 2013). A semi-structured interview or topical guide was also used to guide individual interviews and conducted in a similar fashion. The guide was comprised of similar questions and the probes used during the focus group interviews were also similar.

A co-facilitator who was experienced in qualitative research was invited to assist the primary researcher in keeping the focus group interviews on track by re-directing the discussion and posing probing or clarifying questions as necessary. The co-facilitator also supplemented data generation by taking notes about group interaction and dynamics, such as who may have dominated the conversation; spoke over, interrupted, rebuked, minimized, or ignored others; as compared to those who remained mostly quiet, appeared reluctant to participate or offer any insights, or disagreed with other, more dominant informants (Green & Thorogood, 2009c). Based upon availability, the co-facilitator participated in approximately half of the focus group interviews.

### **Data Analysis and Credibility**

An inductive and descriptive thematic content analysis of the study data occurred (Barroso, 2010; Guest, MacQueen, & Namey, 2012). Data analysis began with the

review of each verbatim-transcribed interview after the quality review and any corrections had been completed. Based upon an iterative review and analysis of the verbatim-transcribed focus group and individual interview data, initial codes were identified and assigned. As data analysis continued, general themes began to emerge, under which various coded data were then grouped (Green & Thorogood, 2009g). Themes that were well supported with recurring examples and exemplars throughout the data were kept, while others that were not well supported were set aside.

A number of techniques were utilized to support the study's credibility. At the outset and regularly throughout the focus and individual interviews, the primary researcher employed real-time member checking. This was accomplished by regularly re-stating, paraphrasing, or offering the primary researcher's interpretation of what the participant or participants were describing. The primary researcher invited the participants to interrupt, disagree, or correct the researcher's interpretation if it did not coincide with what they were attempting to convey during the interview. The use of real-time member checking served to support not only the credibility of the data, but at times augment, or extend elucidation of themes or sub-themes (Polit & Beck, 2012f).

Peer debriefing was also utilized to support the study's credibility. The researcher met with two doctorally prepared colleagues, both of whom completed a qualitative research study; and a member of the researcher's dissertation committee who is a qualitative expert. During a total of five debriefing discussions that occurred with the researcher's colleagues and the member of her dissertation committee, the topical coding, as well as emerging themes or sub-themes were discussed, challenged, revised, and ultimately validated (Green & Thorogood, 2009d; Polit & Beck, 2012e).

The primary researcher used reflexivity (Green & Thorogood, 2009d) by noting, or bracketing in field notes and transcribed interviews any impressions, thoughts, biases, or perceptions about the information gleaned, compared against the backdrop of the researcher's professional role and years of experience as an obstetric nurse. To support the study's auditability, the researcher maintained detailed research notes, memos and documents, as well as all research decisions or changes (Polit & Beck, 2012f).

## **Study Results**

### **Sample**

After employing the described mechanisms to purposively recruit voluntary informants for this study, a total of 46 hours of fields observations were completed, and 21 interviews were conducted, two of which were individual, representing a total of 91 members of the interprofessional obstetric team. Nearly half of the 91 voluntary participants were comprised of registered nurses (48.4%, n = 44), followed by physicians (23%, n = 21), advanced practice nurses (9.9%, n = 9), pharmacists (2.2%, n = 2), with the remainder of the sample informants being comprised of ancillary unlicensed, assistive personnel (16.5%, n = 15) (Figure 3). Approximately 87% (n = 79) of the study participants reported their gender as female, and 11% (n = 10) reported their gender as male. Two participants did not report their gender (2.2%, n = 2).

Forty-four (48.4%) of the study participants reported possessing more than 10 years of experience in their roles, while 24.2% (n = 22) reported possessing greater than five years up to 10 years of experience in their role, and 16.5% (n = 15) reported possessing greater than one year up to three years of experience in their role. Two (2.2%, n = 2) informants did not report on their years of experience in their role. Two-thirds



(67%, n = 61) of the informants reported working primarily on the day shift; followed by approximately 21% of the participants who reported working on both day and night shifts (n = 19), night shifts (7.7%, n = 7), or staggered shifts (2.2%, n = 2). One informant reporting working on another shift and one informant did not report on which shift was worked most often.

Study participants could participate in more than one training modality.

Fifty-nine percent (n = 54) of participants reported attending didactic or classroom training regarding obstetric hemorrhage, while 48.4% (n = 44) reported participating in simulation team training. Forty-four percent (n = 40) of the study participants reported completing on-line obstetric hemorrhage training, while 42% (n = 38) reported receiving information about the obstetric hemorrhage and massive transfusion protocols via electronic mail. Although all the study participants verbally stated they had participated in some type of hemorrhage training during the consenting process, there was one participant who reported not having received any training on the demographic form.

### **Themes**

Based upon a preponderance of the responses in field notes that represented 46 hours of field observations, and verbatim transcripts of the two individual and 19 focus group interviews that represented a total of 91 participants, two central themes emerged and were substantiated through an inductive, descriptive, iterative analysis of the data. The first of the two central themes was “knowing”. Knowing included cognitive, sensory, intuitive, rote, and biased knowing about obstetric hemorrhage. All of the types of knowing about obstetric hemorrhage were influenced by both the training and experience of the participants. Knowing about obstetric hemorrhage was further

influenced by the interplay between members of the interprofessional obstetric team within the non-linear, complex, interactive environment during an obstetric hemorrhage event including the location of the obstetric hemorrhage event, the availability of medications and supplies, and the team composition (i.e. the experience of members of the team and how well members of the team knew one another).

The theme of knowing was influenced by the individuals comprising the interprofessional obstetric team and the process of functioning together as a team or “teaming” during an obstetric hemorrhage event, the second of the two central themes identified. Participants reported that the quality or effectiveness of teaming during an obstetric hemorrhage was influenced by such elements as how effective the communication was among the team (i.e. direct, assertive, transparent, closed-loop), the degree to which members of the team cooperated with one another during a hemorrhage event, the amount and type of resources and support available to the team (i.e. medications, supplies, blood products), being aware of who was leading the response efforts during a hemorrhage, the degree to which trust existed between members of the team, the clarity of roles among emergency responders during a hemorrhage, and the efficiency with which the team managed the hemorrhage (i.e. how rapidly a second intravenous access was obtained, interventions were performed, and how fast the patient was moved to an operating room) (Figure 4). Including all of the rich exemplars which supported the two central themes would exceed the scope of this manuscript, therefore only those which best illustrated the themes were included in the following sections.

## **Knowing**

Knowing emerged as one of two central themes. Sub-themes of knowing included cognitive, sensory, intuitive, rote, and biased knowing. All types of knowing helped interprofessional obstetric team members anticipate when an obstetric hemorrhage may occur, prevent it, as well as how to recognize and manage an obstetric hemorrhage when it did occur.

**Cognitive knowing.** Cognitive knowing refers to possessing knowledge about obstetric hemorrhages that may have been obtained through attending courses or training; or reading about how to anticipate, prevent, recognize, and manage an obstetric hemorrhage. An exemplar illustrating cognitive knowing about an obstetric hemorrhage was offered by a perioperative nurse during a focus group:

'...She was a basket case this morning...and she's 41, first baby, um, the baby was large, she had, um, gestational hypertension, she had a cardiac history, she had anxiety/depression in her background and [pauses], a myomectomy, that's what required the section anyway, all those things were like red flags to me, I knew she was gonna do something, I just kind of prepared myself for that. I just knew it. [pauses]. And, she did.'

**Sensory knowing.** Sensory knowing refers to what members of the interprofessional obstetric team reported seeing, hearing, or touching that helped them to anticipate and recognize when an obstetric hemorrhage may be or was actually occurring. Participants reported seeing such things as blood clots, large amounts of bleeding, noticing a faster pace of the operative team, hearing blood hitting the floor or being suctioned without stopping through suction tubes, and palpating boggy uteruses.

Participants reported that visual clues helped to recognize a potential obstetric hemorrhage, such as a perioperative nurse who recalled that: “The patient was...her pressure was significantly low, her pulse was high, and her pressures were awful, her skin was, was as pale as that wall right there [pointing to a white wall].” Participants reflected on how they identify a potential obstetric hemorrhage based on what they heard. A surgical scrub technician offered: “...a very, *soaked* [emphasis added] lap hits that metal pan with a good old *thud* [emphasis added] [laughs], and they can—it’s just a clue-in....And it splatters on the floor....—you know,...—it’s just one of those *hearing* [emphasis added] things.” In response to this example, another surgical scrub technician reflected: “Just listening to the suction...[he/she made a rapid ‘cla cla cla cla cla’ sound intended to mimic how a large amount of blood sounds being suctioned through suction tubing]...” A perioperative nurse shared that the sense of touch has helped to identify a potential obstetric hemorrhage, offering, “To me, the feel of her uterus, yeah. It tells you a lot. It, it, for 37 weeks it was a big baby...I would not have expected to be above U [top of uterus in relationship to patient’s umbilicus], it, it just felt knobby, like it was filling with clots.”

**Intuitive knowing.** Participants reported knowing something was wrong with their patient, even in the absence of external evidence, such as active bleeding or a change in the vital signs. They reported just “knowing” something was wrong as a feeling or emotion. During field observations in labor and delivery, when the researcher was discussing obstetric hemorrhage and asked a labor and delivery nurse how she knew that something may be wrong, he/she shared that “It’s a gut feeling - you just know. You walk in a room-and something may not even look wrong, but you just have a feeling.

You may not even be able to put it in words. You can't chart 'I just have a feeling.'"

Another labor and delivery nurse offered:

'...It was an unexpected event,...so, when I tell you that she was not bleeding and then she was, there was no in between with her. We had scant, scant, scant, a tiny little bit of blood, more than scant maybe, and then right back to scant which is typical and normal and...her husband came out and said, um, 'she's dizzy', and, and in my *soul* [emphasis added] [pauses] I *knew* [emphasis added] she was hemorrhaging at that point...you know, sometimes you know...I knew something had gone wrong.'

During another focus group a perioperative nurse shared:

'...I had kind of a gut feeling in the OR that she was going to do something. And um just because when I massaged her she had a little more [bleeding]...I couldn't say that it was a little bit more than I'd like to see [meaning bleeding], I just didn't like the feel of her uterus basically...she had many red flags...the hairs on my neck, um, up...Yes. I just had a feeling.

When asked when this type of knowing emerged in their practice, participants responded that arriving at that stage took about two to five years, depending upon the frequency with which obstetric hemorrhage was encountered. A perioperative nurse offered:

'You know, after many years of doing this, you know,...nobody wants to hear in the evidence based practice that's a gut level feeling [questioning inflection], but it is a gut level feeling [emphasis added]. It's you, I mean, you know the risk factors. You already have the risk factors, and you start climbing 'em up the

thing, so you start anticipating. First of all you've had major surgery, so it is a gut level feeling....You know what you know when you know it....'

**Rote knowing.** Nurses and physicians shared that although they were aware that an obstetric hemorrhage protocol existed, they did not use one during an actual hemorrhage event and relied instead on their own rote knowing. These participants reported that they knew how to manage an obstetric hemorrhage without having to consciously process it or think about how to do it. An attending obstetric physician stated that the obstetric hemorrhage algorithm was "Just in your head." An obstetric hospitalist physician agreed, and added "my head....Head checklist [taps temple as he/she is talking]." During another group interview, an obstetric nurse stated: "I honestly don't. Because I already know what to do" when asked if he/she used a hemorrhage algorithm or checklist during a hemorrhage. Answering the same probing question, another obstetric nurse stated, "No. Because I know what's like—your priorities, I know I need this, I know I need this. It's like—you probably have like a mental checklist." And an obstetric resident physician shared "...And I feel like...—there is kind of a checklist you can go through in your head, but I think you study it and then use it, and then it just gets imprinted in your brain." During a group interview, several perioperative nurses chimed in all at once, saying "...grab a cart, pulled 800 micrograms of cytotec, take orders, up her pit, you know, anticipate for her [referring to surgeon] to walk in and do the bi-manual on her to see..."

**Biased knowing.** A final sub-theme of knowing was inflated (or biased) knowing, characterized by the described perception that actually measuring or quantifying the amount of blood loss wasn't necessary unless the blood loss was

perceived to be more than expected. A labor and delivery nurse reflected on estimating blood loss during a hemorrhage, offering:

‘And you weigh the blood. You’re weighing it. On scales. It’s [weighing of the pad] incorporated only in the event of a hemorrhage. If your patient is just status post-delivery, and they’re having what we consider a normal amount of bleeding, then we estimate, and we are taught to estimate, we’ve gone to classes to help us estimate correctly how much blood and we are, pretty accurate. Um, but anytime we have an amount of bleeding that is more than what is normal and is expected, we go ahead and weigh it so we can keep up with, really, how is this patient doing? How much have we actually lost here? And, and that’s just part of our protocol that we do that here.’

Reflecting upon the impact of experience in knowing how to estimate the volume of blood loss, a nurse said, “...and through all of course your experience, you know, you get to learn, and you assess your patient. That’s how I’ve learned estimations.” An obstetric resident physician offered, “Yeah. It’s sort of—especially in the operating room, it’s a joint thing. I mean, we’re eyeballing what we see is first bleeding. And then anesthesia is also looking at the canister of blood and then evaluating the laps along with the scrub techs [inaudible, speaking at once]. This mirrors an anesthesiologist explained to the researcher during field observations about how members of the anesthesia team partner and assist in determining blood loss during surgical or hemorrhage cases requiring resuscitative measures.

## **Obstetric Hemorrhage and Massive Transfusion Protocols Underpin the Impact of Training and Experience on Knowing**

The obstetric hemorrhage and massive transfusion protocols provided structure for team training and subsequent experiences. During a focus group interview, a member of the blood bank recalled what it was like since the obstetric and massive transfusion protocols were implemented, stating “Because we know what’s coming next. Before protocol, we don’t know what you’re going to order. You might say, RBC’s [red blood cells] here and then next time you might say, I want six more RBC’s. There is no plasma in it. So basically, we have to wait for you—you want to be prepared but...” Training included didactic or traditional modalities (classroom plus skills stations), on-line modules, and simulation team training. Well distributed throughout the study data were numerous responses from participants indicating that training and experience influenced knowing about the risk factors for and preventing an obstetric hemorrhage, as well as how they recognized and managed this obstetric emergency.

Participants acknowledged that although the on-line training did provide additional knowledge about obstetric hemorrhage, the utility of this training modality in managing an obstetric hemorrhage had limitations. A nurse from mother-baby (postpartum) shared, “So, it’s [on-line training] more about knowledge. Like, what do you know about hemorrhage? What do you need to assess, and stuff like that? But it’s not really—like, as a new grad, for example, it really doesn’t tell me what do I need to do—what do you need to look for first—do first?” Another mother-baby nurse said:

’Yeah, it’s a lot of information—[on-line training], at one time,....We’re doing vaginal packing sometimes, but it’s rare, so we don’t really get people balloons



and things like that. That's more of an L&D thing, so—the [on-line training] covers a lot of things that don't apply to our—generally, a healthy mother-baby.'

Simulation team training appeared to exert a greater influence on participants' ability to effectively and efficiently manage an obstetric hemorrhage. Evaluation of simulation team training was identified as helpful by numerous participants because it demonstrated how to use the obstetric hemorrhage and massive transfusion protocols in a safe environment, clarified team roles, and improved the team's cohesion during hemorrhages. During a group interview, an obstetric physician said, "...The simulation is important because it gets everybody on the same page, and then part of it is if you do it multiple times, then; A, you get more comfortable; B, I might do it with five different nurses each time I do it. So then, I know—...more people..." A labor and delivery nurse recalled the impact of simulation team training in the following exemplar:

'We went through a *long* [emphasis added] training, um, where, we all held the lanyards, and, they had an actual dummy [manikin] in the bed, with cherries as clots in between her legs, it was like, really well thought out and well done, and...we were estimating blood weights, and measuring pads....Doing all the things, and, and every time we would run the scenario you would play the lead, and the next time you would play the helper...it was helpful [upward inflection in voice, as if considering response], because they were rolling out the new protocol on how they wanted it [obstetric hemorrhage] to be handled...better than just telling you how you want it to be handled, showing you, and so that was nice, that they took the time to send us through the training, and, and really show us, this is how it's supposed to go down.'

There were numerous participants who reported a gap in this training methodology in that not all of the interprofessional obstetric team members had participated in simulation team training. These same participants recommended that any interprofessional obstetric team member that might directly or indirectly provide care for an obstetric hemorrhage patient participate in simulation team training for this obstetric emergency condition.

### **Impact of Experience on Knowing**

During field observations and both individual and focus group interviews, participants reported that experience in their own roles; experience in recognizing and managing obstetric hemorrhages; and listening to others' experiences in anticipating, preventing, recognizing, and managing an obstetric hemorrhage exerted a powerful influence on their own knowing. An operating room nurse had this to say about the impact of experience: "I don't think that there's any amount of training that can help you....until you're there. You can train and train and train. But once you get into the situation, it's not always going to be what you trained for." During another group interview, a resident obstetric physician recalled, "And there's really no substitute for having an actual experience and kind of knowing just without even thinking what the next step is to do....But I think the experience has been the kind of ultimate teacher...You know, that's sort of a experience thing, and part of it is taking cues off of the people who have more experience than you do." This same resident physician reflected upon the impact that the clinical unit on which the obstetric hemorrhage occurs and the team working on that unit may have on the development of experience in managing a hemorrhage, recalling, "...But when you're upstairs [mother-baby], the

nurses just aren't as accustomed to dealing with that situation. It doesn't come up as often. And so, I think you—you feel more alone as the, you know, primary person who knows what the next step is....”

### **Teaming**

Teaming was identified as the second of the two central themes. Teaming appeared to stem from knowing, which was further influenced by the interactions among members of the interprofessional obstetric team that occurred during an obstetric hemorrhage. Effective or ineffective teaming refers to the result of communication and cohesion among members of the team, resources and support available to the team, clarity of who was leading and roles among members of the team, trust, and the actions that took place during the care of an obstetric hemorrhage patient. The following sections will outline these sub-themes and include supporting exemplars.

Communication was central to effective and efficient teaming among members of the interprofessional obstetric team. Evidence of communication was well distributed throughout the data, including closed-loop and assertion or speaking up. During a dialogue during a group interview with participants from the obstetric triage unit, a nurse described closed-loop communication, sharing, “Because somebody will typically say, ‘I’ll go get the Methergine.’”, to which another triage nurse added, “...Methergine given to....How they gave it and where they gave it at....LR’s [intravenous fluid] hanging...” Speaking up during emergencies like a suspected or an actual obstetric hemorrhage is especially important. A surgical scrub technician remarked during a group interview that “You can’t be passive at all....You have to be active.” Another surgical scrub technician

in the same group interview described speaking up during surgeries where there was concern about excessive bleeding, adding:

“No. No. No. We—We’re not shy.... You have to know when to bring your voice higher and higher to say, ‘Look. This is a problem [claps hands together sharply three times]. We need it fixed,’ [laughs] you know.... And where it’s also—we all learn from that situation [patient death from hemorrhage]. And we—you know, I’m not afraid to tell a doctor, ‘Look. There’s some bleeding. You need to stop, you know. Your bleeding up there is nothing. Hold some pressure on it. You need to look at this.’ Not telling them what to do, but kind of saying—‘You’re not seeing this the way I am. I need you to see it.’.... So, us being able to stand our ground and say, you know, I think we’re being heard more. If we’re standing our ground to say, ‘Look. We’re included here too.’ So it’s helped, in my opinion.”

During individual and focus group interviews, participants offered several examples of perceived team cohesion. Team cohesion was another important element of an effective and efficient response to an obstetric hemorrhage. Responding to a question about what made a particular hemorrhage event go well, an obstetric nurse said “Teamwork”. Recalling this hemorrhage event another obstetric nurse added that the team response was “Very cohesive”. During another group interview, an operating room nurse described team cohesiveness, saying “... We have awesome teamwork here. And we’re all very proactive in managing it... we’re calling the doctor, somebody’s bringing in your lab tubes, someone’s starting a second IV, someone’s brought your crash cart.” Another perioperative nurse offered:

‘You know, I think...everybody is kind of saying the same thing. It’s—it’s almost hard to give words to that *experience* [emphasis added] [laughs] in that *training* [emphasis added]. I mean when you get in there,...it’s like it comes—it turns on. And you—those assessment skills no matter what type of nurse,...the clinical skills that we all have, you, able to look at the situation, okay,...“This is necessary. Okay.” And someone says, “Okay. I got the labs.” You kind of verbalize or said, “No, that somebody is doing that.” And you look at the situation, and you say, “Okay. This needs to be done.” And someone, “Okay. I have that part of it.” And it just kind of...that team cohesion, it just, *happens* [emphasis added].’

A member of the blood bank team compared and contrasted what it was like before and after implementing the obstetric hemorrhage training program:

‘Before we had training, before we started on the protocols, it was disorganized. It was lack of communication. We were failing to work with one another. We didn’t have teams. It was not a team approach. I feel that us in the blood bank always had our own protocols....We’re prepared for bleeding...everybody else didn’t seem to be on that same page....So I was so happy when we started working on this and putting the teams together and developing a...protocol—a way for handling worst case scenarios.’

During another group interview, a mother-baby nurse shared a perspective about team cohesion during an obstetric hemorrhage:

‘Once we determine that this is probably bleeding, like I said, we call the rapid—we start moving the baby out of the room. We start moving extra people out of

the room, then our team comes—like, some will bring a Foley if they don't have one—people grab tubes if we don't have it—they start drawing blood. And then, that's when we start weighing....first, all the rest of the nurses, someone would call the charge nurse, they'll come in. The bedside nurse will stay there because she knows all the information. 'Someone take the baby out.' 'Hey, can you grab a Foley?' 'Hey, can you grab some tubes for blood?' 'Hey, can you grab a scale?' 'Hey, tech, can you grab a vital sign machine so we can take vitals?' So,... 'I'll start recording.'

Supporting the interprofessional obstetric team during a hemorrhage event with structural, human, and technological resources was very important. Multiple participants remarked about a variety of support they have received during these emergencies. One perioperative nurse stated, "The hemorrhage cart is really, really wonderful. Everything is in there. You don't have to run and get 50 gillion things, it's in your cart. Just pull your cart to your door...." Cognitive aids helped team members who responded to obstetric hemorrhages remember what their roles were during the emergency. A labor and delivery nurse described lanyards which were "cards in the OR....That tell you exactly on the back what is your job....That's why it's written, because they know you're not gonna remember..." A perioperative nurse recalled how helpful the electronic medical record was during the administration of blood, stating:

'I'd have to say that during my 2nd postpartum hemorrhage here...I did have to transfuse my patient....The way [electronic medical record] works here it's a lot quicker, it's good....I had an order, I acknowledged it, my charge nurse came and

just, we put it together, scanned, verified one form, one...for me, oh my God, this is amazing [laughing].'

Although the emergency response teams existed prior to the obstetric and massive transfusion protocols and their implementation, the function of the emergency teams was improved as a result of the protocols and training, as was the integration of the clinical and ancillary teams who provide care to manage an obstetric hemorrhage. A labor and delivery nurse described:

'...the resources here make me feel so much more comfortable when I think a patient is having an issue because we have an extensive blood bank, because we have extensive residents at our fingertips, because we have...ancillary staff that can come and help...It's *staff* [emphasis added]. It's having residents in the next room. It's having a hospitalist upstairs. So that, like for example last night, my patient needed a C-section, but the surgeon had just called an urgent section [a higher priority cesarean delivery] on his/her other patient next door. It didn't matter my patient was *safe* [emphasis added]. *Period* [emphasis added]. Because the hospitalist's job is to come down and perform that section,...the charge nurse of course comes in and lends a hand, we have ER 1, 2 and 3 [emergency response nurses who are part of the emergency response team]...That's the big life saver here. If, if my daughter was gonna have a hemorrhage, God forbid, *this* [emphasis added] is where I want her to be when that happens. [pausing] We don't have any other outlying hospital that has a blood bank that can match ours.'

Participants shared how important it was for any emergency response team to have a leader, and for that leader to lead. When recalling an obstetric hemorrhage event,

an obstetric resident physician said, “So I think from speaking from my experience upstairs coming down here, once the attending got there and elevated the level of concern to the right people and started funneling the patient down to Labor and Delivery, from then, it just—it just flowed....” An obstetric physician added during this group interview, “...And it kind of goes back to you keep the room at a normal volume,...I don’t care if you feel like you can’t throw a strike today. Don’t let the other team know because if I keep myself under control and nobody knows that I’m panicking on the inside—...then everything goes good. As soon as you start raising your voice and screaming and—everybody—[inaudible, speaking at once] the whole thing ratchets up.”

During another group interview, a resident obstetric physician shared an event when “...it was loud in the OR, I think the attending did a good job of like speaking up loudly to tell everyone to be quiet so he/she could kind of take control—of the situation....”

An effective and efficiently functioning team is promoted when members of the response team know and trust one another, even during a simulated emergency. A blood bank physician shared the following:

‘I think on a more philosophical level, I think the trust issue is very important. We are using similar protocol in that we should never contrast for instance, but you are using a very similar protocol across the street in pediatrics and they are not really doing a lot to simulation and it does cause a lot more confusion. And part of that confusion is this trust issue because when we do a lot of simulation, when you are an integral part of the whole system, even a simulation, it allows us to trust each other. It’s like trustful. You guys are going to fall. We will catch you. We are ready to catch you because we are expecting you to fall. But—and



that simulation really kind of brings that trust—that we trust that you know what you're going to do with the information and the part that we give you and we trust or we believe that you trust us in providing the part that at the time that you need them.'

During another group interview, a resident obstetric physician shared this perspective about knowing the people with whom you work:

'And I think you get to know the people as well. I mean I think in the beginning when you're not here that often as an intern, you don't really know everybody's names, kind of goes back to what Dr. (omitted) was saying is that you start to, you know, know people's name. You—when you just see them, you don't have to really think about it. And you know they know what you're going to want and that you can really direct your communication with them. And I think that makes the difference too just being comfortable with the people that you're working around....Well the other part of that-They know you....'

Role clarity was an integral part of an effectively and efficiently functioning emergency team. During a group interview an anesthesia technician described the simulation team training and its impact on clarifying roles and the zones during an obstetric hemorrhage, recalling: "We've had—simulations in the procedure room....we practiced that setup and the simulation—with—L&D....it created—zones for everybody....who takes care of what. So...everybody's aware of what everybody's doing, of what their role is." An operating room nurse recalled a massive transfusion response during an actual obstetric hemorrhage:

‘An MTP [massive transfusion protocol], I think it was the first week I was here. I don’t even know, remember, it was kinda like a blur,..and...it was amazing. I saw how it was handled here, and there was no running around, it was calm and collected and everybody knew what they were supposed to do, and I think...it was awesome...In preparation for that and you run it so smoothly...I think the delineation of roles is huge. And not being told to ‘Here, you go give blood, draw labs, here, you run this to blood bank’, that’s craziness. Everyone has a delineated role and they only do their role...*Absolutely!* [emphasis added] Makes people not feel so, um, disjointed [upward inflection], and gives them a clear focus. “My only job is to draw labs. My only job is to be the runner for blood. My only job is to assist anesthesia. My only job is to...whatever....”

During another interview, an obstetric physician offered this regarding the importance of role clarity:

’And I think having one person be in charge, everyone knowing who that person is and everyone kind of having their assigned roles—if they’re not able to do what they need to do, reassigning it to someone else who can do that. You know, knowing, here, go to person in anesthesia is, here, go to nursing person is, or go to scrub person is, so that everyone can kind of help manage those major things and—I think that’s the most important thing to make any situation go well. In addition to having the appropriate help, which I think is one of the great things about being here, is we always have our hospitalists who are around to help us out.’

Promptly recognizing and taking action during an obstetric hemorrhage improves the odds of successfully resolving this life-threatening emergency. Numerous participants offered accounts of timely actions taken during obstetric hemorrhages, such as gathering equipment, initiating intravenous access, coordinating the team, and anticipating the need for medications, procedures, or blood transfusions. An obstetric resident physician described, “I usually communicate with the nurse like early on. I’m like, ‘This is patient I think is a risk of bleeding more.’ And the nurses already knows it too, but we just touch base....’Let’s just make sure we have these uterotonics [medications used to contract the uterus and reduce bleeding].’ An obstetric triage nurse recalled a bleeding obstetric patient who “was dizzy. So, the care that I gave—was—we immediately started an IV. We did—a type and screen, a CBC and we did—a DIC panel—on her.”

An operating room nurse recalled getting “...the hemorrhage cart” and “...calling the OR to let them know...we haven’t called it but we might have to go to the back to get a balloon. You know, let anesthesia know, kind of start getting everyone’s ducks in a row. We’ll often ask for a resident to come down to evaluate...We get the scale from the OR so we can, you know, actually have a weight on how much [blood] we’ve lost.” Another operating room nurse reported that “...you expect that there is a need for blood....call the blood bank to make sure that they’re on top of it....Yeah. Sometimes, they don’t—they didn’t have to ask for it because we just know they’d be asking for blood or this and that...We just go ahead and, you know, be ready for it.” An obstetric physician expressed how important it was to anticipate the need for blood, recalling “I mean the way—the way it’s [OB hemorrhage protocol] written is, is that when you hit,

you know, 1,000 to 2,000 at different stages,...so if you hit 1,200 but the bleeding has stopped, don't worry about it...if you see it's a 1,000 and you're still bleeding like stink, you know, and have no idea of when you're going to be able to stop that, that's when you start thinking about, 'Hey, at least, get me some blood.' A resident obstetric physician recalled a hemorrhage event, during which their actions were timely and efficient:

'I was away, the patient was here in delivery. So, I just ran down to the OR—to help out with this patient. We do a section—baby gets out and then she just started bleeding, the uterus wouldn't contract, we used all the uterotonics. Then, we looked between the legs and she ended up having like—more than a liter [blood loss]. So by this point, her EBL [estimated blood loss] was 1,500 plus, maybe 2,000. At that point, we decided that we needed to do a hysterectomy. The attending responded very appropriately, very fast and just anticipating everything that was happening. We called for the—hospitalists—for backup, we called in for blood to be given. I could hear the whispers from anesthesia saying like, "No, but the patient's stable, do we really need to give her blood? The attending, again like there's a lot of bleeding, you may not be seeing it but there's a lot of bleeding between the legs, let's start transfusing now....So, they [anesthesia] were seeing different things and I was standing next to them, so I could hear their doubts in what they were saying....But they still trusted the surgeon....So, they called for the blood and we started transfusing....The hospitalist came in—that was the fastest hysterectomy I've ever done—not done, seen. It was like—ten minutes.'

There was only one unanticipated obstetric hemorrhage that took place during field observations. However, the observations made during the event mirrored the team's anticipation of actions. The researcher observed prompt response from every member present at the event. The hemorrhage cart was immediately brought to the room. Extra team members sprang into action procuring extra supplies. The researcher heard them telling one another as they were entering and exiting the patient's room that they had initiated a secondary intravenous access and administered medications for hemorrhage. She heard the surgical scrub technician say that an operating room was already open and ready should the patient require transfer there for further care. Nothing about this observed response was contrary to descriptions provided during interviews.

### **Discussion**

Based upon an inductive, descriptive analysis of the data generated from field observations and during individual and focus group interviews, knowing and teaming emerged as the two central themes. Knowing included cognitive, sensory, intuitive, rote, and inflated or biased knowing, all of which helped interprofessional obstetric team members anticipate when an obstetric hemorrhage may occur, as well as how to recognize and manage an obstetric hemorrhage when it did occur. Teaming appeared to stem from knowing, which was further influenced by the interactions among members of the interprofessional obstetric team that occurred during the management of an obstetric hemorrhage. Teaming was described as being the result of communication and cohesion among members of the team, resources and support available to the team, leading, trust, role clarity, and the resultant actions that took place during the care of an obstetric hemorrhage patient.

The cognitive, sensory, and intuitive sub-themes of knowing were similar to but not exactly the same as theories of attaining and advancing knowledge published by Christensen (2011) and Rolfe (2011). Christensen offered an alternative mechanism in which the integration of theoretical and practical knowledge occurred. He asserted that there were two phases to this integration of knowledge: knowing-how that led to knowing-that. The beginning of his knowing-how phase began with knowing what he described as pattern recognition. Later in this phase came knowing-why, which he described as theoretical and empirical knowledge that led to the third aspect of this phase of knowing how. He described this as practice or experiential knowledge. Although the elements of his proposed integration make sense, the sequence of his phases do not, nor are they consistent with the data accumulated in this study. Participants in this study described developing the ability to integrate knowing, or knowledge, after having several years of experience, sometimes resulting in a participant's ability to know something was wrong with their patient even in the absence of externally visible signs. Moreover, the phases of his model were suggestive of a linear progression, without the influences of a complex environment or a clear feedback loop that would indicate that clinicians continue learning or acquiring knowledge based upon their evaluation of the success or failure of their actions. Therefore, Christensen's proposed model of theoretical and practical knowledge integration was inconsistent with the results of this study.

Rolfe (2011) published a model of knowledge acquisition and advancement that was based upon the work of Benner (1984). Similar to Benner's model, Rolfe's model of knowledge acquisition began with what he termed propositional knowledge (knowing that) that a novice might possess as a new nurse. In his model, knowledge acquisition

progressed from the novice to the competent (knowing how) level. Experience or experiential learning propelled the competent nurse to that of an expert. Rolfe's model added a stage beyond that of expert that was the final stage of knowledge acquisition in Benner's model. He asserted that this final stage of knowledge acquisition was a continuation of experiential knowledge (knowing that) that was consistent with advanced practice. Unlike Christensen's proposed model, the stages of knowledge acquisition progressed in a logical sequence. In this way, Rolfe's model is more consistent with the results of this study. However, based upon the intuitive knowing data presented in the results of this study, the researcher would argue that members of obstetric teams possessed advanced knowledge or knowing without necessarily possessing an advanced degree.

Benner's (1984) model of knowledge acquisition for nurses was based on the Dreyfus model of skill acquisition. Benner's model consisted of five progressive stages: novice, advanced beginner, competent, proficient, then expert. When applied to nurses, the novice nurse begins with knowledge gained from school courses and reading, and is guided largely by rules. As more experience is gained, the novice progresses to an advanced beginner when their practice is guided by learned aspects of the situation, yet still focused on tasks. The competent nurse is able to perform safely and may begin to notice patterns that require further assessment and intervention, such as obstetric hemorrhage, yet may lack high levels of efficiency. The proficient nurse begins to function more holistically, noticing patterns and demonstrating increasing efficiency and flexibility by adapting required care to the needs and readiness of the patient to receive the care. Expert nurses move beyond proficiency, noticing patterns in patients about

which they may not even be consciously aware. There is an intuitive aspect to this level of care demonstrated by the expert nurse (Benner & Tanner, 1987).

Although the purpose of this study was not to elucidate exemplars of various levels of knowledge acquisition, there were numerous exemplars throughout the results that were more consistent with the continuum of knowledge acquisition, as well as the influence that training and clinical experience exerts upon knowledge acquisition (Benner, 1984). Many exemplars of intuitive knowing were consistent with an expert level of practice (Benner, 1984; Benner & Tanner, 1987). These exemplars were shared by members of the interprofessional obstetric team who possessed greater than five years of experience, also consistent with Benner's model. It is important to note that team members with fewer years of experience may also possess this type of knowing, and may be examined in future studies at this and other research sites.

The development and implementation of the obstetric hemorrhage and massive transfusion protocols provided structure that helped members of the interprofessional obstetric team know how to manage a hemorrhage. Implementing these protocols was consistent with recommendations to standardize and reduce practice variation (Bingham, Lyndon, Lagrew, & Main, 2011; Bingham, Melsop, & Main, 2010; Clark, 2012; Council on Safety in Women's Health Care, 2015; Gawande, 2009; Kacmar, Mhyre, Scavone, Fuller, & Toledo, 2014; Kohn et al., 1999; Main et al., 2015; Shields, Weick & Sutcliffe, 2007; Wiesner, Fulton, & Pelletreau, 2015). These protocols helped promote a shared mental model, an essential element of effective and efficient team performance especially during emergencies.



Although the recommendation to use protocols and checklists is well documented in extant publications, and participants acknowledged that the study facility possessed one for obstetric hemorrhage, many shared that they did not use one during an obstetric hemorrhage event. They reported relying on their own knowing. This is consistent with the definition of rote knowing, which is “Mechanical or habitual repetition (with ref. to acquiring knowledge). Routine, ritual (*by rote*); by heart, from memory; automatically, mechanically” (The Oxford Dictionary and Thesaurus, 1997. p. 695). Participants may not have perceived the need to use the protocol during an obstetric hemorrhage event because they are accustomed to encountering (The American College of Obstetricians and Gynecologists, 2016a). And participants may not have considered the obstetric hemorrhage protocol to be a checklist, which is consistent with The American College of Obstetricians and Gynecologists (2016a), which asserts that an algorithm intended to guide care is not a checklist.

Despite numerous recommendations to quantify obstetric blood loss, interview participants reported that this was not universally performed. A recent study supported previously reported findings that obstetric team members are very often inaccurate in visually estimating blood loss (Hancock, Weeks, & Lavender, 2015). Consistent with this study, it is possible that participants did not rely upon the quantified volume of blood loss to make treatment decisions, relying instead on parameters such as a patient’s vital signs or other signs of hemodynamic compromise. Another possible explanation for this finding is that participants may possess a degree of cognitive bias (Croskerry, 2013). This cognitive, or anchoring bias, may have led to the conclusion that what they are

visually assessing was correct, and therefore, quantifying blood loss through mechanisms such as graduated collection bags or weighing sponges was unnecessary.

Teaming was the result of communication and cohesion among members of the obstetric team, resources and support available to the team, leading, trust and role clarity among members of the team, and the resultant actions that took place during the care of an obstetric hemorrhage patient. Several elements of teaming as identified in these results were consistent with published descriptions of effective teams (Edmondson, 2012; Thomas et al., 2004). Effective and efficient communication is perhaps the most important element of teaming, and is consistent with recommended strategies to improve the quality and safety of patient care, including closed-loop and speaking up (Clark, Belfort, Byrum, et al., 2008 & Kohn et al., 1999,). Numerous exemplars of closed-loop communication and speaking up about a suspected or actual obstetric hemorrhage reported in these results were consistent with published findings and recommendations (Daniels, Hamilton, Crowe, Lipman, Halamek, & Lee, 2017; Fiscella, Mauksch, Bodenheimer, & Salas, 2017; Guise & Segal, 2008; Kirschbaum, Rask, Brennan, Phelan, & Fortner, 2012; Lyndon et al., 2015; Minehart et al., 2012; Siassakos, et al., 2013; Seago, 2008; Simpson, James, & Knox, 2006; Singer & Vogus, 2013; Valentine & Edmondson, 2016).

Trust or feeling emotionally safe among members of the interprofessional obstetric team was important in the care of obstetric hemorrhage patients. This finding is similar to an element of effective teams (Edmondson, 2012; Fiscella, Mauksch, Bodenheimer, & Salas, 2017). The exemplars illustrated that team members had trust in fellow members of the team to know and carry out their roles on the team, whether those

roles were clinical or non-clinical. The team members also shared examples of other important elements of teaming that are consistent with extant literature, such as leading and team cohesion (Cornthwaite, Alvarez, & Siassakos, 2015; Fiscella, Mauksch, Bodenheimer, & Salas, 2017; Nielsen & Mann, 2008).

Although on-line education was convenient, the results of this study were similar to studies where they reported that although the teamwork training was useful, the participants reported that the benefits did not translate to a perceived improvement in teamwork at the unit level (Sonesh et al., 2015) or a reduction in a composite measure of obstetric complications (Fransen, Van de Ven, Schuit, Van Teterine, Mol, & Oei, 2017). In contrast, the exemplars provided in this study indicated that simulation team training provided a more realistic experience, and perhaps provided superior anticipatory preparation for recognizing and managing an obstetric hemorrhage. Simulation team training on the obstetric hemorrhage and massive transfusion protocols not only helped create a shared mental model among members of the interprofessional obstetric team, but helped them to know how to use the protocols effectively. Considering the increasingly complex environment in which obstetric health care is delivered (Braithwaite, Runciman, & Merry, 2009; Engebretson & Hickey, 2011), being able to train together around a common obstetric emergency (Bergh, Baloyi, & Pattinson, 2015; Daniels & Auguste, 2013; Lutgendorf, Spalding, Drake, Spence, Heaton, & Morocco, 2017; Smith, Siassakos, Crofts, & Draycott, 2013) improved other aspects of teaming such as a clearly identifying the leader, role clarity, team cohesion, and initiating prompt actions (Fransen, et al., 2012). These results were consistent with published studies exhorting the benefits of employing simulation team training in obstetrics (Hamman, Beaudin-Seiler,

Beaubein, Gullickson, Freeth, et al., 2012; Gross et al., 2010; Guise, et al., 2010; Hamman, Beaudin-Seiler, Beaubein, Gullickson, Orizondo-Korotko et al., 2010; Riley, Davis, Miller, Hansen, Sainfort, & Sweet, 2011; Phipps, Lindquist, McConaughy, O'Brien, Raker, & Paglia, 2012; Salas et al., 2013; Salas & Rosen, 2013; Siassakos, Crofts, Winter, Weiner, & Draycott, 2009; Thomas, Williams, Reichman, Lasky, Crandell, & Taggart, 2010; Wallin et al., 2016).

### **Study Strengths**

This study had several strengths. First, conducting a qualitative study with an aim to understand the experience of front line team members who cared for patients with obstetric hemorrhage is consistent with recommendations to consider the thoughts, perspectives, and recommendations from teams closest to the care, which is consistent with highly reliable organizations (Weick & Sutcliffe, 2007). Second, purposively sampling participants from multiple disciplines and roles who provide or support the care provided to obstetric hemorrhage patients added richness to the data. And third, regularly performing member-checking throughout the individual and group interviews underpinned the credibility of the study findings.

### **Study Limitations**

There were a number of study limitations. Although purposive invitations to members from teams who care for obstetric hemorrhage patients and received some type of obstetric hemorrhage training was extended, not every team was represented in the final sample. While invited if they met inclusion criteria and expressed interest in participating, not all chose to do so. Additionally, some members of the team who participated in testing and recommending revisions of final obstetric hemorrhage and

massive transfusion protocols no longer work at the study facility, precluding their potential participation in the study and creating a potential gap in data generation and the resultant learning.

Although participants were purposively sampled based on the inclusion criteria, they weren't expressly sampled based upon their years of experience in their roles. Most participants possessed more than 10 years of experience. This level of experience was likely reflected in the exemplars, and may have influenced the interpretation of participants' experiences. Data was also not collected on participants' educational level. Having these data may have augmented the interpretation of the data with respect to described levels of knowing. Similarly, data on participants' number of years of experience at the facility was not collected. Collecting these data may have augmented the interpretation of the data with respect to the alignment of distribution of tenure, which may have helped to identify if too few team members were sampled with fewer years of experience.

Another potential study limitation was that some of the study participants also worked at other obstetric facilities. Although the researcher asked for examples and discussion to be focused on experiences at the study site, there may have been some overlap in participants' recollections or descriptions of care during an obstetric hemorrhage. As described above, the researcher addressed this possibility through frequent member-checking during interviews.

Another potential study limitation was that primary researcher holds a leadership role in the quality and safety department at the study facility. As part of that role, the researcher interacted often with a number of the participants. While none of the

participants had a direct or indirect reporting relationship to the researcher, the researcher's role may have promoted or hindered participation in the study. The researcher promoted participation by emphasizing that participation was absolutely voluntary, that withdrawing from an interview or the study could occur at any time without fear of retaliation or retribution of any sort, and with the assurance that such withdrawal would not affect the informant's role or position in the study setting in any way. The researcher received no requests for withdrawal from the study from any participants.

The researcher's years of experience in the obstetric field and being employed at the study setting may have increased the potential for bias. To address this, the researcher acknowledged thoughts and feelings that arose during field observations and interviews, and reflexively captured them in the appropriate place in transcribed field notes and transcribed interview recordings. These thoughts and feelings were considered during iterative data review and analysis. Consultation with members of the peer debriefing group to discuss, validate, or refute themes or sub-themes also reduced the potential for bias.

### **Implications for Practice and Future Research**

The study results suggested that the development, implementation, and training on the obstetric and massive transfusion protocols helped to reduce practice variation and promoted a shared mental model among members of the interprofessional obstetric team. The simulation team training program was found to be especially helpful in facilitating an effective and efficient team response during an obstetric hemorrhage, especially when conducted in the actual clinical practice setting and when all members of the team who

would routinely participate in the emergency response were included. Ensuring that all members of the interprofessional obstetric team are included in this training is important. There is an opportunity to optimize this program by considering the level and types of experience participants possess when planning simulation team training. Adding sensory elements during simulated obstetric emergencies may also be beneficial.

Although some participants reported that visually estimating blood loss was inaccurate and blood loss should be weighed, there were a number of participants who reported that they were able to accurately estimate blood loss by visualizing it. As described, this finding was inconsistent with the broadly accepted recommendation to quantify all blood loss. Therefore there is an opportunity to further explore this potential cognitive bias and other perspectives about how obstetric hemorrhage is managed, including how best to develop and implement an obstetric hemorrhage checklist, by repeating this study in other obstetric units in other facilities. Further research, especially qualitative, is also needed about how patients have experienced obstetric hemorrhage. And finally, the results of this study support Benner's novice to expert model, and may apply equally well to other disciplines that comprise the interprofessional obstetric team.

### **Conclusions**

Obstetric hemorrhage remains a leading cause of maternal mortality and morbidity, much of which is potentially preventable. The results of this study elucidated that knowing how to anticipate, recognize, and mount an effective, efficient response to an obstetric hemorrhage is influenced by training and experience. A comprehensive obstetric hemorrhage training program that includes simulation team training program was found to be especially helpful in facilitating an effective and efficient team response

during an obstetric hemorrhage, and may reduce maternal mortality and morbidity. The researcher agreed with remarks made by a blood bank physicians when he/she stated “...the best transfusion is the one that you don’t to give. And I think the best MTP is the one that we don’t need to activate.”



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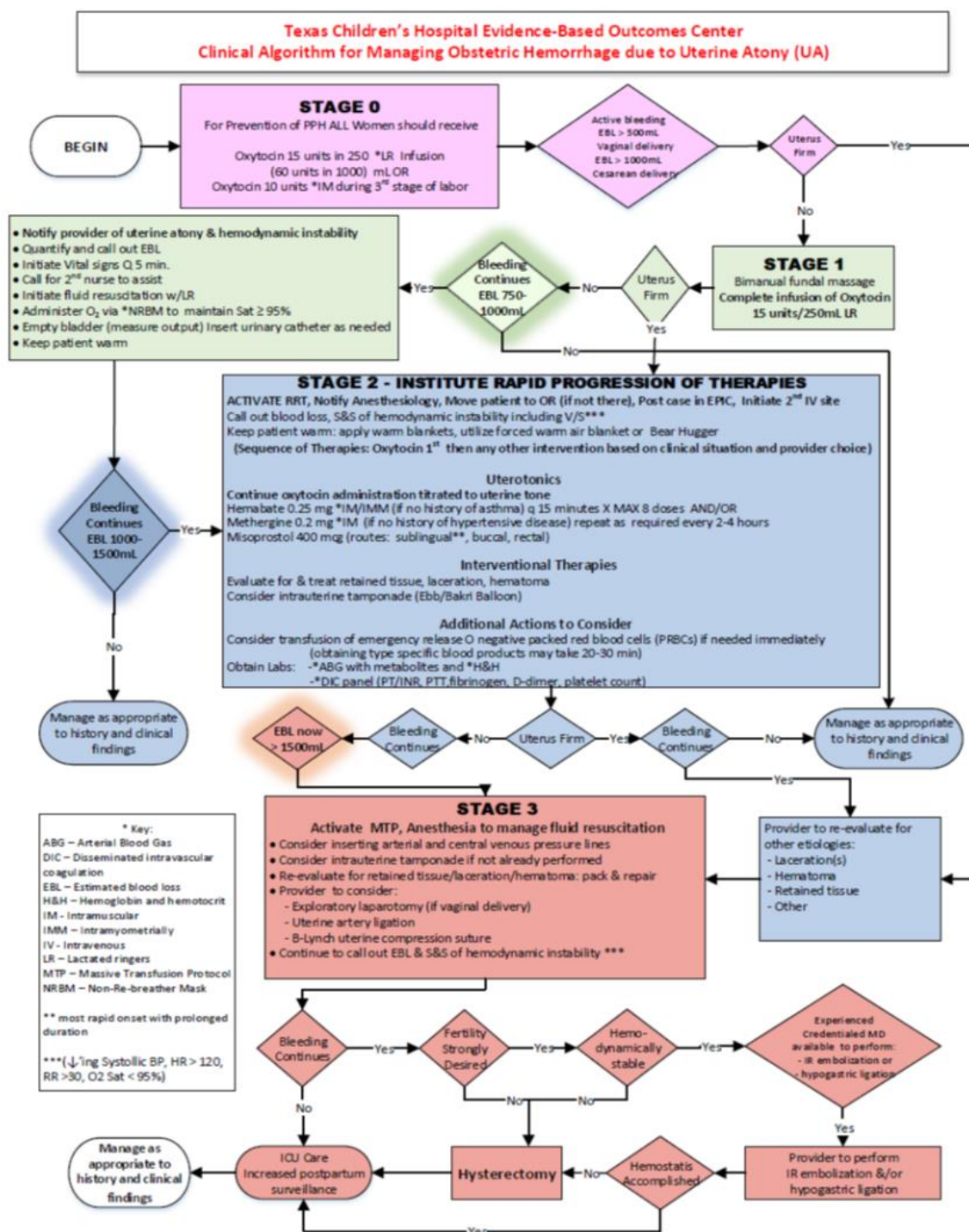


Figure 1. Obstetric hemorrhage management algorithm used at Texas Children's Hospital Pavilion for Women.

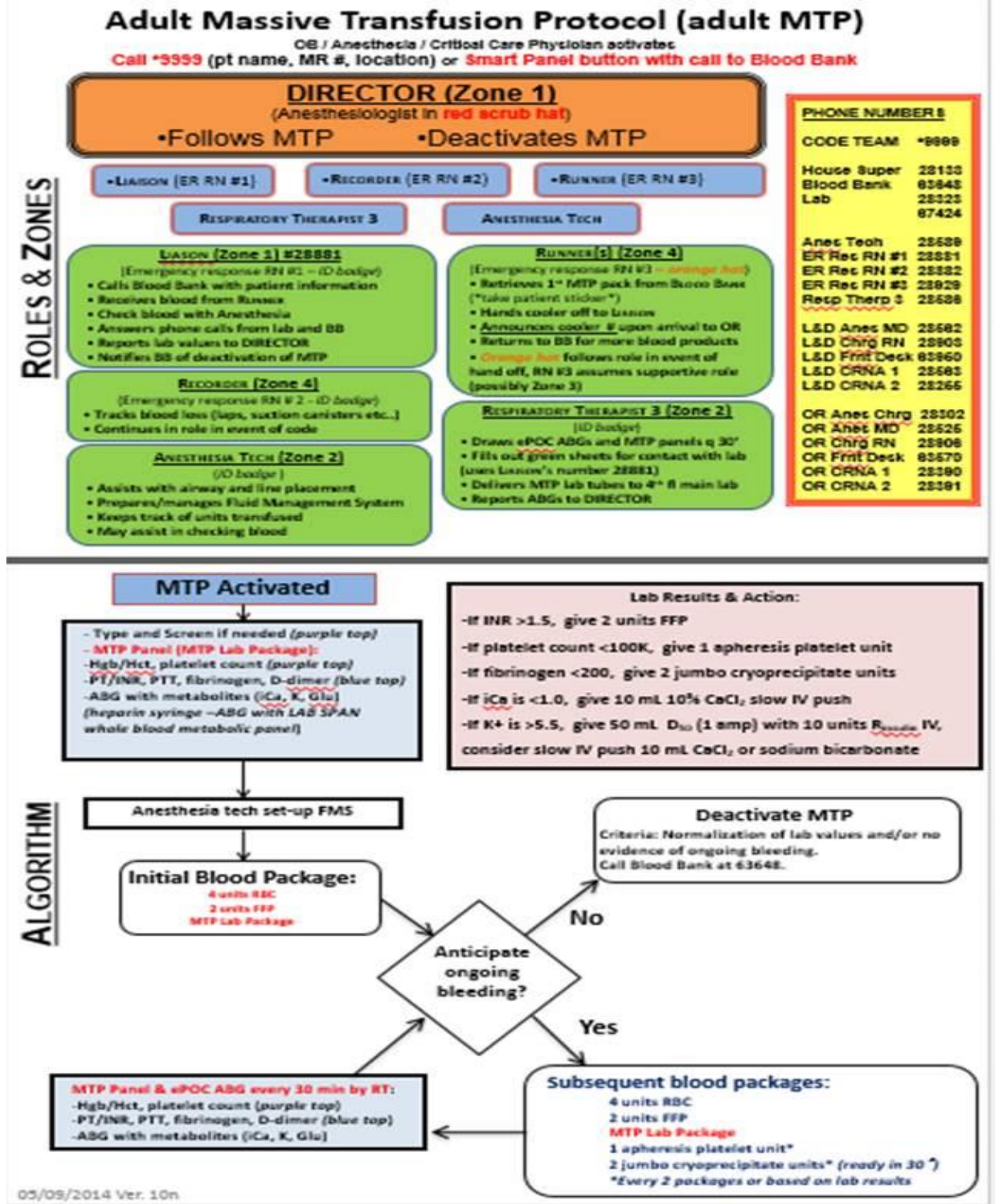
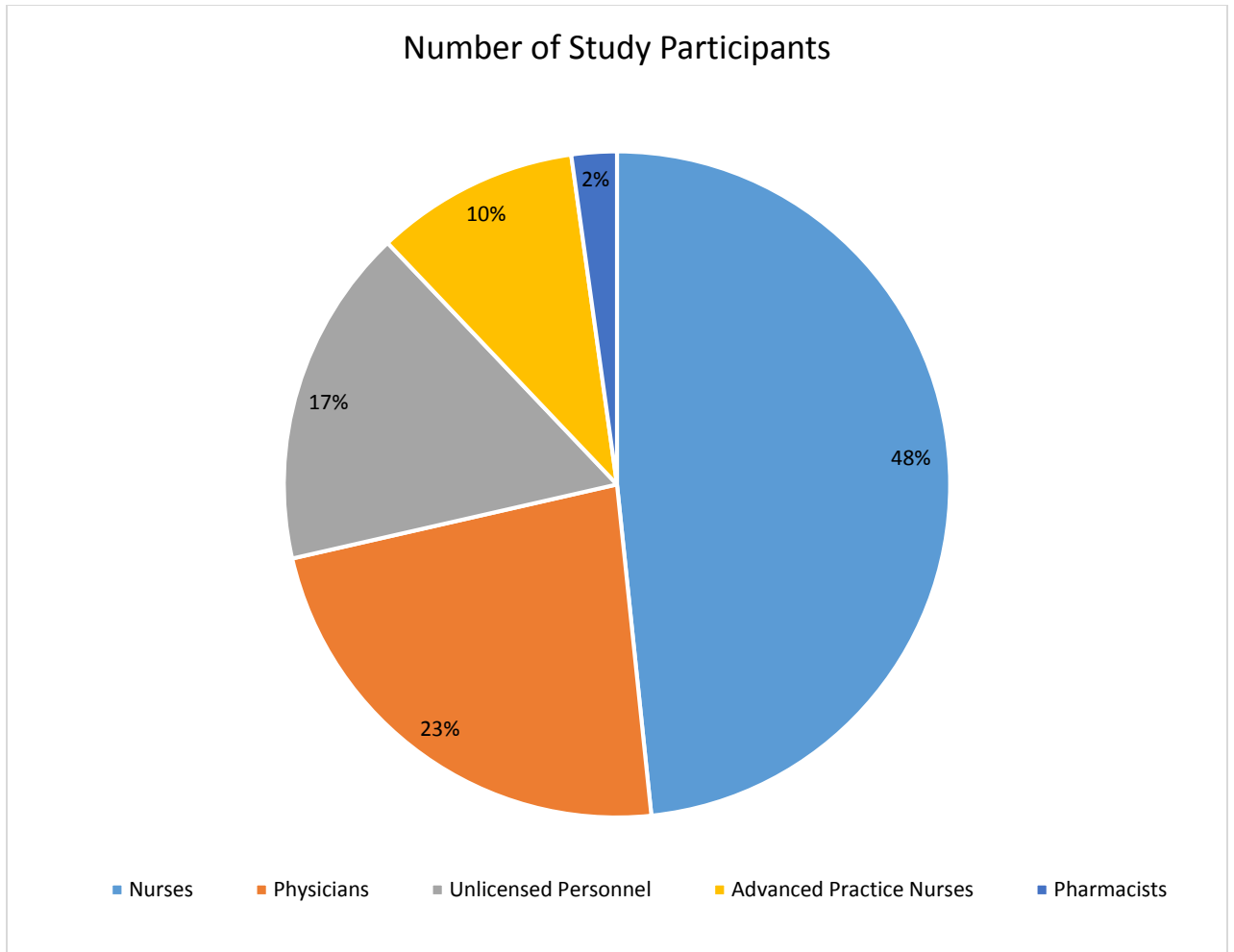
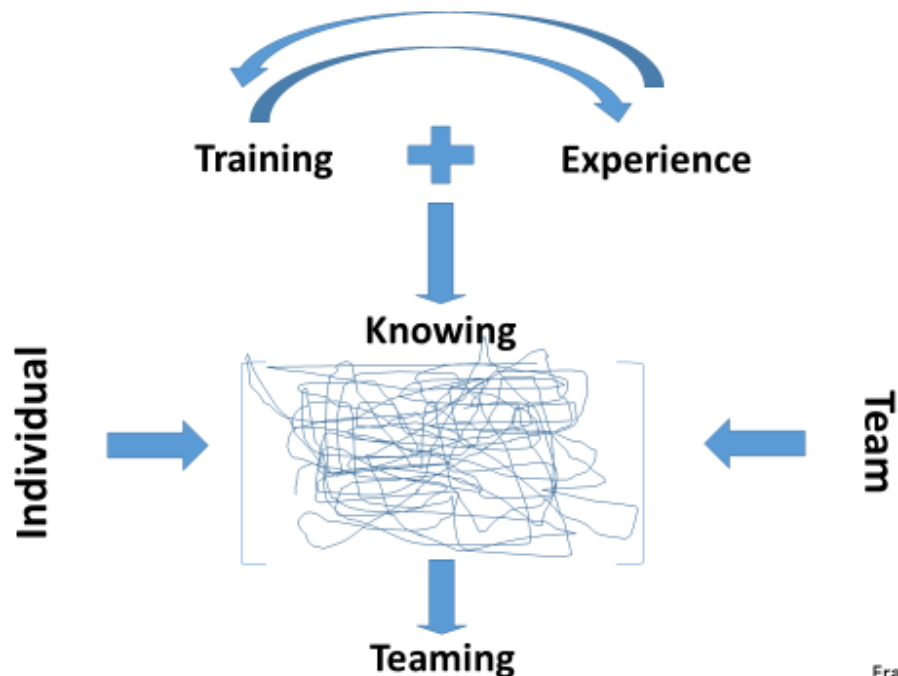


Figure 2. Adult massive transfusion protocol used in the management of postpartum hemorrhage at Texas Children's Hospital Pavilion for Women.





*Figure 3.* Distribution of study participants by roles.



Fran Kelly 5-19-17

*Figure 4.* Model of experience of interprofessional team members after obstetric hemorrhage training program. Knowing and teaming emerged as the two central themes. Knowing included cognitive, sensory, intuitive, rote, and biased knowing about obstetric hemorrhage. All types of knowing about obstetric hemorrhage were influenced by both the training and experience of the participants. Knowing about obstetric hemorrhage was further influenced by the interplay between members of the interprofessional obstetric team within the non-linear, complex, interactive environment during an obstetric hemorrhage event. Participants reported that the quality or effectiveness of teaming during an obstetric hemorrhage event resulted from such elements as how effective the communication was among the team members, the degree to which members of the team cooperated with one another, the amount and type of resources and support available to the team, being aware of who was leading the response efforts, the degree to which trust existed between members of the team, the clarity of roles among emergency responders, and the efficiency with which the team managed the hemorrhage.

*Appendix A*

Baylor College of Medicine Institutional Board Review Approval

January 6, 2017

NANCY M HURST  
BAYLOR COLLEGE OF MEDICINE  
PEDIATRICS: NEWBORN

Baylor College of Medicine  
Office of Research  
One Baylor Plaza, 600D  
Houston, Texas 77030  
Phone: (713) 798-6970  
Fax: (713) 798-6990  
Email: [irb@bcm.tmc.edu](mailto:irb@bcm.tmc.edu)

**H-40184 - UNDERSTANDING THE EXPERIENCE OF INTERPROFESSIONAL TEAM MEMBERS AFTER PARTICIPATING IN COMPREHENSIVE OBSTETRIC HEMORRHAGE TRAINING**

**APPROVAL VALID FROM 1/6/2017 TO 12/5/2017**

Dear Dr. HURST

The Institutional Review Board for Human Subject Research for Baylor College of Medicine and Affiliated Hospitals (BCM IRB) is pleased to inform you that the research protocol and consent form(s) named above were reviewed and approved by Expedited procedures on 1/6/2017 by Board 1.

The study may not continue after the approval period without additional IRB review and approval for continuation. You will receive an email renewal reminder notice prior to study expiration; however, it is your responsibility to assure that this study is not conducted beyond the expiration date.

Please be aware that only IRB-approved informed consent forms may be used when written informed consent is required.

Any changes in study or informed consent procedure must receive review and approval prior to implementation unless the change is necessary for the safety of subjects. In addition, you must inform the IRB of adverse events encountered during the study or of any new and significant information that may impact a research participants' safety or willingness to continue in your study.

The BCM IRB is organized, operates, and is registered with the United States Office for Human Research Protections according to the regulations codified in the United States Code of Federal Regulations at 45 CFR 46 and 21 CFR 56. The BCM IRB operates under the BCM Federal Wide Assurance No. 00000286, as well as those of hospitals and institutions affiliated with the College.

Sincerely yours,



GABRIEL HABIB, M.D.

Institutional Review Board for Baylor College of Medicine and Affiliated Hospitals

*Appendix B*

University of Texas Health Science Center at Houston

Institutional Board Review Approval



Committee for the Protection of Human Subjects

6410 Fannin Street, Suite 1100  
Houston, Texas 77030

Frances Kelly  
UT-H - SN - Department of Family Health

NOTICE OF PERMISSION TO RELY ON BAYLOR COLLEGE  
OF MEDICINE IRB January 25, 2017

**HSC-SN-17-0050 - Understanding The Experience Of  
Interprofessional Team Members After Participating In  
Comprehensive Obstetric Hemorrhage Training.**

CHAIRPERSON: *L. Maximilian Buisa*

PROVISIONS: This permission relates to the research to be conducted under the above referenced title.

CPHS has reviewed the above submission and determined that it meets the criteria for being reviewed by Baylor IRB. Please submit an application to Baylor IRB via their electronic system and await written approval.

Research participants must sign authorization for release of medical records unless such authorization is waived by Baylor IRB or UT Houston CPHS.

The research should not be initiated until all necessary institutional approvals and signatures have been obtained including but not limited to fully executed clinical trial agreement and Memorial Hermann Hospital approval (if the research is being conducted at a MHH facility).

*Appendix C*  
Study Information Poster



## Study Information Poster

### *Understanding the Experience of Interprofessional Team Members Participating in Comprehensive Obstetric Hemorrhage Protocol* **HSC-SN-17-0050**

#### **You are invited to participate in an important research study.**

You are **invited** to take part in a research project called, Understanding the Experience of Interprofessional Team Members Participating in Comprehensive Obstetric Hemorrhage Protocol Training, conducted by Frances Kelly, MSN, RNC-OB, NEA-BC, CPHQ, of The University of Texas Health Science Center at Houston, School of Nursing.

#### **What is this study about?**

The **purpose** of this research study is to understand the experience among members of the interprofessional obstetric team, as part of implementing an obstetric hemorrhage protocol at the Pavilion for Women at Texas Children's Hospital.

#### **Why should someone participate in this study?**

Your thoughts and perspectives as a member of the obstetric team will be invaluable in understanding how the team has achieved improvements in caring for patients experiencing an obstetric hemorrhage to date. The study findings will help understand how the improvements already made can be sustained, and support additional improvements in either the protocol or the factors that help the team implement the protocol in clinical practice.

#### **Who can participate in the study?**

You are invited to participate in this important research study if you are:

- A Texas Children's Hospital Pavilion for Women team member, and
- You have participated in some type of training for obstetric hemorrhage or massive transfusion protocols, and
- You have participated in the care (directly or indirectly) of an obstetric patient who has experienced a hemorrhage.

#### **How can someone participate?**

Contact Frances Kelly at 832-824-1369 or 713-542-1945 for more information or to sign up.

*Appendix D*

H-40184 Institutional Review Board for Baylor College of Medicine and Affiliated  
Hospitals Understanding the Experience of Interprofessional Team Members  
Participating in Comprehensive Obstetric Hemorrhage

**CONSENT FORM**

HIPAA Compliant

**Institutional Review Board for Baylor College of Medicine and Affiliated Hospitals**  
**Understanding the Experience of Interprofessional Team Members Participating in**  
**Comprehensive Obstetric Hemorrhage**

H-40184- UNDERSTANDING THE EXPERIENCE OF INTERPROFESSIONAL TEAM  
MEMBERS AFTER PARTICIPATING IN COMPREHENSIVE OBSTETRIC  
HEMORRHAGE TRAINING

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**Background**

You are invited to take part in a research study. Please read this information and feel free to ask any questions before you agree to take part in the study.

**Purpose**

The purpose of this research study is to understand the experience among members of the interprofessional obstetric team as part of implementing an obstetric hemorrhage protocol at the Pavilion for Women at Texas Children's Hospital. I will use the information I learn from this study to help the team sustain the improvements already made, and support further improvements in either the protocol or the factors that help the team implement the protocol.

**Procedures**

The research will be conducted at the following location(s):  
Baylor College of Medicine and Texas Children's Hospital- Women's Pavilion.

If you decide to participate in the study you will be asked to attend one focus group interview. The focus group interview will be done in person in a conference room located in the conference center at the Pavilion for Women (exact room to be determined). The focus group will be scheduled at various times of the day and day of the week to meet the needs of team members with various schedule. There will be multiple focus groups scheduled during which you can choose to participate.

The interview will discuss your experiences as a member of the Pavilion for Women in participating in training for the obstetric hemorrhage and massive transfusion protocols, and what actually recognizing and management an obstetric hemorrhage is like in the clinical environment. Your thoughts and perspectives as a member of the obstetric team will be invaluable in understanding how the team has achieved improvements in caring for patients experiencing an obstetric hemorrhage to date, and how we can make future improvements. I will use a question or topical guide to keep us on track during the interview, and make sure we ask important questions and give you ample opportunity to share your thoughts and perspectives. There is a possibility that something may get discussed during the interview that was not part of the interview guide, or about which clarification or a follow up discussion in private may be very helpful. If this happens, I will ask your permission to contact you over the phone to schedule a follow up discussion at a later time.

An audio-recording of the interview will be made during the focus group interviews, and during any follow up discussion if they are scheduled. Your name or identity will not be associated with the audio-recording. A written copy of the audio-recording will be made to help me review and analyze all the responses. Your name or identity will not be associated with the written copy of the audio-recording. The audio-recording will not be used for any other reason. It will be destroyed at the end of the study once all reviews and analyses are completed.

A written report of the information shared by members of the obstetrical teams who participate in the study will be completed and shared with the obstetrical teams. No names or personally identifying information will be used in the report. If you tell me something which I believe is of a serious nature, I will

**CONSENT FORM**

HIPAA Compliant

**Institutional Review Board for Baylor College of Medicine and Affiliated Hospitals  
Understanding the Experience of Interprofessional Team Members Participating in  
Comprehensive Obstetric Hemorrhage**

H-40184- UNDERSTANDING THE EXPERIENCE OF INTERPROFESSIONAL TEAM MEMBERS AFTER PARTICIPATING IN COMPREHENSIVE OBSTETRIC HEMORRHAGE TRAINING

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refer you to a member of the quality and safety team or the compliance hotline at Texas Children's Hospital.

The total amount of time you will take part in this research study is no longer than about two hours. If you agree to allow me to contact you should there be a need for another discussion, there may be another 30 to 60 minutes that will be needed. If you participate in a focus group and a follow up discussion, the total time commitment may be up to three hours.

**Research related health information**

Authorization to Use or Disclose (Release) Health Information that Identifies You for a Research Study

If you sign this document, you give permission to people who give medical care and ensure quality from Baylor College of Medicine and Texas Children's Hospital- Women's Pavilion to use or disclose (release) your health information that identifies you for the research study described in this document.

The health information that we may use or disclose (release) for this research includes:

- Photographs, videotapes, and/or audiotapes of you
- Other: Information listed on data form (Appendix C) to include: clinical role, yrs in role, work shift, gender, specialised training in OB hemorrhage, experience managing OB hemorrhage

The health information listed above may be used by and or disclosed (released) to researchers, their staff and their collaborators on this research project, the Institutional Review Board, Baylor College of Medicine, and Texas Children's Hospital- Women's Pavilion.

**Use or Disclosure Required by Law**

Your health information will be used or disclosed when required by law.

Your health information may be shared with a public health authority that is authorized by law to collect or receive such information for the purpose of preventing or controlling disease, injury, or disability and conducting public health surveillance, investigations or interventions.

Baylor College of Medicine and Texas Children's Hospital- Women's Pavilion are required by law to protect your health information. By signing this document, you authorize Baylor College of Medicine and Texas Children's Hospital- Women's Pavilion to use and/or disclose (release) your health information for this research. Those persons who receive your health information may not be required by Federal privacy laws (such as the Privacy rule) to protect it and may share your information with others without your permission, if permitted by laws governing them.

Please note that the research does not involve treatment. Baylor College of Medicine and Texas Children's Hospital- Women's Pavilion may not condition (withhold or refuse) treating you on whether

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**Understanding the Experience of Interprofessional Team Members Participating in**  
**Comprehensive Obstetric Hemorrhage**

H-40184- UNDERSTANDING THE EXPERIENCE OF INTERPROFESSIONAL TEAM  
MEMBERS AFTER PARTICIPATING IN COMPREHENSIVE OBSTETRIC  
HEMORRHAGE TRAINING

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you sign this Authorization.

Please note that you may change your mind and revoke (take back) this Authorization at any time. Even if you revoke this Authorization, researchers, their staff and their collaborators on this research project, the Institutional Review Board, regulatory agencies such as the U.S. Department of Health and Human Services, Baylor College of Medicine, and Texas Children's Hospital- Women's Pavilion may still use or disclose health information they already have obtained about you as necessary to maintain the integrity or reliability of the current research. If you revoke this Authorization, you may no longer be allowed to participate in the research described in this Authorization.

To revoke this Authorization, you must write to: Frances Kelly  
Texas Children's Pavilion for Women  
6651 Main street, E0315.34  
Houston, TX 77030  
[fkelly@texaschildrens.org](mailto:fkelly@texaschildrens.org)

This authorization does not have an expiration date. If all information that does or can identify you is removed from your health information, the remaining information will no longer be subject to this authorization and may be used or disclosed for other purposes.

No publication or public presentation about the research described above will reveal your identity without another authorization from you.

**Potential Risks and Discomforts**

Some people may find it difficult to talk about their experiences, thoughts, feelings, or perspectives regarding their role on an obstetric team involved in caring for a patient who has experienced a hemorrhage. You are free to skip any question or stop participating in the interview at any time.

Study staff will update you in a timely way on any new information that may affect your decision to stay in the study. There is a small risk for the loss of confidentiality. However, the study personnel will make every effort to minimize these risks.

**Potential Benefits**

You will receive no direct benefit from your participation in this study. However, your participation may help the investigators better understand Your participation may help the investigators and others better understand the experiences of obstetric team members when recognizing and managing an obstetric hemorrhage, as well as potentially improve the safety for future obstetric patients who experience a hemorrhage..

**Alternatives**

You may choose to not participate in this study.

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Understanding the Experience of Interprofessional Team Members Participating in  
Comprehensive Obstetric Hemorrhage****H-40184- UNDERSTANDING THE EXPERIENCE OF INTERPROFESSIONAL TEAM  
MEMBERS AFTER PARTICIPATING IN COMPREHENSIVE OBSTETRIC  
HEMORRHAGE TRAINING**

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**Subject Costs and Payments**

You will not be asked to pay any costs related to this research.

We will provide you with a meal voucher that may be used in the Pavilion for Women's Fresh Bistro (not to exceed \$10.00) in appreciation for your time in the interview, and your parking will be validated if you agree to participate in an interview when you are not already scheduled to be at the hospital.

**Subject's Rights**

Your signature on this consent form means that you have received the information about this study and that you agree to volunteer for this research study.

You will be given a copy of this signed form to keep. You are not giving up any of your rights by signing this form. Even after you have signed this form, you may change your mind at any time. Please contact the study staff if you decide to stop taking part in this study.

If you choose not to take part in the research or if you decide to stop taking part later, your benefits and services will stay the same as before this study was discussed with you. You will not lose these benefits, services, or rights.

The investigator, NANCY M HURST, and/or someone he/she appoints in his/her place will try to answer all of your questions. If you have questions or concerns at any time, or if you need to report an injury related to the research, you may speak with a member of the study staff: FRAN KELLY at 713-542-1945 during the day and after hours.

Members of the Institutional Review Board for Baylor College of Medicine and Affiliated Hospitals (IRB) can also answer your questions and concerns about your rights as a research subject. The IRB office number is (713) 798-6970. Call the IRB office if you would like to speak to a person independent of the investigator and research staff for complaints about the research, if you cannot reach the research staff, or if you wish to talk to someone other than the research staff.

**CONSENT FORM**

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**Institutional Review Board for Baylor College of Medicine and Affiliated Hospitals**  
**Understanding the Experience of Interprofessional Team Members Participating in**  
**Comprehensive Obstetric Hemorrhage**

H-40184- UNDERSTANDING THE EXPERIENCE OF INTERPROFESSIONAL TEAM  
MEMBERS AFTER PARTICIPATING IN COMPREHENSIVE OBSTETRIC  
HEMORRHAGE TRAINING

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Signing this consent form indicates that you have read this consent form (or have had it read to you), that your questions have been answered to your satisfaction, and that you voluntarily agree to participate in this research study. You will receive a copy of this signed consent form.

\_\_\_\_\_  
Subject Date

\_\_\_\_\_  
Investigator or Designee Obtaining Consent Date

\_\_\_\_\_  
Witness (if applicable) Date

\_\_\_\_\_  
Translator (if applicable) Date

*Appendix E*

Demographic Data Collection Tool



*H-40184 Understanding the Experience of  
Interprofessional Team Members After Participating  
in Comprehensive Obstetric Hemorrhage Protocol*  
Demographic Data Collection Form

**UTHealth**  
The University of Texas  
Health Science Center at Houston

Protocol approval number HSC-SN-17-0050

Participant Initials: \_\_\_\_\_ Study ID: HSC-SN-17-0050

Please mark the correct answer to the questions in the white boxes. (Shaded areas for study staff only)

Visit Number		Initials	Comments
Interview Date / /	<input type="checkbox"/> Consent Signed and Received		
Interview Time	<p><b>1. Role (check all that apply)</b>  <input type="checkbox"/> Nurse (<input type="checkbox"/> L&amp;D <input type="checkbox"/> WSU <input type="checkbox"/> Triage <input type="checkbox"/> M/B <input type="checkbox"/> Perioperative) (1)  <input type="checkbox"/> Physician (<input type="checkbox"/> Generalist OB/GYN <input type="checkbox"/> MFM <input type="checkbox"/> Anesthesiologist  <input type="checkbox"/> (transfusion medicine <input type="checkbox"/> intensivivist <input type="checkbox"/> resident) (4)  <input type="checkbox"/> Certified nurse midwife  <input type="checkbox"/> Certified nurse anesthetist  <input type="checkbox"/> Surgical technician (<input type="checkbox"/> L&amp;D • Perioperative) (3)  <input type="checkbox"/> Anesthesia technician (4)  <input type="checkbox"/> Blood bank (5)  <input type="checkbox"/> Laboratory (6)  <input type="checkbox"/> Respiratory Therapist (7)  <input type="checkbox"/> Pharmacist (or <input type="checkbox"/> Pharmacy technician) (8)  <input type="checkbox"/> Other (9)</p>		
	<p><b>2. Gender</b>  <input type="checkbox"/> Female (1)  <input type="checkbox"/> Male (2)</p>		
	<p><b>3. Years of Experience in Role</b>  <input type="checkbox"/> &lt; 1 year (1)  <input type="checkbox"/> &gt; 1-3 years (2)  <input type="checkbox"/> &gt; 3-5 years (3)  <input type="checkbox"/> &gt; 5-10 years (4)  <input type="checkbox"/> Greater than 10 years (5)</p>		
	<p><b>4. Shift Worked Most Often</b>  <input type="checkbox"/> Day shift (0700 - 1900) (1)  <input type="checkbox"/> Night shift (1900 - 0700) (2)  <input type="checkbox"/> Staggered shift (arrive at times other than 0700 or 1900) (3)  <input type="checkbox"/> Work day and night shifts (4)  <input type="checkbox"/> Other (5)</p>		
	<p><b>5. What Training did You Receive for Obstetric Hemorrhage (please check all that apply)</b>  <input type="checkbox"/> Classroom/lecture (1) <input type="checkbox"/> Simulation training (2) <input type="checkbox"/> APS/GNOSIS (3)  <input type="checkbox"/> Review hemorrhage protocol from email (4)  <input type="checkbox"/> Haven't participated in training (do not interview) (5)</p>		
	<p><b>6. Have you participated in managing an obstetric hemorrhage within past year?</b>  <input type="checkbox"/> Yes (1) <input type="checkbox"/> No (2) (do not interview)</p>		

*Appendix F*

Script and Questions for Focus Group Interviews

Welcome and Introduction: Thank you all for agreeing to participate in this important discussion. As you are probably aware, an interprofessional team at the Pavilion for Women has been focused on reducing preventable harm among obstetric patients, including that associated with obstetric hemorrhage. To help understand the impact of the team's current efforts, and to inform future efforts to improve the management of obstetric hemorrhage, I am interested in hearing about your experiences in caring for patients experiencing an obstetric hemorrhage.

Ice breaker: Before we begin the discussion, please introduce yourselves, your role, and how long you've working here at the Pavilion for Women.

General questions, possible probes (indented), and the sequence in which they will be asked include the following:

Please think back to a time when you participated in caring for a patient who had an obstetric hemorrhage. Please describe what that was like?

How was the hemorrhage recognized?

How was it managed?

Who else helps manage an obstetric hemorrhage? What roles do they fulfill?

How were you able to tell who was in charge of managing the hemorrhage?

What helped you to know what to do during the hemorrhage?

Be prepared to probe further about cognitive aids, any training, orientation, roles, what people do in the roles, role clarity, etc.

When new people join your team, what helps them to know what to do during an obstetric hemorrhage?

How is recognizing and managing an obstetric hemorrhage any different than managing other obstetric emergencies?

Please take a minute to think about an obstetric hemorrhage in which you were involved that you believe was managed well. What do you think made it go so well?

Please tell me more about that (depends upon the responses).

Conversely, please take a minute to think about an obstetric hemorrhage in which you were involved that you believe was not managed well. What do you think made it not go well?

Please tell me more about that (depends upon the responses).

As we begin to close out our discussion, I am very interested in hearing your thoughts and ideas about how we should move forward to further improve the obstetric hemorrhage program.

What do you believe has impacted or helped you the most as a team to care for an obstetric patient experiencing a hemorrhage?

What policies should guide the management of an obstetric hemorrhage?

What practices do you believe are important in managing an obstetric hemorrhage?

What education and training are important in preparing your team in managing an obstetric hemorrhage?

What teamwork (or other) skills are necessary to help the team effectively and efficiently manage an obstetric hemorrhage?

What barriers do you think may exist that would prevent us from implementing your recommended policies, practices, education and training, or teamwork skills that you believe are important in managing an obstetric hemorrhage here in the Pavilion for Women?

Is there anything else that you believe is important to talk about regarding managing an obstetric hemorrhage that we haven't already discussed?

Additional probes to consider using at appropriate times may include:

Please tell me more about that time.

What happened next?

That must be difficult to manage. Please tell me how that made you feel?

What are your thoughts about why this happens (or doesn't happen)?

*Appendix G*

Script and Questions for Individual Interviews

Welcome and Introduction: Thank you all for agreeing to participate in this important discussion. As you are probably aware, an interprofessional team at the Pavilion for Women has been focused on reducing preventable harm among obstetric patients, including that associated with obstetric hemorrhage. To help understand the impact of the team's current efforts, and to inform future efforts to improve the management of obstetric hemorrhage, I am interested in hearing about your experiences in caring for patients experiencing an obstetric hemorrhage.

General questions, possible probes (indented), and the sequence in which they will be asked include the following:

Please think back to a time when you participated in caring for a patient who had an obstetric hemorrhage. Please describe what that was like?

How was the hemorrhage recognized?

How was it managed?

Who else helps manage an obstetric hemorrhage? What roles do they fulfill?

How were you able to tell who was in charge of managing the hemorrhage?

What helped you to know what to do during the hemorrhage?

Be prepared to probe further about cognitive aids, any training, orientation, roles, what people do in the roles, role clarity, etc.

When new people join your team, what helps them to know what to do during an obstetric hemorrhage?

How is recognizing and managing an obstetric hemorrhage any different than managing other obstetric emergencies?

Please take a minute to think about an obstetric hemorrhage in which you were involved that you believe was managed well. What do you think made it go so well?

Please tell me more about that (depends upon the responses).

Conversely, please take a minute to think about an obstetric hemorrhage in which you were involved that you believe was not managed well. What do you think made it not go well?

Please tell me more about that (depends upon the responses).

As we begin to close out our discussion, I am very interested in hearing your thoughts and ideas about how we should move forward to further improve the obstetric hemorrhage program.

What do you believe has impacted or helped you the most as an individual to care for an obstetric patient experiencing a hemorrhage?

What policies should guide the management of an obstetric hemorrhage?

What practices do you believe are important in managing an obstetric hemorrhage?

What education and training are important in preparing you to manage an obstetric hemorrhage?

What teamwork (or other) skills are necessary to help you effectively and efficiently manage an obstetric hemorrhage?

What barriers do you think may exist that would prevent us from implementing your recommended policies, practices, education and training, or teamwork skills that you believe are important in managing an obstetric hemorrhage here in the Pavilion for Women?

Is there anything else that you believe is important to talk about regarding managing an obstetric hemorrhage that we haven't already discussed?

Additional probes to consider using at appropriate times may include:

Please tell me more about that time.

What happened next?

That must be difficult to manage. Please tell me how that made you feel?

What are your thoughts about why this happens (or doesn't happen)?

**CURRICULUM VITAE**  
**Frances C. Kelly, PhD, MSN, RNC-OB, NEA-BC, CPHQ, CPPS**

**EDUCATION:**

University of Texas, Houston, Texas	2017	PhD	Nursing
University of Texas, Houston, Texas	1992	MSN	Nursing
Houston Baptist University, Houston, Texas	1985	BSN (Summa cum laude) Nursing	

**PROFESSIONAL POSITIONS:**

Texas Children's Hospital Pavilion for Women Houston, Texas Director, Quality and Safety	July 5, 2011 to present
Harris County Hospital District (now Harris Health) Houston, Texas  Administrative Director of Nursing Women's and Infant's Services Ben Taub General Hospital (BTGH) Houston, Texas 553 Bed, Public, Not for Profit, Level 1 Trauma Center	May 27, 2008 to June 2011  February 2011 to June 2011
Administrative Director of Nursing Women's and Children's Services Ben Taub General Hospital, and Interim Administrative Director of Nursing Women's and Children's Services Lyndon B. Johnson Hospital (LBJ) 332 Bed, Public, Not for Profit, Level 3 Trauma Center	December 2009 to January 2011
Clinical Director of Nursing Women's and Children's Services Ben Taub General Hospital Houston, Texas	March 2009 to December 2009



Nurse Manager of Rooming-In and Well Nursery Women's and Children's Services Ben Taub General Hospital Houston, Texas	May 2008 to March 2009
Texas Woman's University School of Nursing Adjunct Clinical Nursing Faculty for OB	Fall 2008, 2009 and 2010; Spring 2009, 2010, 2011, and 2013; Spring 2016
University of Texas Health Science at Houston School of Nursing Adjunct Clinical Nursing Faculty for OB	Summer 2009 and 2010; Fall 2010
Memorial University Medical Center 530+ Bed, Private, Not for Profit, Tertiary Care Hospital Savannah, Georgia	June 2000 to May 2008
Clinical Director of Women's Services	April 2003 to May 2008
Clinical Nurse Manager of Women's Services	January 2002 to April 2003
Clinical Nurse Manager of L&D	June 2000 to January 2002
Southeast Georgia Regional Medical Center Brunswick, Georgia 316 Bed, Level II Perinatal, Community Hospital	
Clinical Nurse Specialist, Maternity Center	June 1996 to May 2000
Springhill Memorial Hospital Mobile, Alabama	June 1992 to May 1996
Assistant Director of Education and Development	January 1994 to May 1996
Maternal-Child Clinical Nurse Specialist	June 1992 to May 1996
Women's Hospital of Texas, Houston, Texas	March 1986 to May 1992
Nurse Manager, Labor & Delivery, and Antepartum	~ May 1991 to May 1992
Nurse Manager, Labor & Delivery	1989 to ~ May 1991
Staff Nurse, Labor & Delivery	March 1986 to 1989

St. Luke's Episcopal Hospital  
Houston, Texas  
Academic, Tertiary Hospital

September 1985 to February 1986

Staff Nurse, Medical-Surgical Intensive Care Unit

### **PROFESSIONAL MEMBERSHIPS:**

American Society of Professionals in Patient Safety (ASPPS) as part of National Patient Safety Foundation (NPSF)	2016 to present
American Nurse's Association (ANA)	2010 to present
Texas Nurse's Association (TNA)	2010 to present
Houston Organization of Nurse Executives (HONE)	2008 to present
Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) (previously NAACOG)	1990 to present
Sigma Theta Tau (STT)	1985 to present

### **CERTIFICATIONS:**

Certified Professional in Patient Safety, Certification Board for Professionals in Patient Safety	December 2016 to present
Certified Professional in Healthcare Quality, National Association of Healthcare Quality	July 2012 to present
Nursing Executive, Advanced, American Nurses Credentialing Center	November 2006 to present
Leadership Certificate, Nursing Leadership Academy, Memorial Health University Medical Center, Savannah, Georgia	2004
Pediatric Advanced Life Support/Instructor	1995 to 2000
Advanced Cardiac Life Support/Instructor	1994 to 2007
High Risk and Critical Care Obstetrics, University of Texas Medical Branch, Galveston, Texas and Vanderbilt University, Nashville, Tennessee (Now held by Thomas Jefferson University, Philadelphia, Penn.)	October 1992 to October 2001
Neonatal Resuscitation Provider, American Academy of Pediatrics and American Heart Association.	1990 to present
Inpatient Obstetrics, National Certification Corporation.	July 1989 to present
Basic Cardiac Life Support, American Heart Association	1985 to present

### **PUBLICATIONS:**

Kelly, F. C. & Swart, S. C. (2016). Caring for the laboring woman (Module 5). In B. B. Kennedy & S. B. Baird (Eds.), Intrapartum management modules (5th ed.), 90-116. Philadelphia, PA: Wolters Kluwer.

Swart, S. C. & Kelly, F. C. (2016). Pharmacologic management of labor pain (Part 2 of Module 6, Nonpharmacologic and pharmacologic methods of pain relief for the laboring woman. In B. B. Kennedy & S. B. Baird (Eds.), Intrapartum management modules (5th ed.), 117-141. Philadelphia, PA: Wolters Kluwer.

Wallin, K. D., Kelly, F. C., & Sembera, K. A. (2016). Building high reliability through simulation. In C. A. Oster & J. S. Braaten (Eds.), High reliability organizations. A healthcare handbook for patient safety & quality, 288-310. Indianapolis, IN: Sigma Theta Tau International Honor Society of Nursing.

Kelly, F. (2010). Keeping PEDIATRICS in pediatric disaster management: Before, during, and in the aftermath of complex emergencies. In D. Bjarnason (Ed.), Critical Care Nursing Clinics of North America, 22(4), 465-480.

### **ORAL PRESENTATIONS:**

Kelly, F. (2017, June). *The how and what of hospital fall prevention*. Webinar presented for Vizient, Alliant, Georgia Medical Care Foundation, Atlanta, Georgia.

Kelly, F. (2015, October). *OB triage: it's not first come first served anymore*. Podium presentation at the Symposia Medicus 29<sup>th</sup> Annual Fall Conference on High Risk Obstetrics, New Orleans, Louisiana.

Kelly, F. (2015, October). *Expectant versus active management of the third stage of labor*. Podium presentation at the Symposia Medicus 29th Annual Fall Conference on High Risk Obstetrics, New Orleans, Louisiana.

Kelly, F. (2015, October). *Creating and implementing a comprehensive quality and patient safety program*. Podium presentation at the Symposia Medicus 29th Annual Fall Conference on High Risk Obstetrics, New Orleans, Louisiana.

Kelly, F. (2015, June). *Beyond The Joint Commission's perinatal core measures: reducing pregnancy-related morbidity and mortality by implementing a comprehensive quality and patient safety program*. Podium presentation at the 2015 Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN) National Conference, Longbeach, California.

Kelly, F. (2015, May). *The true meaning of error prevention*. Podium presentation during Texas Children's Women's Service's Ambulatory Education Retreat, Houston, Texas.

Kelly, F. (2015, May) *Best practices in debriefing after an emergency in perinatal care*. Podium presentation at the 2015 Texas Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN) Conference, Conroe, Texas.

Kelly, F., Magliaro, B., Tyer-Viola, L., & Dildy, G. (2015, February). *Obstetric hemorrhage guideline and algorithm*. Webinar for Solutions for Patient Safety Collaborative: Obstetric Adverse Event Hospital Acquired Condition Pioneer Team.

Wallin, K., Kelly, F., & Sembera, Kerry. (2014, October). *Innovative use of high-fidelity simulation as an advanced quality improvement tool*. Podium presentation at the American Nurses Credentialing Center National Magnet Conference, Dallas, Texas.

Baird, S. & Kelly, F. (2014, June). *Preparing for potential neonatal compromise: intrapartum triggers and neonatal assessment*. Specialty program podium presentation at the 2014 Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN) National Conference, Orlando, Florida.

Kelly, F. (2014, June). *Nurse-facilitated communication: getting at the heart of patient safety*. Case studies in Quality and Safety podium presentation at the Leadership Summit on Perinatal Quality and Safety pre-conference for the 2014 Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN) National Conference, Orlando, Florida.

Kelly, F. (2014, April). *Defining a fair and just culture*. Invited keynote speaker for Nursing Leadership Retreat. Harris Health System. Houston, Texas.

Kelly, F. (2014, January). *Research problems, research questions, and hypotheses*. Research Scholars Program. Texas Children's Hospital. Houston, Texas.

Kelly, F. (2013, November). *Umbilical Cord Blood Gas Analysis*. Fetal Monitor II Course for the Houston Area Collaborative Perinatal Program (HACPP). Houston, Texas.

Kelly, F. (2013, October). *Daily leader safety brief: mobilizing the power of an interdisciplinary team*. Oral paper presentation at the 38<sup>th</sup> Annual National Association of Healthcare Quality (NAHQ) Educational Conference, Louisville, Kentucky.

Kelly, F. (2013, July). *Acid-Base Balance and Imbalance*. Oral presentation at the Critical Care Obstetrics Course. Texas Children's Hospital, Pavilion for Women, Houston, Texas.

Baird, S. & Kelly, F. (2013, June). *Obstetric triage: it's not first come, first served anymore*. Specialty program podium presentation at the 2013 Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN) National Conference, Nashville, Tennessee.

Kelly, F. (2013, June). *Daily leader safety brief: mobilizing the power of an interdisciplinary team*. Innovative program podium presentation at the 2013 Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN) National Conference, Nashville, Tennessee.

Kelly, F. (2013, April). *Preparing for high risk and complex perinatal patients*. Podium presentation at the Contemporary Forums National Obstetric Conference, New Orleans, Louisiana.

Kelly, F. (2013, April). *Active versus expectant management of the third stage of labor*. Podium presentation at the Contemporary Forums National Obstetric Conference, New Orleans, Louisiana.

Kelly, F. (2013, April). *Daily leader safety brief: enhancing communication, collaboration, and problem solving among members of interdisciplinary teams*. Podium presentation at the Contemporary Forums National Obstetric Conference, New Orleans, Louisiana.

Kelly, F. (2012, January). *Acid-Base Balance and Imbalance*. Podium presentation during the Critical Care Obstetrics Course, Texas Children's Hospital, Pavilion for Women, Houston, Texas.

Kelly, F. (2011, April). *Just culture - a pre-requisite for a culture of safety*. Podium presentation at the Texas Nurse's Association, District 9 Membership meeting, Houston, Texas.

Kelly, F. (2011, January and February). *Just culture - a pre-requisite for a culture of safety*. Podium presentation for the Lighting the Way Series for Ben Taub and Lyndon B. Johnson General Hospitals, Harris County Hospital District, Houston, Texas.

## POSTER PRESENTATIONS

Kelly, F., Kelly, B., Denning, S., and Magliaro, B. (2017, June). *Mobility readiness assessment: an innovative fall prevention program for obstetric patients*. Poster presented at the 2017 Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN) National Conference, New Orleans, Louisiana.

Dildy, G., Kelly, F., Timmins, A., Baker, B. W., Tyer-Viola, L, Hagan, J., Franco, M., Clark, S., & Belfort, M. (2017, January). *Developing a comprehensive quality and patient safety program to effectively reduce obstetrical adverse events in an integrated children's hospital system*. Poster presented at The 37th Annual Meeting of the Society of Maternal-Fetal Medicine, Las Vegas, Nevada.

Zhang-Rutledge, K., Eppes, C., Denning, S., Kelly, F., Dildy, G., Belfort, M. A., & Clark, S. L. Reducing the episiotomy rate – impact of the Hawthorne effect. Abstract presented at The 37th Annual Meeting of the Society of Maternal-Fetal Medicine, Las Vegas, Nevada.

Bhatt, A., Brand, C., Fortunov, R., Gallegos, J., Georgiadis, P., Gokulakrishnan, G., Humphrey, J., Hurst, N., Iniguez, S., Kainer, K., Kelly, F., Levy, B., Magliaro, B., Miller, G., Moore, M., Reyes, S., Sundgren, N., Suresh, G., Umbriaco, E., & Ybarra, N.

(2016, September). *A.S.K. U.S. How We Got SMART: Improving the Quality of Communication between Obstetrics and Neonatal Teams at Deliveries*. Poster presented during Texas Children's Hospital Quality Day, Houston, Texas.

McMullen, L., Leong-Kee, S., Kelly, F., Washington, C., & Franco, M. (2016, September). *Interdisciplinary Postpartum Hemorrhage and Transfusion. Simulation Program: Impact on Outcomes*. Poster presented during Texas Children's Hospital Quality Day, Houston, Texas.

Tyer-Viola, L. & Kelly, F. (2015, June). Reducing surgical site infection (SSI): find the right fit. Applying best evidence to your patient characteristics. Poster presented at the 2015 Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN) National Conference, Longbeach, California.

Kelly, F. & Weber, E. (2013, October). Ready, aim, fire! Triggers for proactively calling the neonatal response team. Poster presented at the 38th Annual National Association of Healthcare Quality (NAHQ) Educational Conference, Louisville, Kentucky.

#### **AWARDS AND RECOGNITION:**

2005 - Memorial Health University Medical Center, Savannah, Georgia: Firestarter Award.

2001 - Memorial Health University Medical Center, Savannah, Georgia: Annual Leadership Excellence Award.

2001 - Memorial Health University Medical Center, Savannah, Georgia: Ambassador Award for Allied Health Professions.