


Fall 12-13-2013

Lean Management Principles to the Creation of Postpartum Hemorrhage Care Bundles

Bethan Faulkner

University of San Francisco, bfaulkner@usfca.edu

Follow this and additional works at: <https://repository.usfca.edu/dnp>

 Part of the [Maternal, Child Health and Neonatal Nursing Commons](#), and the [Nursing Administration Commons](#)

Recommended Citation

Faulkner, Bethan, "Lean Management Principles to the Creation of Postpartum Hemorrhage Care Bundles" (2013). *Doctor of Nursing Practice (DNP) Projects*. 16.

<https://repository.usfca.edu/dnp/16>

This Project is brought to you for free and open access by the Theses, Dissertations, Capstones and Projects at USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. It has been accepted for inclusion in Doctor of Nursing Practice (DNP) Projects by an authorized administrator of USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. For more information, please contact repository@usfca.edu.

Applying Lean Management Principles to the Creation of PPH Care Bundles

Beth Faulkner DNP(c), MN, CCNS, RNC

University of San Francisco California

EL-DNP Degree Program

N789 Evidence Based Practice Change Final Project

December 2013

Table of Contents		
Section	Description	Page
I. Title and Abstract	Title Page	1
	Table of Contents	2-3
	Abstract	5
II. Introduction	Background	6
	Lean Applied to Healthcare	8
	Local Problem Identification (PICO)	11
	Intended Improvement	11
	Review of Evidence	12
	Conceptual/Theoretical Framework	17
	III. Methods	Methods
	Ethical Issues	20
	Setting	21
	Planning the intervention	24
	Implementation	25
	PDSA	31
	Analysis	32
IV. Results	Evaluation/Outcomes	34
	Monitoring Results	34
V. Discussion	Standardize and Sustain Processes	37
	Barriers/Limitations	38

	Conclusions	39
VI. Other Information	Cost Summary	41
	SWOT Analysis	42
	Acknowledgements	43
VII. References		44
VIII. Appendices	A: EBP Question Development Tool	50
	B: Evidence Based Practice Summary Tool	51
	C: Evidence Based Practice Synthesis and Recommendation Tool	57
	D: PQMS Principles “The House”	61
	E: LPCH Mission, Values and Vision Basic	63
	F: LPCH Performance Improvement Roadmap	64
	G: 5 P’s for Maternity	65
	H: Local Improvement Team Charter	68
	I: MESS Board	72
	J: Spaghetti Chart & Process Map	73
	K: Fishbone Diagram	74
	L: A3 for PPH LIT	75
	M: PPH Urgent Care Bundle Job Breakdown Worksheet	76
	N: Uterotonic Medications	
	O: Managing a Problem Effectively	78

P: Improvement Ramp With Standards	80
Q: PPH Urgent Care Bundle Implementation Improvements – First Test of Change	81
R: Rapid Process Improvement (RPI) Agenda	82
S: RPI LPCH Report Out DMS Progress	83
T: PPH Prevention Bundle MESS	84
U: PPH Prevention Bundle Standard	85
V: PPH Prevention Bundle Process Flow Diagram	86
W: DMS for PPH Prevention Bundle Task List	87
X: RPI PPH Prevention Bundle Follow Up Check List	88
Y: PPH Prevention Data Collection Tool	89
Z: Andon Tracker (escalation) and Process Checks	90
AA: PPH Prevention Bundle Audit Tool and Results	91
BB: RN Hand Off New Standard Audits	93
CC: PPH Simulation Pre and Post Survey Results	94
DD: PPH Simulation Evaluation Mean Scores	95
EE: Visibility Board for DMS/Gemba	98
FF: Total Number of PPH's for Vaginal Deliveries & C-Section Deliveries	99
GG: LIT Cost Breakdown and Projected Budget	101
II: SWOT Analysis	104
HH: Gantt Chart	105

Abstract

Postpartum hemorrhage (PPH) is the number one cause of pregnancy-related death in the US. The Maternity local improvement team (LIT), co-led by an Obstetrician and Board Certified Clinical Nurse Specialist found that each month the maternity unit averages 40 PPHs with 1-2 resulting in an emergency. Over a 6-month period, the LIT decreased response time for emergencies significantly. Supply retrieval time decreased by 99.9%, MD response time decreased by 81%, and Family Centered Care increased by 100%. They recently turned their attention to prevention. Given the lack of literature on preventing PPH in postpartum units, the team developed a PPH prevention *bundle*-a small set of evidence-based interventions enhancing teamwork and communication to improve patient outcomes. Dr. Crowe as the national lead for benchmarking obstetrical adverse events in the Solutions for Patient Safety collaborative will track the success of the PPH bundle, which could become the first national standard in prevention of PPH requiring a blood transfusion. The team targeted 100% compliance to bundle elements, with an ultimate goal of decreasing need for transfusion. Many problems have been encountered along the way, such as RN handoffs from Labor and Delivery as well as having appropriate staff to help new mothers to the bathroom for the first time, but the team has worked through them one-by-one. Through simulation training over a 6 month period, 100 RNs, MDs, and family representatives simulated the *bundle* approach. The PPH Prevention Bundle could become the first national standard in prevention of PPHs on a postpartum unit.

Key Words: Postpartum Hemorrhage, Care Bundles, Lean Management, Simulation, and Family Centered Care

Applying Lean Management Principles to the Creation of PPH Care Bundles

Healthcare today is changing at a rapid pace and converting from a volume-based fee-for-service structure to a quality, value-based pay-for-performance model. To maximize value and eliminate waste, health care leaders must evaluate processes by accurately specifying the value desired by the end user, typically the patient.

This can be accomplished by identifying every step in the process, referred to as *value stream*, which is a series of steps taken to provide the product, service and/or experience the customer desires. When applied rigorously and throughout the organization, lean principles can have a dramatic effect on productivity, cost and quality (IHI, 2005).

Background

Postpartum hemorrhage (PPH) is the leading cause of maternal death worldwide (Smith & Brennan, 2012). According to the World Health Organization (WHO, 2013), this is the case in both developing and developed countries. If unattended, PPH can be fatal even to a healthy woman within 2 hours. It is the quickest of maternal killers (WHO, 2013). The American College of Obstetricians and Gynecologists (2006) estimates that, worldwide, 140,000 women die of PPH each year—one every 4 minutes. More than half of all maternal deaths occur within 24 hours of delivery. All women who carry a pregnancy beyond 20 weeks gestation are at risk for PPH and its sequelae.

Childbirth is the number one reason for admission to the hospital in the United States (Institute of Healthcare Improvement {IHI}, 2012). There has been no decrease in maternal mortality in recent years and there is little progress in moving toward the U.S. government's *Healthy People 2020* target of no more than 11.4 maternal deaths per 100,000 live births (U.S.

Department of Health and Human Services, 2012). Postpartum hemorrhage is a driver of maternal mortality and has significant prevention opportunities.

Therefore, it is imperative that cross-functional multidisciplinary teams be created, along with equipment and support structures in place to manage this vulnerable patient population. Though the frontline practitioners will be the first to respond to a PPH, support from administrators and the healthcare management system is essential for successfully standardizing processes and ensuring optimal patient outcomes. Cross-functional care teams need to find new and better ways to work together to produce reliable change.

Although many risk factors have been identified and associated with PPH, it often occurs without warning. Moreover, there is considerable variation in the frequency of postnatal observations and management in various hospital facilities (Cameron, Roberts, Bell, & Fisher, 2007). Standardized, reliable high-quality postpartum management should be expected and provided regardless of where the patient is hospitalized.

The concept of *lean management* is most commonly associated with Japanese manufacturing, particularly the Toyota Production System (Liker, 2004). Lean management principles have been used effectively in manufacturing companies for decades, but are a relatively new concept in health care. However, according to the Institute for Healthcare Improvement (2005), lean principles can and already are being successfully applied to the delivery of health care.

The core idea of *lean* involves determining the value of any given process. The lean principles begin with driving out waste so that all work adds value and serves the customer's needs. The journey towards lean operations begins by identifying value-added and no value-added steps in every process (Liker, 2004).

Lean Applied to Health Care

A lean process is a set of actions or steps, each of which is accomplished properly, in the proper sequence and at the proper time to create value for the customer (IHI, 2005). Health care has been slow to identify the true customer—the patient. It is critically important that health care leaders use the primary customer to define the value of a service. A perfect process creates precisely the right value for the customer. Every step generates value for the customer, produces an optimal result every time, mitigates delay, is flexible, and links by continuous flow. Failure in any of these dimensions produces some type of waste (IHI, 2005).

Macrosystem

The health industry is moving from a volume-based reimbursement system (fee-for-service) to a value-based system (payment based on highest quality at the lowest cost) (Lucille Packard Children’s Hospital, 2012). The macrosystem is a large system within which microsystems are contained. In the health industry, the macrosystem develops the culture of care based on the organizational mission, vision and values working to improve healthcare from the outside in.

An executive level management team that is aligned in its vision and understanding of lean is a critical foundation for successful implementation of lean principles. Implementing lean thinking requires major change management throughout an organization, which can be very difficult to accomplish in health care because it is a different way of looking at process improvement. The Chief Executive Officer must be a vocal, visible champion of lean management and create an environment where it’s permissible to fail, set stretch goals and encourage “leaps of faith” (IHI, 2005).

In order to deliver an extraordinary experience for patients and their families, lean management principles must incorporate a family-centered (customer-focused) management and improvement system for making work simpler, more effective, and safer. The everyday works of the unit based multidisciplinary team needs to directly and measurably support organizational goals to increase patient satisfaction and safety, improve outcomes, engage employees, decrease waste and increase efficiency.

Mesosystem

Mesosystem is the level of management between the local unit leadership (microsystem) and the executive level leadership (macrosystem). The daily management system (DMS) operates at the mesosystem level and is based on the lean philosophy of making problems and improvements a visible and active part of daily work and culture. The clinical outcomes and satisfaction of patients and families are the primary measures of value, and every employee is empowered as a problem-solver and problem-preventer. All levels of leadership are focused on providing support and coaching at the frontlines as their primary role, with every problem viewed as an opportunity. The multidisciplinary team utilizes the DMS to design and refine the simplest, safest and most reliable process for patient care. The DMS makes the patient the focus of all improvement-mapping the patient experience from start to finish, identifying opportunities for continuous improvement, making changes in response to data and measuring success.

Microsystem

A valuable part of the DMS includes the microsystem-focused Local Improvement Team (LIT), whose ongoing cross-functional and multidisciplinary group focuses on improving the quality of care and safety for patients in their local working environment. The LIT analyzes performance gaps, sets strategic goals, prioritizes complex problems and creates standards. The

LIT becomes the mechanism for improvement within each individual unit. Administrative support at the mesosystem level creates the conditions for success and solves problems identified by the LIT. While the macrosystem level provides the direction and cultural mindset focused on patient and family-centered care as the primary goal, the LIT on the frontline contributes to overall success of the organization and health care delivery from the point of patient and family contact.

Applying Lean Principles to PPH Management

There has been no decrease in maternal mortality in recent years and there is little progress in moving toward the U.S. government's *Healthy People 2020* target of no more than 11.4 maternal deaths per 100,000 live births (U.S. Department of Health and Human Services {USDHSS}, 2012). Between 1996 and 2006, the rate of maternal deaths in California virtually tripled from 6 per 100,000 to 17 per 100,000 (Lyndon et al., 2010). In African-American women, that increase in rate was far greater; 28.7 to 54.9 per 100,000 live births (Lyndon, et al., 2010). The California Pregnancy Related Maternal Mortality Review (CA-PAMR) found that postpartum hemorrhage (PPH) was one of the leading causes for maternal death in CA and a major contributor to maternal morbidity (Lyndon et al., 2010). Morbidity rates have remained constant and include massive transfusions, secondary surgical procedures, ICU admission and loss of fertility (Lyndon et al., 2010).

Tragically, deaths from PPH consistently rank at the top of the most preventable list; with 70-92% of deaths considered preventable (Lyndon et al., 2010). While efforts to standardize treatment abound, relatively few institutions have created a systematic PPH protocol for early recognition and rapid response (Lyndon et al., 2010). Therefore it is imperative that cross-functional teams be formed, with equipment and support structures in place to manage this

significant patient population. Though the frontline practitioners will be the first to respond to a PPH, support from executive leadership and the local mesosystem DMS is essential for successfully standardizing processes and ensuring optimal patient outcomes. Cross-functional care teams need to find new and better ways to work together to produce reliable change.

Local Problem Identification and Intended Improvement

Despite ongoing staff education on management of PPH on the postpartum unit the Patient Care Manager on the postpartum unit received several patient and family complaints related to management of PPH and lack of confidence in staff response. In addition, several patient safety event reports were received from staff related to ineffective management of PPH. Anecdotal evidence from observation and debriefings following *OB STAT* PPH episodes also indicated a lack of standardized effective response. Moreover, the frequency of patients experiencing a PPH on the postpartum unit is on average 8.6 per week (clinically defined as > 500 ml of blood loss for a vaginal delivery and > 1000 ml of blood loss for a C-section).

PICO Components

The first element *P* indicates patient, population, problem post-partum women recovering on a high acuity maternity unit one hour or more post-delivery all of whom are at risk for PPH. Couplet care (mother-baby) staffing model is practiced and the unit has 52 adult beds, an average daily census of 39 postpartum mothers and 31 infants (excluding infants admitted to the NICU) and on average 4800 births per year. Target staffing ratio is 4 couplets to one nurse (8 patients).

The intervention is the *I*. The early recognition and effective rapid response to PPH

The *C* is current practice-no standardized protocols in place for early recognition and management of PPH. The rapid response to PPH is chaotic without clearly defined roles; supplies are in multiple places and are difficult to find in an emergency causing a delay in patient

care. Variation in practice has been observed, unsatisfactory outcomes identified through patient/family complaints and patient safety event reports.

The final element *O* is the outcome which includes improved patient and family satisfaction indicated by our patient satisfaction surveys (Press Ganey), no patient complaints related to PPH, no patient safety events related to PPH, decrease in need for blood transfusions, decreased length of stay for PPH patients, improved interdisciplinary team management and communication measured by results of interdisciplinary debriefings, standardized management consistently practiced, able to implement protocols quickly producing better patient outcomes as measured by fewer complications from PPH's. Benchmarking with other like facilities to compare outcomes.

Review of Evidence

Evidence Based Practice Question

Through the PICO process the EBP question was developed. What are the best practices on inpatient postpartum units to effectively and safely manage postpartum hemorrhage? Refer to Appendix A for the EBP question development tool.

Evidence Search Strategy

Initial search terms included postpartum hemorrhage, management of PPH, patient safety, and standards for PPH management, maternal bleeding, care bundles, and guidelines. Databases searched included The Cochrane Library Database of Systematic Reviews, The Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed (which also searches MEDLINE), and Google Scholar, WHO, American College of Obstetrics and Gynecology (ACOG), and the Institute of Healthcare Improvement (IHI).

Search operators for Boolean AND, OR, and NOT to combine and exclude concepts such as PPH AND management AND effective, PPH OR maternal bleeding and standards OR best practices, PPH AND postpartum unit. Limiters included Scholarly Peer Reviewed Journals and published dates from 2005-2012. Source types were Academic Journals and other searches were done by type and at times by author or specific name of article. Analysis of the resulting articles focused on effective management. Further searches reviewed each title and subject for publications that focused on effective management and/or early recognition of PPH on the postpartum unit as opposed to in the delivery room during the third stage of labor.

As articles were chosen and saved in a review folder each abstract was reviewed for content that could help answer the EBP question. Articles were specifically searched for Randomized Control Trials and Meta-Analysis but many of these did not address content that would help answer the EBP question. Additionally the search included professional organization websites including ACOG, WHO, IHI and organizational resources from within the healthcare system. The resulting evidence included the following: standards/guidelines, expert opinion, patient/family preferences, clinical expertise, organizational data, organizational constraints, culture, daily management systems, methods, and supply management.

Postpartum Hemorrhage

Childbirth is the number one reason for admission to the hospital in the US (U.S.) (IHI, 2012). PPH is the leading cause of maternal death worldwide. More than half of all maternal deaths occur within 24 hours of delivery, most commonly from excessive bleeding. All women who carry a pregnancy beyond 20 weeks gestation are at risk for PPH and its sequelae. In the United States the direct pregnancy-related maternal mortality rate is approximately 7-10 women per 100,000 live births. National statistics suggest that approximately 8% of these deaths are

caused by PPH. In the developing world maternal mortality rates can reach in excess of 1000 women per 100,000 live births, and the World Health Organization (WHO) statistics suggest that 25% of maternal deaths are due to PPH. (Smith & Brennan, 2012). The American College of Obstetrics and Gynecologists (2006) estimated that, worldwide, 140,000 women die of postpartum hemorrhage each year-one every four minutes. According to the National Center for Health Statistics of the Centers for Disease Control and Prevention (2006) the national maternal mortality rate was 13.3 deaths per 100,000 live births. There has been no decrease in maternal mortality in recent years and it is not moving toward the U.S. government's *Healthy People 2020* target of no more than 11.4 maternal deaths per 100,000 live births (USDHHS, 2012). According to the California Pregnancy-Related and Pregnancy Associated Mortality Review Committee, in CA, hemorrhage and complications of pre-eclampsia have been the drivers of maternal mortality and both have significant prevention opportunities (The Joint Commission, 2010).

Maternal deaths could be just the tip of the iceberg and a signal that there are bigger problems beneath the surface, some of which are preventable. For every woman who dies, there are 50 others who are very ill, suffering significant complications of pregnancy, labor and delivery. For 1991 through 2003, the morbidity rate in the US for severe complications and conditions associated with pregnancy was 50 times more common than maternal death (Callaghan, MacKay, & Berg, 2008). Serious sequelae following PPH include adult respiratory distress syndrome, coagulopathy, shock, loss of fertility, and pituitary necrosis. Many risk factors have been identified and associated with PPH but it often occurs without warning. Moreover, there is considerable variation in the frequency of postnatal observations and management in various hospital facilities (Cameron, Roberts, Bell, & Fisher, 2007).

Standardized reliable high quality postpartum management should be expected and provided regardless of where the patient is hospitalized.

Lean Quality Management System

The Institute of Medicines (IOM, 2001) report, *Crossing the Quality Chasm*, states healthcare today harms too commonly and routinely fails to deliver its potential benefits. The report suggests that bringing state-of-the-art care to all Americans in every community will require a fundamental redesign of the nation's health system. Currently it is poorly organized, overly complex, and unable to meet the challenges at hand. The IOM report recommends six aims for improvements which are built around the core need for healthcare to be safe, effective, patient-centered, timely, efficient, and equitable.

Therefore it is imperative that cross-functional teams be formed with equipment and support structures put in place to manage this significant maternal patient population. Though the frontline practitioners will be the first to respond to a PPH, support from administrators and the healthcare management system is essential for successfully standardizing processes and ensuring optimal patient outcomes. Cross-functional care teams need to find new and better ways to work together to produce reliable change.

Lean management principles have been used effectively in manufacturing companies for decades. The IHI (2005) explains that lean principles can and already are being successfully applied to the delivery of health care. The concept of *lean management* is most commonly associated with Japanese manufacturing, particularly the Toyota Production System (TPS). The core idea of *lean* involves determining the value of any given process. The lean principles begin with driving out waste so that all work adds value and serves the customer's needs. Identifying value-added and non-value-added steps in every process is the beginning of the journey toward

lean operations. To maximize value and eliminate waste, leaders in health care must evaluate processes by accurately specifying the value desired by the user, identifying every step in the process referred to as *value stream* and making value flow from beginning to end based on the needs of the customer/patient. When applied rigorously and throughout the organization, lean principles can have a dramatic effect on productivity, cost, and quality.

Translation

Level I evidence is limited in regard to pertinent findings to the EBP question and the majority of evidence is rated as Level IV. Refer to the Evidence Based Practice Summary Tool which summarizes much of the evidence used to support the recommendations Appendix B and the Evidence Based Practice Synthesis and Recommendation Tool that provides recommendations based on evidence synthesis and selected translation pathway based on level of evidence Appendix C (The Johns Hopkins Hospital/The Johns Hopkins University, 2012). However, the overall quality of the available evidence is high. Hence, a practice change is recommended but due to the level of evidence the initial stage should include a small scale attempt at change at the microlevel before deciding to implement the full-scale macro level.

The practice change recommendation includes forming an interdisciplinary team to begin working on the EBP question, evaluating current state and completing a root cause analysis. To promote the practice change the team needs to focus on early identification of PPH through the implementation of the PPH *Prevention Bundle* and the PPH *Care Bundle* for rapid, effective management of an acute PPH. Care bundles are a small set of evidence-based interventions for a defined patient population and setting that, when implemented together, will result in better outcomes than when implemented independently (Resar, Griffin, Haraden, & Nolan, 2010). The LIT similarly needs to develop metrics to ensure sustainability and measure improved outcomes.

Moreover, the LIT is responsible for determining the fit, feasibility, and appropriateness of recommendations for the translation path (Dearholt & Dang, 2012). The team should assess organizational readiness and strategically plan for building the capacity of the organization and unit to support the change before implementation can begin.

In situ PPH simulations will help to serve as mini tests to determine where the need for change exists and the effectiveness of the created bundles. Additionally, the EBP recommendations will be incorporated into the microsystem postpartum unit daily management system (mesosystem), which will bring visibility and accountability of the EBP standards. Hence, the upper level management (macrosystem) will be aware of-and instrumental in-supporting the structure at each level.

Conceptual/Theoretical Framework

Eight-stage process of creating major change

The methods used in successful transformations are all based on one fundamental insight: that major change will not happen easily. This occurs for many reasons such as inwardly focused cultures, paralyzing bureaucracy, parochial politics, a low level of trust, lack of teamwork, arrogant attitudes, a lack of leadership in middle management, and the general human fear of the unknown (Kotter, 1996). To be effective, a method designed to alter strategies, reengineer processes, or improve quality must address these barriers and address them well.

Kotter (1996) developed an eight-stage process of creating major change. Each stage is associated with the eight fundamental errors that undermine transformation efforts. These common errors include allowing too much complacency, failing to create a powerful guiding coalition, underestimating the power of vision, under communicating the vision, permitting

obstacles to block the new vision, failing to create short-term wins, declaring victory too soon, and neglecting to anchor changes firmly in the organizational culture.

The eight stages all build on each other and are effective when implemented sequentially. The stages include (1) establishing a sense of urgency, (2) creating the guiding coalition, (3) developing a vision and strategy, (4) communicating the change vision, (5) empowering broad-based action, (6) generating short-term wins, (7) consolidating gains and producing more change, and (8) anchoring new approaches in the culture (Kotter, 1996).

The focus of this framework is to change underlying behavior and build empowerment of employees. The idea is to focus on vision and strategies and not in terms of hierarchy and management. According to, Kotter (1996), successful transformations are 70-90 % leadership and only 10-30 % management. Leaders establish direction, align people, and motivate them to overcome barriers to change.

The Cycle of Leadership Valor

The steps in the leadership framework established by Catherine Robinson-Walker (2013) include (1) initiate, (2) illuminate, (3) curate, and (4) integrate. The first step, initiating self-awareness, is necessary to moving forward as a leader. This step involves taking a moment to reflect on the current situation rather than respond immediately.

The second, *illuminating*, is comprised of three levels of reality: (a) the essence of who you are as a leader and what is important, (b) consensus of the facts and a focus on the data available, and (c) dreaming-the vision you have for the future. Also, being able to recognize *seductions* that interrupt leadership valor is an important part of illumination. A leadership seduction is an unconscious temptation, habit, or operating strategy that is not helpful in the current situation (Robinson-Walker, 2013).

According to Robinson-Walker (2013) the six seductions include (A) “I am right”, (B) storytelling (a distorted account of an actual event), (C) checking out (resigned or disengaged), (D) being distracted, (E) constantly saying no, and (F) “it’s all about you”.

Step three is being a *curator*, one who actively selects the leadership qualities and skills that are most important and relevant at the time. The curator creates a plan and chooses how to implement and calibrate the approach. The key to this step is about planning with a deeper appreciation of who you are and adjusting leadership according to the circumstances.

Lastly, step four is identifying what worked, what was less successful, and what changes need to occur the next time. This is a key step and allows the leader to learn from experience and not repeat mistakes. Taking this last step prepares the leader to access the cycle again with greater wisdom, self-awareness, and clarity.

These four steps encompass the Cycle of Leadership Valor, enabling one to lead courageously. Additionally, they supply the tools to support and sustain you as a valiant leader rather than opt for the *mini loop of expediency*, reacting immediately to a situation in order to resolve it quickly. Leadership *valor* is when a leader exhibits bravery, integrity, is focused, committed to increasing self-awareness, able to learn and change, willing to practice new behaviors, and can release attitudes and thoughts that no longer serve them.

Leadership, change and proposed strategic innovation plan.

My proposed strategic innovation plan utilizing the LIT would benefit from both the change and leadership frameworks described above. Healthcare today is changing at a rapid pace. Healthcare executives need to implement Kotter’s (1996) eight-stage process of creating major Change if we are to not only survive but also thrive in this new environment. It’s imperative that we are able to create better performance through customer- and productivity-

oriented behavior, more and better leadership, and more effective management (Kotter, 1996).

We will need to have courage, or valor, in their leadership to be able to articulate the connections between new behaviors and organizational success. Building sustainability in lean processes will require significant cultural change and a strong leader who follows the four steps described in the Cycle of Leadership Valor (Robinson-Walker, 2013).

Methods

The design points of my strategy include organizational transformation, maximizing value, sustainability, leadership training and a unique approach to healthcare management. Applying Kotter's (1996) eight-stage process of creating major change and Robinson-Walker's (2013) cycle of leadership valor frameworks to the lean consulting strategic plan will facilitate the company's alignment with its stated mission, vision, values and goals. Such alignment will allow for a standard to evaluate attainment of objectives, creating a platform for success and sustainability.

Ethical Considerations

The University of San Francisco determined this project was a quality improvement project that does not include research on human subjects and therefore did not require full internal review board approval.

Autonomy is the agreement to respect another's right to self-determine a course of action and support of independent decision-making. This ethical principle is central to nursing care. In clinical situations nurses should respect a patient's autonomy, such as whether she wishes to receive a blood transfusion when one is deemed necessary to sustain life. This is an important consideration when working with PPHs.

Beneficence is the core principle of our patient advocacy and applies when we feel it would be harmful for the patient to not receive appropriate preventative care as well as interventions such as blood transfusions when deemed necessary to sustain life. Nonmaleficence is when we feel obligated to do no harm to our patients. These ethical dilemmas will be issues that need to be addressed at times when caring for new mothers. The need to balance autonomy with beneficence and nonmaleficence is imperative for the frontline RN, advanced practice nurse, and MD when caring for obstetrical patients.

Setting and Authorization of the Project

The project is being implemented at Lucille Packard Children's Hospital at Stanford (LPCH) in the Johnson Center for Pregnancy and Newborn Services. The labor and delivery department consists of 10 labor/delivery/recovery rooms, three operating rooms, three short stay/triage rooms, and three post-anesthesia care unit beds. LPCH delivers approximately 4800 babies per year. The postpartum unit is 52 adult beds divided between two floors, units F1 and F2. Of those 52 beds, 12 are dedicated to antepartum patients and 40 are postpartum beds. Refer to (Appendix D) for the 5 Ps (Purpose, Patients, Patterns, Processes, and Professionals) of the maternity unit. The postpartum patients often fall into the category of higher acuity, with many experiencing acute or chronic medical conditions that require treatment irrespective of pregnancy. Additionally, they are transferred from labor and delivery while still within the recovery period requiring close monitoring for potential PPHs. The average daily census is 39 mothers and 31 babies. PPH's currently occur at a rate of 11 per week (defined as >500ml blood loss for vaginal delivery and >1000ml blood loss for caesarean deliveries).

The project continues to receive support from all levels of the organization and is strategically aligned with the Packard Quality Management System (PQMS). The launch of the

PQMS was in 2011 and is based on implementing lean principles. The PQMS for Lucille Packard Children's Hospital at Stanford (2012) is a patient and family-centered management and improvement system based on the lean principles for making work simpler, more effective and safe ensuring that every patient's and family's outcome and experience is extraordinary. The basic principles include respect for people, innovation and education, service, affordability and quality which all work together to deliver extraordinary family-centered care (Appendix D).

The PQMS aligns with and supports the mission and vision of LPCH (Appendix E). The everyday work needs to directly support the organizational goals to increase patient satisfaction and safety, improve outcomes, engage employees and increase efficiency. The PQMS is LPCH's form of *lean system management* and was launched in 2011 (Appendix F) and will help realize the highest value for patients and families. Over the past 50 years, businesses and hospitals that have transitioned to management systems like PQMS have substantially grown their industry leadership in the face of economic and competitive challenges secondary to the lasting improvements they have made (LPCH, 2012).

The DMS and visual management bring structure, clarity, and efficiency to systems that are currently overburdened and chaotic. The PQMS is a sustainable *lean management system* that makes problems and improvements a visible and active part of the daily work and culture.

The results of the PQMS are the following:

- The clinical outcomes and satisfaction of patients and families are the primary measures of value.
- Every employee is empowered as a problem-solver and problem-preventer.
- Every level of leadership is focused on providing support and coaching as their primary role.

- Every problem is treasured as an opportunity (LPCH, 2012).

Staff and physicians at LPCH will use the PQMS to design and refine the simplest, safest, and most reliable processes for patient care. Making the patient the focus of all improvement, the PQMS helps to map the entire patient experience (value stream) from start to finish and on a daily basis identify opportunities for improvement, make changes and measure success (LPCH, 2012).

Monthly *report outs* are live events that focus on the details of how the PQMS is being applied in various units throughout the hospital. Report outs provide an opportunity for the LIT to consider what worked and what did not work with each PQMS project, to share ideas for continued improvement, and to see the real and lasting changes that PQMS is making in how the work is managed at LPCH.

The maternity unit LIT PPH project plans were reported out to executive leaders and department administrators at LPCH. Included were the Chief Executive Officer (CEO), Chief Operating Officer, Chief Medical Director of Performance Improvement, Chief Nursing Officer & Vice President of Patient Care Services among many others on the leadership teams at LPCH. The report was presented by the LIT Co-Leaders, Director of the Johnson Center and the Unit Patient Care Manager. The Maternity LIT was the first LIT at LPCH to receive the Toyota 8-step problem solving training and to launch their first project using A3 problem-solving, in addition to the IHI's microsystems based tools (IHI, 2005). Moreover, the CEO presented a written report of the integration of the maternity LIT fully into the PQMS to the LPCH Board of Directors. There is significant institutional support for this innovative project.

Planning the Intervention

Forming the Local Improvement Team

Creating the perfect process begins by identifying the core processes, or *value streams*, within the organization and particularly in the local unit microsystem. On the postpartum unit PPH management is identified as a core process that has a significant impact on patient outcomes. This high acuity postpartum unit (receiving up to, 4800, maternal/infant couplet admissions per year) is one that manages patients with a high level of complexity. The IHI (2012) recommends the creation of cross-functional multidisciplinary teams with all stakeholders included to ensure success.

The members of the LIT developed for the PPH process improvement project included the following: Obstetrical MD, Co-Lead; Board Certified Clinical Nurse Specialist, RN, Co-Lead; Patient Care Manager, RN; Department Director, RN, Quality Manager, RN; Performance Improvement Director, RN; Director of Performance Improvement and Patient Safety, MD; Performance Improvement Intern, Obstetrical PharmD; Patient and Family Counsel Representative, PhD; Documentation Specialist; Analyst; Unit Based RN Educator; Assistant Nurse Manager for Days, RN; Assistant Nurse Manager for Nights, RN; and the Staff RNs on the maternity unit of LPCH.

Initial training in the PQMS principles utilizing a three-day in house workshop held in June of 2012. The training was “home grown” by the Performance Improvement department and based on IHI and Lean methods and tools. The agenda for the three-day training and the LIT group charter (Appendix H) established group norms and respect for the input of all members. Brainstorming and multi-voting proved to be a successful strategy to encourage involvement from all group members.

Lean Systems Management Study Trip

Key members of the LIT along with LPCH executive leadership attended an intense four day Lean Systems Study trip to Salt Lake City, Utah, visiting Autoliv Manufacturing Company, as well as Seattle Children's Hospital and Seattle Children's Hospital Research Institute in Seattle, WA. The trip objectives were to study the successful integration of lean principles into daily operations, and to recognize barriers and countermeasures that arise in the lean journey. Visual management tools are an important aspect of the lean principles where those out on the frontlines can easily communicate process barriers that need countermeasures. The benefits of this trip included improved knowledge and buy in from key stakeholders and top administrators in the lean journey.

Daily Management System

DMS is an important aspect of the lean journey. In order for LIT's to be successful they have to have the operational support of the DMS. DMS is when key interdepartmental executives and managers round each day at the visibility board (includes all the information needed for the rounds) on the front lines ensuring that the *methods, equipment, supplies, and staff* (MESS) are working effectively and efficiently (Appendix I). This ensures communication of problems to leadership who can coach, provide countermeasures and remove barriers for the frontline staff.

Implementation of the Project

Identification of Problem and Current State

Postpartum hemorrhage is identified as a high risk and low volume core process on the postpartum unit. The LIT began by mapping the process in its current state specifying value from the standpoint of the customer as well as waste. Going out to the *gemba*, or the frontlines, in

order to observe where the work is done is an important element of the lean way in order to grasp the current state of the problem (Rother, 2010). The frontlines are where the work is done, problems are identified and solutions realized.

An *in situ* simulation of a PPH emergency (OB STAT) simulation was initiated on the maternity unit without prior warning to the multidisciplinary team throughout the Johnson Center. The objectives included observation of the process, utilization of supplies, team communication and timing. A spaghetti chart and process map (Appendix J) demonstrated. The LIT held a debriefing session with the multidisciplinary team that responded to the simulation to discuss team communication, role clarity and overall effectiveness.

Major findings included the following: (a) the PPH supply box was difficult for one person to retrieve, and supplies were jumbled and difficult to find; (b) it took five minutes for the first MD to arrive (no value added to the customer, so determined as *waste* in the process), (c) Staff roles were unclear since three people searched for supplies and medication by three people searching for the same supplies or medication; (d) no one documented the interventions; (e) there was no identified team leader, resulting in chaos; (f) similarly, there was confusion over whose responsibility (MD vs. RN) it was to activate the massive transfusion guideline (MTG); (g) further, there was a malfunction in the medication dispensing system, and there was no standing PRN orders for the first line medication. no one addressed the family member to let them know what was going on with their loved one; (h) communication problems and confusion occurred regarding names of supplies; (I) a medication- dispensing system malfunction; and h) no standing PRN orders for first-line medication administration. Finally, no one addressed the family members to let them know what was going on with their loved one.

Root Cause Analysis

A fishbone diagram summarized the core problem issues that emerged with materials, process methods, people, and environment (Appendix K). For each problem identified, the lead RN and MD facilitated the group and asked the question *why?* The team repeatedly asked *why* to get to the root of the problem. As problems were identified, the LIT prioritized and worked to break down the problem further. Numerous process issues were identified, confirmed by observation, and then prioritized in order to highlight which of them provided the greatest value to the customer.

The lean management approach states that any identified process issue an organization faces should be captured on a single sheet of paper. The term *A3* refers to an international-size piece of paper that is approximately 11-by-17 inches. An analysis on a single *A3* typically includes the following elements: title, owner/date, background, current conditions, goals, targets, analysis, proposed countermeasures, plan, and follow-up (Shook, 2010). Templates for the *A3* can be found on the Lean Enterprise Institute website (Shook, 2009).

The *A3* is meant to be an initial analysis of the problem and is continually adjusted as the team works through the causes, targets and countermeasures. The LIT determined the need to capture PPH current state process on an *A3*. One owner of the process was chosen by the LIT and identified as the RN, CCNS co-lead; the executive sponsors were the chief nursing officer and the director of the maternity area. All LIT members developed the *A3* and continued to revise it as the process moving forward (Appendix L). Through the root cause analysis, the LIT identified that the most critical problem in the process was the initial RN management of the PPH within the first 5 minutes prior to MD and OB STAT team arrival on the postpartum unit.

Setting Aim and Target

The goal of the project is to develop a standardized, reliable method for the multidisciplinary team to follow that is consistent and leads to improved processes and patient outcomes.

Postpartum hemorrhage is defined as blood loss > 500 ml following vaginal delivery, or > 1,000 ml following cesarean delivery. While a loss of these amounts within 24 hours of delivery is termed early or primary PPH (Smith & Brennan, 2012), estimates of blood loss at delivery are subjective and generally inaccurate.

Another consideration is the differing capacities of individual patients to cope with blood loss. Though there are identified risk factors placing patients at risk for PPH, frequently there are no indications prior to the episode. Hence, this is a major patient safety concern, so the care process is a priority in delivering the greatest value to our customer-the patient.

Develop Countermeasures

Reliable Method

In 2001 the IHI developed the *bundle* concept to improve critical care processes to the highest levels of reliability, which hypothesized positing improved patient outcomes. The theory is that enhancing teamwork and communication among multidisciplinary teams would create optimal conditions for safe and reliable care. *Care bundles* are a set of evidence-based interventions for a defined patient population and care setting that, when implemented together, will result in significantly better outcomes than when implemented individually (Resar, Griffin, Haraden, & Nolan, 2012).

The goal of the care bundle approach is to pull together the short list of interventions and treatments that are already recommended in national guidelines and by local consensus of

clinicians as appropriate care for the population of focus (Resar, et al., 2012). The idea is to include only those interventions that clinicians accept as being applicable to most patients in the population. This allows the team to move forward with improvement, rather than spending time debating the validity of the interventions.

According to IHI (2012), bundles and the all-or-none measurement (100 % compliance of the entire bundle as opposed to measuring individual bundle element compliance) change the way care is provided in the following ways: (a) bundles change the assumption that evidence-based care is being delivered reliably, (b) they promote awareness that the entire care team must work together in a system designed for reliability, and (c) bundles promote the use of improvement methods to redesign care processes. The goal of using bundles is to reduce harm and improve care for the patient by improving the reliability of care processes.

Additionally, as the number of bundle elements increases, it becomes increasingly more difficult to achieve high compliance with the all-or-none measurement. According to Resar et al. (2012), using three to five elements has demonstrated the most success, as the intent is neither to create a comprehensive care protocol nor to include elements that vary in their applicability to individual patients.

As a recommendation for the initial management and basic treatment of an unexpected PPH that occurs on the postpartum unit where it takes up to five minutes for a MD to arrive, the LIT proposed creating a *PPH Urgent Care Bundle* based on IHI's care bundle model. When designing the *PPH Urgent Care Bundle*, the LIT implemented the design guidelines established by Resar et al. (2012). These consisted of having (a) three to five elements with strong clinician agreement, (b) each element relatively independent of the others, (c) used with a defined patient population in one location, (d) an engaged multidisciplinary team, and (e) descriptive rather than

prescriptive to allow for local customization. Compliance with *bundles* is measured using an all-or-none measurement, meaning that all elements together are counted as one, with a goal of 95 % or greater compliance rate.

PPH Urgent Care Bundle Elements

The aim of using *bundles* is to reduce harm and improve care for the patient through improving the reliability of care processes. The PPH Urgent Care Bundle job breakdown worksheet outlines the key points of how and why the elements are required (Appendix M). The PPH Urgent Care Bundle elements; for recognition and management of critical PPH on the postpartum unit forms a five step process:

1. First responder calls for help (OB STAT) and massage uterus, assessing need for urinary catheter placement provides reassurance to the patient and/or family explaining what is being done and why;
2. The second responder measures blood pressure, pulse (cycled every minute), check oxygen saturation, and apply oxygen via mask, and begins documentation;
3. Third responder starts IV (if no IV), draw labs, and begin IV fluids;
4. Fourth responder administers Pitocin (if unable to give IV, give IM) then Methergine (-if BP <140) (Appendix N for uterotonic medication recommendations);
5. Team leader determines need for MTG (discuss with MD on arrival), (World Health Organization, 2009).

The RN in charge of the postpartum unit during the emergency is designated as team leader and is responsible for delegating the elements of the bundle as individuals respond to the emergency, beginning the documentation, delegating documentation as soon as possible, priming

intravenous (IV) tubing with appropriate fluid and giving the update of bundle elements completed when the attending MD arrives at the patient's room. The bedside RN will give a brief history of the patient according to the situation, background, assessment and recommendations (SBAR) format (Safer Healthcare, 2012). By creating the PPH Bundle, a standard is established and allows variance from the standard to be identified and improved upon quickly.

Simulation Training

Clinical practice simulations, which are designed to enhance the management of PPH, are recommended by the Joint Commission on Accreditation of Health Care Organizations (2010) as a way to improve quality of care. Simulation-based learning provides accessible learning opportunities, the freedom to learn from mistakes, the opportunity to customize learning experiences and the ability to offer detailed feedback during evaluation debriefings.

Integration of simulation into institutional healthcare training facilitates patient safety. It also raises the bar for objectivity in evaluation, utilizing visible, accepted metrics for performance in place of anecdotes and opinions (Society for Simulation in Healthcare, 2012). Considering PPH is a high-risk but low-volume occurrence, the LIT recommends simulation drills for initial training purposes, and then monthly for ongoing maintenance of skills. Documentation of monthly drills should be maintained as an indication of education and training of staff for optimal patient outcomes. Additionally, introductory education on the new PPH bundles included four hours of simulation training for all the staff on the maternity unit.

Plan-Do-Study-Act

The Plan-Do-Study-Act (PDSA) cycle is the scientific method applied to quality improvement, defined as action-oriented learning supported by small-scale tests of change in real work settings enabling sustainable change (IHI, 2012). The LIT identified that there was a

problem with the management of PPH on the unit. The next step is determining how it should be managed. There are questions that are necessary to ask in order to move forward with a plan and evaluate standards (Appendix O).

Standards are the starting point for continuous improvement and the basis for comparison of interventions before the standard and after. Implementation of a standard makes visible what is expected (Appendix P). With no standard you cannot objectively manage change or work toward continuous improvement. The tendency with no standard is to regress.

Once the PPH Bundle is initiated on the unit, compliance with the bundle will be measured using all-or-none measurement (meaning all elements have been met within five minutes), with the goal of at least 95 percent compliance. Each individual element of the bundle will also be tracked for compliance so that it can easily be determined where the process needs continued improvement.

The small tests of change will be measured through in situ simulations and actual cases of PPHs with the intent of uncovering unforeseen problems and obstacles along the way, generating further refinements in the next steps (Rother, 2010). After testing the change on a small scale, learning from each test and refining the process through several PDSA cycles, the team will implement the change on a broader scale. Small tests of change will ensure a standardized way for the multidisciplinary team to manage an urgent situation, resulting in improved patient outcomes.

Analysis

In the process of implementing the PPH Urgent Care Bundle the LIT identified that PPHs were occurring at a very high rate with an average of 11 per week. The LIT determined that an

important element of management of PPH is not only effective management of the acute PPH, but that preventing PPH could improve patient safety and long-term outcomes.

Utilizing *Kaizen* (the Japanese term for creating a culture of continuous improvement) methodology the LIT planned a PPH prevention rapid process improvement (RPI) build day (Appendix R). A RPI is a continuous improvement process where all key stakeholders meet to focus on an identified problem and develop a plan for improvement.

At the RPI the key stakeholders addressed the specific DMS elements we are specifically assessing including: huddle structure, andon response and escalation, leader standard work, current standard work or reliable methods around PPH prevention, and MESS to support the standard. The LIT team worked to ensure that there was a visible standard process, training for all applicable staff on the standards, MESS to support the standard, an audit process for the standard, and visibility of the outcomes or process metrics.

Given the lack of literature on preventing PPH's in postpartum units, the team developed a PPH prevention *bundle*-a small set of evidence-based interventions enhancing teamwork and communication to improve patient outcomes (Appendix S-BB). The PPH prevention bundle standard (Appendix U) and the bundle flow diagram (Appendix V) are sets of interventions that when implemented with 100 % reliability are expected to decrease the number of PPHs and the need for blood transfusions improving patient outcomes.

By creating the PPH Bundles, a standard is established and allows variance from the standard to be identified and improved upon quickly. The MD LIT co-lead and national lead for benchmarking obstetrical adverse events in the Ohio Collaborative Solutions for Patient Safety collaborative; and the CNS co-lead of the LIT will track the success of the PPH bundle, which could become the first national standard in prevention of PPH requiring a blood transfusion.

The team targeted 100% compliance to bundle elements, with an ultimate goal of decreasing need for blood transfusions. Many problems have been encountered along the way, such as RN handoffs from Labor and Delivery and having appropriate staff to help new mothers to the bathroom for the first time, but the team has worked through them one-by-one. Through simulation training over a six-month period 100 RNs, MDs, and family representatives simulated the *bundle* approach. The PPH Prevention Bundle could become the first national standard in prevention of PPH's on a postpartum unit.

Evaluation/Outcomes

Program Evaluation

Four-hour blocks of simulation training were provided for over 100 RN's with MD participation to introduce both of the new PPH bundles to frontline staff. The simulation training was done at the Stanford Center for Advanced Pediatric and Perinatal Education (CAPE). The staff completed a pre-simulation survey indicating their level of comfort in responding to an acute PPH emergency prior to the simulation training. Following the training, a post survey demonstrated an increase in the RN's perception of his/her ability to respond to an acute PPH (Appendix CC). Additionally, an analysis of the mean scores of the evaluation by the frontline staff demonstrated the effectiveness of the simulation training (Appendix DD). Overall the staff felt the simulation training was effective, but communicated that in situ simulation added additional realism. Upon completion of the training the majority of RNs requested additional practice via in situ simulation training.

Monitoring Results and Process

The PPH urgent care bundle initially indicated that only the first two elements were completed within five minutes. This was significantly short of the target, which was completion

of all elements within five minutes. However, this first test of change prompted a further in-depth review, resulting in significant process improvement as well as additional opportunity to improve patient care (Appendix J; Appendix Q).

The RN workflow for retrieving PPH supplies improved from a total of 12 minutes to 18 seconds. This was a 99.9 % improvement from the initial in situ simulation, during which the PPH supply box never made it into the patient room. This improvement was accomplished by changing the location of the PPH supply box, which allowed all necessary supplies to be in a convenient location close to all patient rooms. Morning huddles allowed for staff training on the new location.

The MD OB STAT response time was decreased from 5 minutes to 57 seconds, an improvement of 81 %. This was accomplished by changing the process by which MDs are notified during an OB STAT page. They were no longer dependent on the pager and its associated lag time but were now able to hear the page overhead in all locations and respond immediately (Appendix Q).

Family-centered care improved 100 % from the first in situ simulation. This was accomplished by designating the first responder to communicate with the patient and her family as part of the first element in the PPH Bundle. As first responders, the RNs stayed close to the patient and massaged the uterus, so it was natural for them to discuss what was happening with the patient and family. The family representative in the second in situ simulation felt completely involved, updated and less anxious about what was happening during the crisis (Appendix Q).

There were other opportunities for continued improvement in order to accomplish the outcome goal of 100 % PPH urgent care bundle compliance within five minutes. These included shortening medication retrieval time from the medication dispensing machine, further education

through simulation training on the five PPH bundle elements, working on closed-loop communication and reorganizing the PPH supply box to make supplies easier to locate quickly. The PDSA cycle continues to identify countermeasures to address these opportunities in order to reach the outcome goal of 100 % bundle compliance within 5 minutes. Once achieved, the focus will then shift to sustainability of changes and continued improvement.

Plotting data over time using a run chart is a simple and effective way to determine whether changes are leading to improvement. The goal is to complete the entire PPH urgent care bundle (all-or-none measurement) within the first five minutes. The data collected will be the total number of actual or simulated numbers of PPH on the maternity unit, showing a rate of 100 % compliance with PPH Urgent Care Bundle and a decrease in the amount of time needed to complete the PPH bundle elements.

The PPH prevention bundle was introduced to the maternity unit after the initial tests of change for the PPH Urgent Care Bundle (Appendix V). The prevention bundle was a result of the PDSA cycle. Once the LIT realized improvement in response to acute PPH management the focus shifted to prevention.

The PPH prevention bundle audits measure compliance of each element of the bundle as well as overall compliance of the elements combined. The charge RN completes the audits on the maternity unit one time per day (Appendix AA).

The results indicated a need for improvement with the second bundle element, which is the thirty-minute check of vital signs and fundal assessment from time of transfer from labor and delivery. The third element was similarly difficult for staff to accomplish due to the difficulty in attaining assistance to help a new mother up to the bathroom for the first time. This resulted in pressure to help the patient up to the bathroom without assistance. The LIT identified this as a

gap and searched for ways to address the problem to provide adequate support to the front-line RNs.

The audits showed the overall compliance of the prevention bundle is 89 percent (Appendix AA). The audit process is used as a coaching opportunity. If one of the elements is not met, the charge RN identifies the cause for not meeting the standard. If the cause is lack of knowledge the charge RN utilizes the opportunity to coach the frontline RN in the moment. The barriers to meeting the standard are then identified and placed on the *visibility board* (Appendix EE).

As part of the DMS, the executive team comes to the visibility board on *gemba* rounds every day. If standards are met there is a green dot, and if the standard is not met there is a red dot placed to visually indicate a potential problem. The cause is identified and a countermeasure developed. If the charge RN is not able to implement the countermeasure he/she escalates that to the executive team at *gemba* rounds. Hence, the unmet standard can be corrected quickly before it is repeated over time.

The total number of patients diagnosed with PPH has consistently decreased over the past year. Since the LIT began focusing on PPH emergency response and prevention, there are demonstrable outcomes highlighting the decrease in the number of PPHs over the past year at LPCH (Appendix FF). This is significant as the numbers of PPH's nationally have been increasing over time.

Discussion

Standardize and Sustain Successful Processes

The PDSA includes defining what is expected, trying the process out according to plan on a small scale, comparing the actual outcome with the expected outcome, standardizing and

stabilizing what works, or beginning the PDSA cycle again (Rother, 2010). Lean management system support of the PPH bundle implementation and sustainability through the DMS ensures that the methods, equipment, staffing and supplies (MESS) framework is utilized in the postpartum unit. If any aspect of these four areas needs improvement, solutions are quickly determined by mapping them out on a MESS board (Appendix I). The MESS framework is accomplished through daily visits by the unit administrator to the frontlines and directly observing the work that is being done in the operational areas. This is a fundamental principle that allows the frontline staff to carry out the operational goals (Rother, 2010). If there are identified problems with MESS in relation to the PPH bundles, the unit administrators are immediately aware of them and can address the concerns as they occur. This ensures that improvements do not slip backwards and are sustained with high reliability.

Barriers to Implementation

Frequent process checks included review of plan execution and progress toward desired outcomes, identifying gaps between planned goals vs. actual outcomes and addressing the discrepancies. The barriers identified through these checks included: MD resistance to running actual drills during the day without notification to all responders, the limitations in space for drills to be conducted on the unit, shortages in staff, ability of RN to find a second person to help new mothers up to the bathroom, and communication to front-line RN on a regular basis.

The LIT utilizing the PDSA cycle mitigated the process. Through teamwork, communication, escalation, the DMS, staff buy-in and organizational support the team were able to work to overcome each barrier. Countermeasures included discussions with the medical staff, compromises on who to notify prior to drills, conference rooms utilized at busy times for the drills instead of patient rooms, organizational lift coaches to help with patient transport to the

bathroom, RN handoffs from labor and delivery to maternity enhancing communication of quantified blood loss, and huddles with both floors every shift at the visibility board to enhance communication to frontline staff. As new barriers arise, the team makes small incremental changes we continue to experience barriers, we establish the next gap, continually making small incremental changes leading to perfection of the standard. The PPH prevention bundle is still in the early stages of implementation. Continuous use of the PDSA cycle will ensure ongoing improvement.

Most recently the PDSA cycle for the prevention bundle has led to include initiating quantified blood loss (QBL) measurement on every patient transferring from labor and delivery to postpartum with a 500cc (vaginal) or 1000cc (C-section) blood loss documented. The LIT is reviewing the logistics involved in making this change. For example, the postpartum unit currently only has two patient scales for both floors which could cause an inability to access supplies when needed. The PPH bundle PDSA is an ongoing process utilizing daily audits and weekly-LIT reviews for adjustments and sustainability.

Conclusion

Postpartum complications can lead to increased length of stay (LOS), increased cost, decreased customer satisfaction and hospital-acquired infections. In working to manage this process in a standardized way, the lean way will contribute to decreased cost, decreased LOS, improved customer satisfaction, decreased maternal deaths and contribute to the U.S. government's *Healthy People 2020* target of no more than 11.4 maternal deaths per 100,000 live births (USDHHS, 2012). The use of bundles of care as an approach to improving reliability and preventing serious outcomes has been demonstrated successfully for nearly 10 years (IHI, 2005). Initial results of this projects small test of change indicated significant improvements in response

time and family-centered care. This supports the hospital's mission of cost effective, high quality, and patient/family centered care.

Success is related to more than simply doing a bundle. Implementing a bundle with high reliability requires redesign of work processes, communication strategies, and infrastructure, along with sustained measurement and vigilance. Bundles are not a magic bullet or meant to be comprehensive care; rather, they are one strategy among many to prevent serious complications in patients and save lives (Resar et al., 2012).

Lean management is not a new concept, but it is relatively new to health care. While skeptics may be right to note "patients are not cars," medical care is- in fact- delivered in complex organizations with thousands of interacting processes, much like the manufacturing industry. Many forward-thinking health care institutions are leading the way by demonstrating that lean management can reduce waste in processes and improve patient outcomes. It is imperative that leaders create an organizational culture that is able to accept lean thinking. Lean principles hold the promise of reducing or eliminating wasted time, money and energy, creating a system that is efficient, cost-effective, and truly responsive to the needs of patients (IHI, 2005).

Working together as an LIT creates alignment so that positive changes can be effective and sustainable problem-solving habits created. This project has established an approach, a value stream created based on the customer perspective and a culture of proactive problem solving rather than workarounds and reacting to crisis. The intent is to utilize this model, move beyond success in this value stream, and make continuous improvement a regular part of the culture throughout the organization- always seizing the next opportunity (Worth et al, 2012).

Other Information

Cost Summary

Creating an LIT, such as the one at LPCH requires very little upfront costs. Initially an investment in time and training of the team needs to be a priority. Key multidisciplinary stakeholders need to be chosen and attend a three-day in house workshop on PQMS and LIT training based on the lean principles and utilizing lean and IHI project management tools. MDs would need to be provided a percentage of time in their workday to invest in the quality improvement work. The performance improvement (PI) team is a key factor in success. Front-line staff and administrators are often focused on the urgent needs, and the PI team helps to maintain long-term vision and provides the necessary support for success.

Additionally, a Lean Systems Management Executive Study trip with key members of the team is not required but enhances knowledge and success. Additional salary costs are minimal because most LIT members are exempt employees. This model keeps education and training costs at a minimum since it is based on in situ mini simulations during the workday. The simulation training will require an interdisciplinary team and an educational budget. However, this training is incorporated into the existing budgeted annual simulation training, which has already been approved on an annual basis at LPCH (Appendix GG).

The lean process will reduce expenses by preventing complications of PPH. By focusing on quality and decreased waste, value will be added to the customer and cost reduced. Moreover, patient satisfaction is expected to rise and will contribute to the ability to rebuild market share in the obstetrical department that has been lost over the last several years. Combined with other improvements, this proposal will lead to additional revenue by attracting more women to choose LPCH for their obstetrical needs. As demonstrated in the LPCH market

analysis, women of childbearing age are the ones making the healthcare choices for their families. As more women seek to deliver at LPCH, they will be more likely to choose LPCH for their children's healthcare needs as well.

Furthermore, staff engagement is expected to improve creating a more satisfying and fulfilling place to work. This contributes to the hospital's goal for Magnet designation, which will in turn attract top nursing candidates nationally to seek employment here. Hence, compared with the nominal cost of implementation the overall return on investment is significant and will only increase as it is implemented in all units throughout the hospital.

Time constraints include the inability to do outside training above what is currently being done on an annual basis. The LIT will work to incorporate the improvements into the everyday workflow of the frontline staff. The multidisciplinary staff likewise needs to participate, even though at times the unit may be too busy. This is a constant challenge that must be consistently evaluated and taken into account during the in situ planned drills. The goal is to work within the time and financial constraints of the setting and accomplish the improvements by being flexible and consistent over time. A Gantt chart outlining the project milestone projections has proven beneficial to indicate the progress of the change (Appendix HH).

SWOT Analysis

Implementing the recommended application of lean principles to the multidisciplinary management of PPH on the maternity unit will promote overall improved quality of care. It will ensure provision of extraordinary patient and family-centered care, decreasing unnecessary cost, and preventing unnecessary patient harm. Additionally, this project has encouraged participation in the Ohio Collaborative Solutions for Patients Safety (OCHSPS), a national collaboration for children's hospitals to reduce medical errors and determine what is driving cost. Benchmarking

with other like facilities utilizing the OCHSPS has demonstrated improvement in overall care quality. The collaborative efforts of the OCHSPS have saved more than 7,700 children from unnecessary harm, and prevented \$11.8 million in unnecessary cost since the partnership began in 2009 (Brimmer, 2012). PPH is one of the metrics collected by the OCHSPS and is considered a reportable and preventable hospital acquired condition (HAC) and an obstetrical adverse event.

There is significant organizational and multidisciplinary support for this innovative approach to a challenging and wide-spread patient safety event. Lean is a proven management strategy that has shown to be effective when applied to healthcare and improves sustainability. A SWOT analysis depicts the key indicators, (strengths, weaknesses, opportunities and threats) of the PPH process for change (Appendix II).

Acknowledgements

I would like to acknowledge the following members of the local improvement team: Susan Crowe, MD; Fran Schlaefter, MN, RN; Lou Filoteo BSN, RN; Heather Freeman, MSN, RN; Denisia Chen, RN; Kevin Chen; Melissa Abad, RN; Kay McMaster, RN; Nichole Kangas, PhD; Shabnam Gaskari, PharmD; Margie Godin, RN, other cross-functional adjunct members as needed and the staff nurses on the Maternity Unit (F1 & F2) at Lucille Packard Children's Hospital at Stanford. In addition my project chair Dr. Amy Nichols and second chair Dr. Timothy Godfrey, SJ. I could not have accomplished the positive impact of this project on patient outcomes without the help of all those aforementioned.

References

- American College of Obstetricians and Gynecologists. (2006). ACOG practice Bulletin no. 76: Postpartum hemorrhage. *Obstetrics & Gynecology*, 108(4), 1039-1047.
- Cameron, C. A., Roberts, C. L., Bell, J. & Fisher, W. (2007). Getting an evidence-based post-Partum hemorrhage policy into practice. *The Australian and New Zealand Journal of Obstetrics & Gynecology*, 47, 169-175.
- Casper, L. (2010) Simulations and drills. San Diego Medical Center and Southern California Permanente Medical Group. Retrieved from:
http://www.cmqcc.org/ob_hemorrhage
- Casper, L., Lee, R. (2009). OB Hemorrhage: carts, kits and trays. Obstetric Hemorrhage care guidelines and compendium of best practices. *California Department of Public Health; Maternal, Child and Adolescent Health Division*. Retrieved from:
http://www.cmqcc.org/ob_hemorrhage
- Cotter, AM, Ness, A., Tolosa, JE. (2010). Prophylactic oxytocin for the third stage of labour (Review). *The Cochrane Library*. John Wiley & Sons, Ltd.
- Dearholt, S. & Dang, D. (2012). *Johns Hopkins nursing evidence-based practice: Model and Guidelines 2nd ed.* Indianapolis, IN: Sigma Theta Tau International
- Deneux-Tharaux, Dupont, Colin, M., Rabilloud, D., Touzet, S., Lansac, J., Harvey, T., Tessier, V., Chauleur, C., Pennehouat, G., Morin, X., Bouvier-Colle, M.H., Rudigozb, R. (2010). Multifaceted intervention to decrease the rate of severe

postpartum haemorrhage: the Pithagore 6 cluster-randomized controlled trial. DOI: 10.1111/j.1470528.2010.02648.x

Gregory, K., Main, E., Lyndon, A. (2009). Definition, early recognition and rapid response using triggers. Obstetric Hemorrhage care guidelines and compendium of best practices. *California Department of Public Health; Maternal, Child and Adolescent Health Division*. Retrieved from: http://www.cmqcc.org/ob_hemorrhage

Institute for Healthcare Improvement. (2012). *How-to guide: Prevent obstetrical adverse events*. Cambridge, MA: Author. Retrieved from <http://www.ihl.org/knowledge/Pages/Tools/HowtoGuidePreventObstetricalAdverseEvents.aspx>

Institute for Healthcare Improvement, (2005). *Innovation Series: Going lean in health care*. Cambridge, MA: Author. Retrieved from: <http://www.ihl.org/knowledge/Pages/IHIWhitePapers/GoingLeaninHealthCare.aspx>

Kotter, J. P. (1996). *Leading change*. Boston MA: Harvard Business School Press.

Liker, J. K., (2004). *The Toyota way: 14 management principles from the world's greatest manufacturer*. New York, NY: McGraw-Hill.

Lucille Packard Children's Hospital, (2012). *Packard quality management system learning system*. Lucille Packard Children's Hospital at Stanford, Palo Alto, CA. Retrieved from <https://intranet.lpch.org/pqms/index.html>

Lyndon A., Lagrew D., Shields L., Melsop K., Bingham B., & Main E. (Eds.). (2010).

Improving health care response to obstetric hemorrhage. California maternal quality

care collaborative toolkit to transform maternity care. *California Department of*

Public Health; Maternal, Child and Adolescent Health Division. Retrieved from:

http://www.cmqcc.org/ob_hemorrhage

Nelson, E.C., Batalden, P.B., Huber, T.P., Mohr, J.J., Godfrey, M.M., Headrick, L.A., Wasson,

J.H. (2002). Microsystems in health care: part 1. learning from high performing front-line clinical units. *Joint Commission on Quality and Patient Safety*, Sept., Vol. 28 (9), 472-493.

Patel, A., Goudar, S.S., Geller, S.E., Kodkany, B.S., Edlavitch, S.A., Wagh, K., Patted, S.S.,

Naik, V.A., Moss, N., Derman, R.J. (2006). Drape estimation vs. visual assessment for estimating postpartum hemorrhage. *International Journal of Gynecology and Obstetrics*, (93), 220-224.

Resar, R., Griffin, F.A., Haraden, C., & Nolan, T. W. (2012). Using care bundles to improve

health care quality. IHI Innovation Series white paper. *Institute for Healthcare Improvement*, Cambridge, MA: Author. Retrieved from

<http://www.ihl.org/knowledge/Pages/IHIWhitePapers/UsingCareBundles.aspx>

Resar, R., Pronovost, P., Haraden, C., Simmonds, T., Rainey, T., Nolan, T. (2005). Using a

bundle approach to improve ventilator care processes and reduce ventilator-associated pneumonia. *Joint Commission Journal on Quality and Patient Safety* 31(5), 243-248.

Robinson-Walker, C. (2013). *Leading valiantly in healthcare: Four steps to sustainable success*. Indianapolis, IN: Sigma Theta Tau International.

Rother, M. (2010). *Toyota kata: Managing people for improvement, adaptiveness, and superior results*. New York, NY: McGrawHill.

Safer Healthcare Partners, LLC, (2012). Retrieved from:

<http://www.saferhealthcare.com/sbar/what-is-sbar/>

Sheikh L, Zuberi NF, Riaz R, Rizvi JH. (2006). Massive primary postpartum haemorrhage: setting up standards of care. *J Pak Med Assoc.* (56), 26-31.

Shields, L., (2009). Uterotonic agents fact sheet. *California Maternal Quality of Care Collaborative*. Retrieved from:

http://www.cmqcc.org/ob_hemorrhage/ob_hemorrhage_compendium_of_best_practices

Shields, L., Veille, JC. (2009). Postpartum Hemorrhage: lessons learned from other states.

Obstetric hemorrhage care guidelines and compendium of best practices. *California Department of Public Health; Maternal, Child and Adolescent Health Division*.

Retrieved from: http://www.cmqcc.org/ob_hemorrhage

Shook, J. (2010). *Managing to learn: Using the A3 management process to solve problems, gain agreement, mentor, and lead*. Lean Enterprise Institute, Cambridge, MA

Shook, J., (2009). A3 templates. *Lean Enterprise Institute*. Retrieved from:

<http://www.lean.org/common/display/?o=1314>

Smith, J. R., & Brennan, B. G. (2012, March 20). Postpartum hemorrhage. *Medscape Reference: Drugs Diseases & Procedures*. Retrieved from

<http://emedicine.medscape.com/article/275038-overview#a0101>

Society for Simulation in Healthcare. (2012). *What is simulation: Advantages of simulation learning*. Retrieved from: <http://ssih.org/about-simulation>

The American College of Obstetricians and Gynecologists. (2006). ACOG practice

Bulletin n. 76: Postpartum hemorrhage. *Obstetrics & Gynecology*, 108(4), 1039-1047.

The Joint Commission. (2006). Perspectives on patient safety: Raising the bar with bundles:

treating patients with an all-or-nothing standard. *Joint Commission on Accreditation of healthcare Organizations*, 6(4). Retrieved from:

<http://www.ihl.org/knowledge/pages/publications/raisingthebarwithbundles.aspx>

The Joint Commission. (2010, January 26). Sentinel event alert: Preventing maternal death. *The*

Joint Commission. Retrieved from:

http://www.jointcommission.org/assets/1/18/SEA_44.PDF

U.S. Department of Health and Human Services (2012). Maternal, Infant and Child Health.

HealthyPeople.gov. Retrieved from:

<http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=26>

Winter C, Macfarlane A, Deneux-Tharoux C, Zhang WH, Alexander S, Brocklehurst P,

Bouvier-Colle MH, Prendiville W, Cararach V, van Roosmalen J, Berik I, Klein M,

Ayres-de-Campos D, Erkkola R, Chiechi LM, Langhoff-Roos J, Stray-Pedersen B, &

Troeger C. (2007) Variations in policies for management of the third stage of labour and

the immediate management of postpartum haemorrhage in Europe. *BJOG*, 114: 845-54.

Womack, J. P., Byrne, A. P., Flume, O. J., Kaplan, G. S., & Toussaint, J. (2005). Innovation

series: Going lean in health care. *Institute for Healthcare Improvement*, Cambridge, MA.

Retrieved from:

<http://www.ihl.org/knowledge/Pages/IHIWhitePapers/GoingLeaninHealthCare.aspx>

World Health Organization. (2009). *Guidelines for the management of postpartum haemorrhage*

and retained placenta. WHO, Geneva, Switzerland. Retrieved from:

http://whqlibdoc.who.int/publications/2009/9789241598514_eng.pdf

World Health Organization. (2013). *The World Health Report: Risking death to give life*. WHO, Geneva Switzerland. Retrieved from:

<http://www.who.int/whr/2005/chapter4/en/index1.html>

Worth, J., Shuker, T., Keyte, B., Ohaus, K., Luckman, J., Verble, D., Paluska, K., Nickel, T.

(2012). *Perfecting patient journeys: Improving patient safety, quality, and satisfaction while building problem-solving skills*. Lean Enterprise Institute, Cambridge, MA.

Appendix A

Question Development Tool

Problem	
Patient safety event reports have been completed by RN staff related to ineffective treatment of a PPH on the postpartum inpatient unit. Patient and family complaints were received related to how management of PPH episodes and lack of confidence in how the staff intervened and communicated	
PICO	
P (Population, setting)	Women on the inpatient postpartum care unit who are transferred within one-two hours of delivery
I (intervention)	Identification of PPH safety risk
C (comparison)	Current practice
O (Outcome)	Decrease in patient safety events related to PPH and improved patient and family satisfaction on the pp inpatient unit
Answerable Question	
What are the best practices on inpatient postpartum units to effectively and safely manage postpartum hemorrhage?	
Initial Search Terms	Related Search Terms
Postpartum Hemorrhage	Maternal deaths
Management of PPH	Maternal bleeding
Maternal Deaths	Maternity best practices
Patient safety	Care bundles
Standards for PPH management	Guidelines

(The Johns Hopkins Hospital/The Johns Hopkins University, 2012)

Appendix B

Evidence based Practice Summary

Article #	Author & Date	Evidence Type	Sample, Sample Size & Setting	Study findings that help answer the EBP question	Limitations	Evidence Level & Quality
1	Lyndon, A., et al. (2010)	Clinical Practice Guidelines	NA	Care Guidelines: best practices for obstetrical hemorrhage, including checklist, flowchart and table chart formats. Includes a step-by-step guide to assist hospital leaders with implementation efforts. Provide sample forms for policy development, risk assessment, quantitative measurement of blood loss and QI implementation model tools. Also, a slide set for professional education that summarize the problem of and the best practices for obstetric hemorrhage	Based on opinion, Specific to the state of CA and does not define standard of care	Non-Research Level IV-A
2	Shields, L. (2009)	Uterotonic Agents Fact Sheet Clinical Practice Guideline	NA	Describes what uterotonic medication should be used to treat obstetrical hemorrhage, dose, route, side effects and contraindications	Based on opinion	Non-research Level IV-A
3	Sheikh, et al. (2006)	Cross-sectional study	32 women with primary PPH (> or = 1000ml	The study highlights the existence of widely variable practices for the management of PPH. Interventions to	Small sample size, only one	Quasi-Experimental Level II-B

			blood loss between Jan 1, 2003 to July 31, 2004 at the Department of Obstetrics and Gynecology at Aga Khan University Hospital, Karachi.	evaluate and control bleeding were relatively aggressive; newer and less invasive options were underutilized. Recommends introduction of an evidence-based management model to potentially reduce the practice variability and improve the quality of care.	location which is a threat to external validity and conclusions may not be generalized to other setting or samples	
4	Winter, et al. (2007)	Survey of policies	The project was a European collaboration, with participants in 14 European countries. All maternity units in 12 countries and in selected regions of two countries in Europe.	Considerable variations were observed between and within countries in policies for management of the third stage of labor. Wide variations were observed in immediate management of PPH after vaginal birth and policies about pharmacological agents to be used.	Internal validity could be a threat with possible sources of bias.	Non-Experimental Level III-A
5	Gregory, K., Lyndon, A. (2009)	Expert consensus opinion	NA	Recommendations: aggressive treatment of women at clinical trigger points has the potential to prevent the development of serious PPH. Defines triggers and standard clinical definition of PPH and that hospitals internally monitor and report all cases with EBL>500 ml for internal site-specific quality monitoring	Based on expert consensus opinion	Non-research Level IV- A

				to ensure adherence to institutional guideline. Adopt protocols for quantified blood loss (QBL), management of all women with cumulative blood loss > or = 500ml and responsibility for RN to call for help and activate maternal hemorrhage response as clinically indicated.		
6	Deneux-Tharoux, et al. (2010)	Cluster-randomized trial	106 maternity units in six French regions	This educational intervention did not affect the rate of severe PPH significantly as compared with control units, although it improved some practices	External validity study may not apply to other settings or samples due to challenges of designing and evaluating behavioral interventions Conclusion validity is of concern for a type II error (false positive)	Experimental Study Level I-B
7	Casper, L., Lee, R., (2009)	Expert opinion based on	NA	Recommendation: OB Hemorrhage Mediation Kit available in L & D and	Opinions of respected authorities	Non-research Level IV-A

		clinical experience descriptive studies and expert committees		Postpartum Unit and recommends contents and amounts of each medication. OB Hemorrhage Tray available on Postpartum Unit with specific contents that were provided		
8	Casper, L., (2010)	Expert opinion	NA	All hospitals adopt regularly scheduled simulation drills for practicing response to obstetric hemorrhage and sample scenario's provided.	Limited or inconsistent evidence on simulation and PPH, expert opinion	Non-research Level IV-A
9	Shields, L., Veille, J., (2009)	Strong Quality Improvement Data. Consensus and expert opinion.	NA	Recommendations: Every hospital should have a protocol for activation and response to maternal hemorrhage activated by either RN or MD. Develop collaborative policy with a massive transfusion guideline.	Based on expert opinion	Quality Improvement Level IV-B
10	Patel, A. et al. (2006)	Randomized Controlled Study	123 women delivered at the District Hospital, Belgaum, India randomized to visual or drape estimation of blood loss.	Drape estimation of blood loss is more accurate than visual estimation. Prompt detection of PPH may reduce maternal morbidity and mortality in low-resource settings.	External validity study setting in low-resource setting may not be able to generalize findings to other	Experimental Study Level I-B

					settings or samples.	
11	Resar, R., Griffin, F., Haraden, C., & Nolan, T., (2012)	Quality Improvement Institute for Healthcare Improvement Innovation Series	NA	Implementation of Care Bundles – a small set of evidence-based interventions for a defined patient population and care setting to improve care processes to the highest levels of reliability, which would result in vastly improved outcomes	Based on a theory of change that has produced better outcomes has not been studied experimentally	Non-research Level V-A
12	Resar, R., et al. (2005)	Collaborative on improving care	Teams of critical care clinicians from 61 health care organizations participated between July 2002 and January 2004	When care processes are grouped into simple bundles, caregivers are more likely to implement them by making fundamental changes in how the work is done. When the care processes are evidence based, subsequent outcomes will improve	Collected data from only 57% of the teams involved in the initiative and those reporting data may have improved more than did teams not reporting data affecting external validity	Quasi Experimental Level II-B

13	Cotter, Ness, & Tolosa (2010)	Cochran Systematic Review of randomized and quasi-randomized control trials	14 Trials are included (7 trials with over 3000 woman)	Prophylactic oxytocin showed benefits (reduced blood loss) for blood loss greater than 500 ml. RR 0.5, 95% CI (CI 0.43-0.59) and for therapeutic oxytocics RR 0.5, 95% CI (CI 0.39-0.64)	Insufficient information about other outcomes and side effects	Level II, B Systematic Review
----	-------------------------------	---	--	--	--	-------------------------------

Appendix C

Evidence Based Practice Synthesis and Recommendation

Category (level Type)	Total Number of Sources /Level	Overall Quality Rating	Synthesis of Findings Evidence That Answers the EBP Question
<p><u>Level I</u></p> <ul style="list-style-type: none"> • Experimental Study • Randomized Controlled Trial (RCT) • Systematic review of RCTs with or without meta-analysis 	2	B	<ul style="list-style-type: none"> • Educational intervention did not affect the rate of severe PPH significantly as compared with control units, although it improved some practices (6) • Quantified blood loss is more accurate than visual estimation (10) • Quantifying blood loss and prompt detection of PPH may reduce maternal morbidity and mortality in low- resource settings (10)
<p><u>Level II</u></p> <ul style="list-style-type: none"> • Quasi-experimental studies • Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis 	3	B	<ul style="list-style-type: none"> • Utilize an evidence-based management model to reduce practice variability and improve quality of care (3) • When care processes are evidence-based and grouped into simple bundles, caregivers are more likely to implement them by making fundamental changes in how the work is done and subsequent outcomes will improve (12) • Prophylactic oxytocin showed benefits (reduced blood loss) for blood loss greater

Category (level Type)	Total Number of Sources /Level	Overall Quality Rating	Synthesis of Findings Evidence That Answers the EBP Question
			than 500 ml (13)
<p><u>Level III</u></p> <ul style="list-style-type: none"> • Non-experimental study • Systematic review of a combination of RCTs, quasi-experimental, and non-experimental studies only, with or without meta-analysis • Qualitative study or systematic review of qualitative studies with or without meta-synthesis 	1	A	<ul style="list-style-type: none"> • Practice and policy variations were observed in immediate management of PPH including pharmacological agents to be used (4)
<p><u>Level IV</u></p> <ul style="list-style-type: none"> • Opinion of respected authorities and/or reports of nationally recognized expert committees/consensus panels based on scientific evidence 	6	A	<ul style="list-style-type: none"> • Every hospital should have a protocol for activation and response to PPH that can be activated by either RN or MD (9) • A collaborative policy with a massive transfusion guideline should be developed (9) • All hospitals should adopt regularly scheduled simulation drills for practicing response to PPH (8) (9)

Category (level Type)	Total Number of Sources /Level	Overall Quality Rating	Synthesis of Findings Evidence That Answers the EBP Question
			<ul style="list-style-type: none"> • Every maternity unit should have a PPH tray available on the unit with specific suggested contents that will be needed to respond during a PPH (7) • Every maternity unit should have a medication kit available in their medication dispensing machine with four specific recommended medications (7) • Early recognition and rapid response to PPH at clinical <i>trigger points</i> has the potential to prevent the development of serious PPH. Trigger points based on specific VS, oxygen saturation and cumulative blood loss (5) • Standard clinical definition of PPH should be used and hospitals should monitor internally and report all cases with EBL > 500ml and ensure adherence to the institutional guideline (5) • Protocols should be adopted for quantified blood loss management (5) • RN should have responsibility to call for help and activate PPH response as clinically indicated by trigger points with an algorithm making these points very clear (5)
<p><u>Level V</u></p> <ul style="list-style-type: none"> • Evidence obtained from literature reviews, quality improvement, program evaluation, 	1	A	<ul style="list-style-type: none"> • Implementation of care bundles (a small set of evidence-based interventions for a defined patient population and care setting)

Category (level Type)	Total Number of Sources /Level	Overall Quality Rating	Synthesis of Findings Evidence That Answers the EBP Question
financial evaluation, or case reports <ul style="list-style-type: none"> Opinion of nationally recognized expert(s) based on experiential evidence 			to improve care processes to the highest levels of reliability will result in vastly improved outcomes (11)

EBP Question: What are the best practices on inpatient postpartum units to effectively and safely manage postpartum hemorrhage?

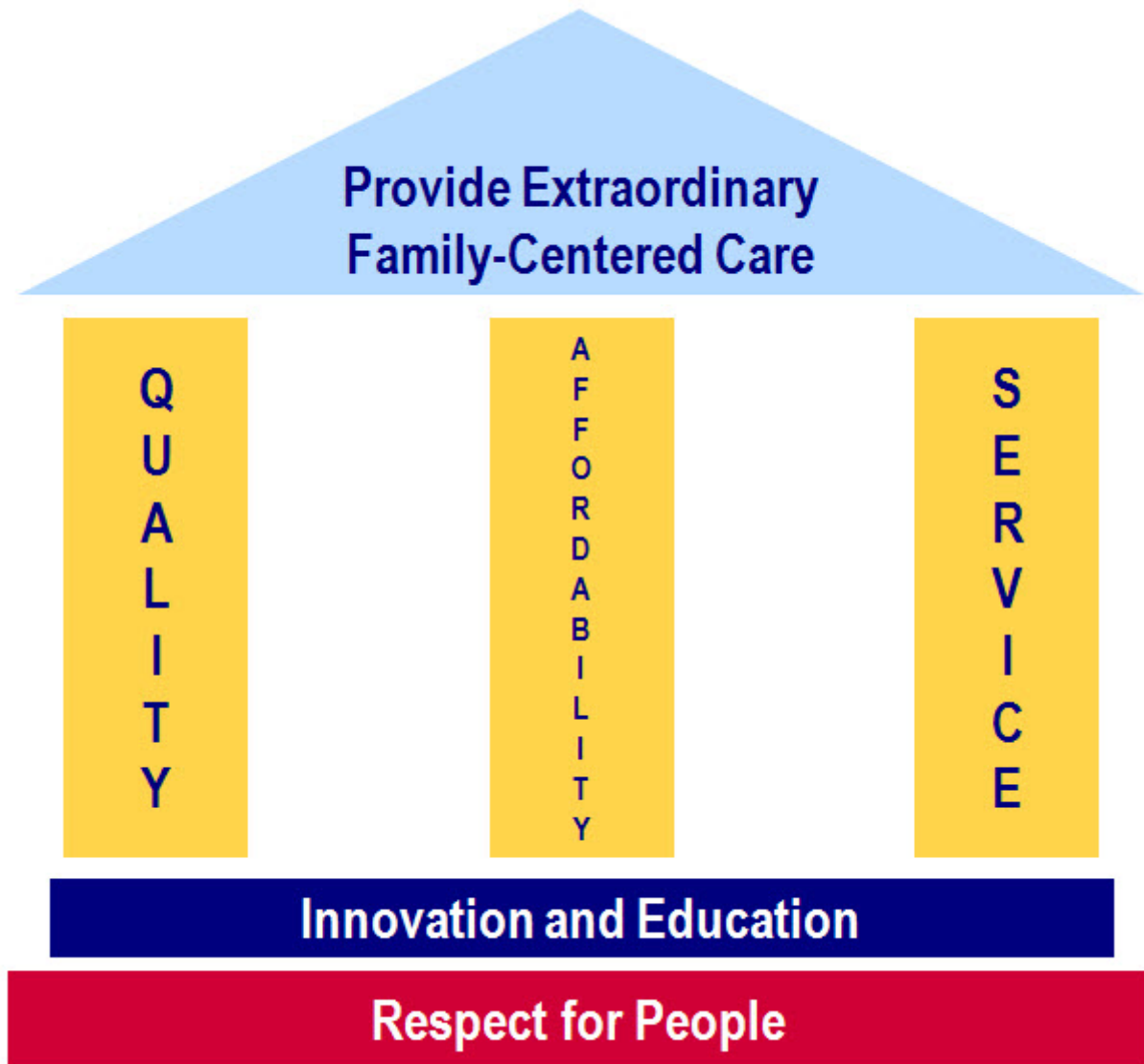
Date: 5-3-13

Recommendations Based on Evidence Synthesis and Selected Translation Pathway
<ul style="list-style-type: none"> Strong, compelling evidence, consistent results: solid indication for a practice change Evidence is relevant to answer the EBP question

(The Johns Hopkins Hospital/The Johns Hopkins University, 2012)

Appendix D

Basic PQMS Principles “The House”



Quality	The degree to which care for our patients increases the likelihood of a desired health outcome and is consistent with current professional knowledge.
Affordability	Reducing overall costs while growing high quality and safe services.
Service	Timely access to family-centered service that exceeds the expectations of our patients, families and referring physicians.
Innovation and Education	Advancing children's and maternal health through innovative performance improvement and discovery and dissemination of knowledge, while training the next generation of care providers and developing leaders.
Respect for People	All members of the Lucile Packard Children's Hospital community, patients and their families, employees, physicians, and volunteers are treated fairly and with dignity, and their opinions and suggestions for improvement are highly valued.

(Lucille Packard Children's Hospital, 2012)

Appendix E

LPCH Mission, Values, and Vision

Mission Statement

To serve our communities as an internationally-recognized pediatric and obstetric hospital that:

- advances family-centered care
- fosters innovation
- translates discoveries
- educates health care providers and leaders
- and advocates on behalf of children and expectant mothers.

Values Statement

Lucile Packard Children's Hospital **CARES** through:

Collaborating to reach goals

Advancing a family-centered approach to treatment

Respecting our patients, their families and our co-workers

Educating, innovating and translating discoveries in pediatrics and obstetrics

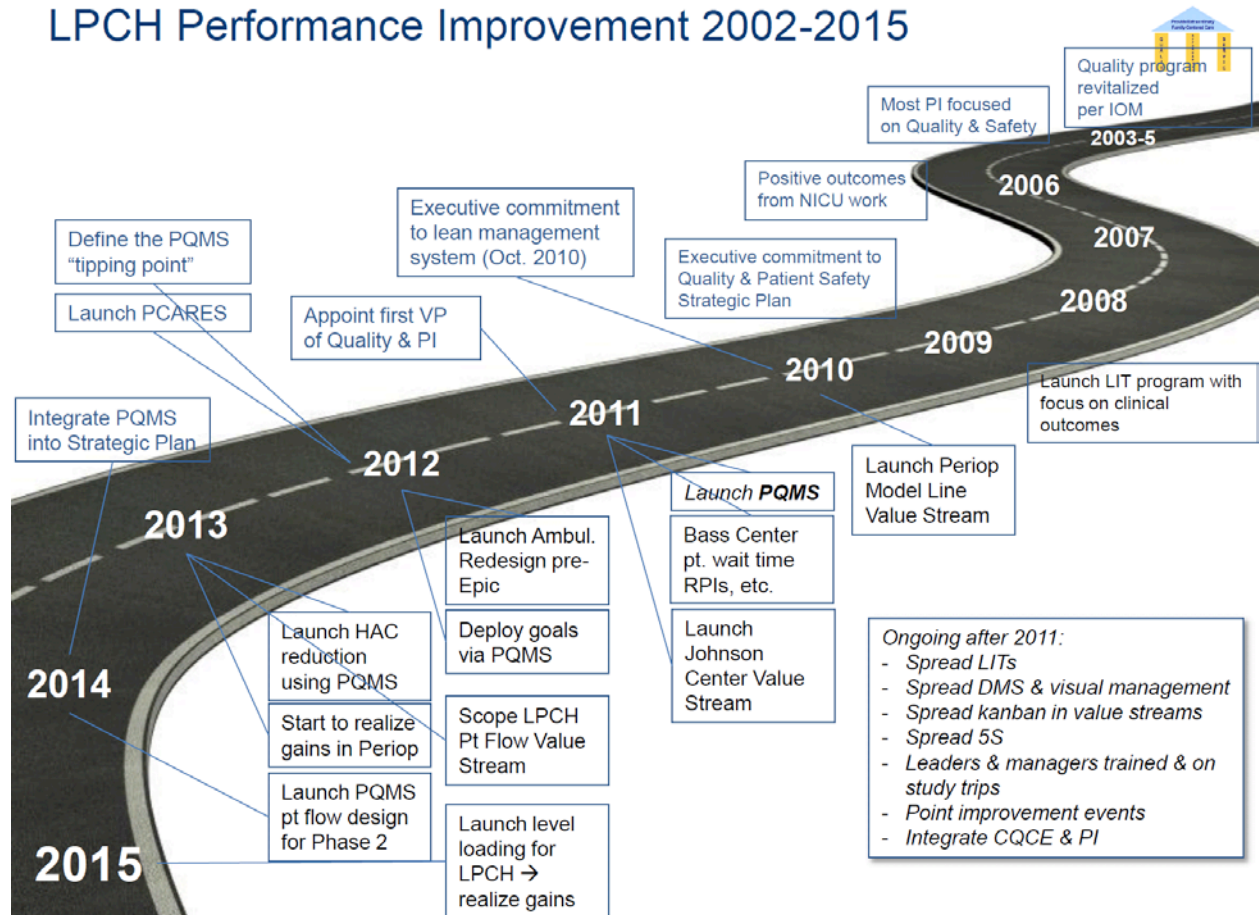
Serving our community through outreach and advocacy

Vision Statement

Our vision is to drive innovation in the most challenging areas of pediatrics and obstetrics to improve the quality of life for children and expectant mothers and those who love and care for them (LPCH, 2012).

Appendix F

LPCH Performance Improvement 2002-2015



Appendix G

5Ps for Maternity

Purpose:

- High quality, family centered care
- Achieved through innovation and education

Patients:

- High risk AP patients; diagnosis, Length of Stay
- High risk PP patients + complex (co-morbidity), diabetic
- Regular moms/babies → healthy people
- % of C/S ~ 29% → loss of ideal delivery
- % of Spanish speaking (2007 ~ 50%)
- Mean age decreased from 37 to 28
- % of 1st time moms
- Immigrant/US born – cultural needs, race, ethnicity
- Education level
- VBAC → high risk, may have failure
- % of PP depression
- Preeclamptic patients
- Zip Code
- % of late preterm patients
- % of early term patients
- Admission data (direct, L&D, transfer, etc.)

Patterns:

- Outcomes
 - Readmissions
 - Well babies
 - Moms
 - Returning to LPCH for next baby
 - PP Hemorrhage
 - Transfusion
 - Patient satisfaction

Processes:

- Antepartum
 - Admission
 - Follow MD algorithm (based on diagnosis)
 - Preeclampsia
 - Pre-term labor
 - Monitoring
 - Dietary
 - Social Services

- Consults
 - NICU
 - Lactation
- Discharge
- Therapists
- Transfers (to L&D, ICU, OR)
- AP rounds
- L&D rounds
- Post-Partum
 - Admission
 - Complex diagnosis management
 - Dietary
 - Lactation
 - Care coordination
 - Interruption
 - Transfer (baby/mom)
- Nurse call → patient communication
- Provider → provider communication
- Inter-departmental communication
- Staffing/Assignment

Professionals:

- 102 RNs (split 50:50 b/t days and nights)
- 12 Nurses' Aides
- 8 Unit Secretaries
- 4 Assistant Nurse Managers
- 1 Patient Care Manager
- 6 Lactation Consultants
- 3 Birth Recorders
- 1 Clinical Nurse Specialist

Appendix H

LIT Curriculum Agenda: Day 1

Dur	Start	Description
0:30	7:45 AM	Welcome and breakfast
0:30	8:15 AM	PQMS Overview
0:45	8:45 AM	Clinical Microsystems Concepts
0:30	9:30 AM	Exercise: 5Ps
0:15	10:00 AM	Break
0:45	10:15 AM	Data Analysis/Interpretation
0:30	11:00 AM	Exercise: connecting metrics to goals and 5Ps
0:20	11:30 AM	Problem identification, clarification, and analysis
0:10	11:50 AM	Exercise: clarifying and analyzing problems
0:45	12:00 PM	Lunch
0:15	12:45 PM	Gap to target: aims
0:20	1:00 PM	Measurement
0:15	1:20 PM	Exercise: aims and measures
0:20	1:35 PM	Gemba exercise prep and travel time
1:00	1:55 PM	Exercise; Go and see: Problem clarification and analysis in LIT gemba
0:20	2:55 PM	Break and travel time
0:30	3:15 PM	Debrief and formulate countermeasures (proposed changes)
0:20	3:45 PM	PDCA
0:20	4:05 PM	Creating standards
0:10	4:25 PM	Wrap up, evaluations, plus, delta

Maternity (F1/F2 units) Local Improvement Team Charter

PURPOSE

The Maternity Local Improvement Team (LIT) is chartered to provide a multidisciplinary approach for improving outcomes and processes within the Institute of Medicine's six domains of quality (safe, effective, efficient, timely, patient and family-centered, and equitable).

BACKGROUND

The LIT is one component of the "Continuous Improvement System," which has been developed to assist the local management dyad (Patient Care Manager and Medical Director) in delivering support to the front line to provide consistent service to our patients and families. The LIT is based on the "Clinical Microsystems" research from Dartmouth (Nelson et al., 2002) as well as the experience of our colleagues and our own internal model line (NICU). The LIT is a permanent, multidisciplinary team that is specially trained in improvement methodologies. The LIT prioritizes, addresses, and develops standards for complex problems. The LIT is a component of the Packard Quality Management System that works in conjunction with the Goal Deployment System and Daily Management System (DMS). Goal Deployment ensures that resources (such as LITs) are aligned to hospital goals. The DMS manages the standards (audits and incrementally improves) and surfaces/addresses problems on a daily basis.

GOALS

The Maternity LIT will:

- Use improvement science methodologies to formulate recommendations to address complex problems
- Prioritize and manage problems to optimize team performance in improving outcomes and processes

- Develop the team members' and others' analytical and problem-solving capabilities through improvement work
- Include front-line care providers in improvement work
- Include other staff who support care delivery in improvement work
- Share results and lessons learned locally, within LPCH, and with the broader healthcare community
- Participate in improvement collaboratives

RESPONSIBILITIES

- Develop, monitor, and maintain a metrics dashboard
- Develop improvement initiatives based on outcome/process metrics, problems surfaced in DMS, and goals deployed through the hospital.
- Report results and lessons learned from initiatives on a regular basis

MEMBERSHIP

The LIT will be co-chaired by a physician and a nurse leader. The core team will include the following:

- Physician Lead
- Nurse Lead
- Department of Family Centered Care Representative
- Quality and/or Performance Improvement manager
- LIT Coordinator/facilitator/project manager
- Patient Care Manager

Additional members may include:

- Clinicians

- Physician(s), including Medical Director
 - Nurse Practitioner
 - Nursing Shared Leadership representative, other nurse(s)
 - Clinical Nurse Specialist and educator
 - Task Force Chairpersons
-
- Analyst
 - Senior Executive
 - Clinical Informatics
 - Other support services, ad hoc (e.g., lactation consultant, pharmacist, social work, lab)

QUORUM AND VOTING

Decisions will be based on consensus of participating members

MEETINGS

The LIT will meet weekly. Additional, related meetings may include meetings with other LITs (internal collaborative) or service line unit/department LIT meetings. The physician or nurse lead may call special meetings at any time. Documentation of all key decisions and tasks will be maintained

REPORTING STRUCTURE

The Maternity LIT reports to the Medical Director, Patient Care Manager, and Johnson Center Service Line Director as well as the Quality Improvement Committee

DOCUMENT INFORMATION

Authors:

Heather Freeman, RN, MS, Director, Performance Improvement

Paul Sharek, MD, MPH, Medical Director, Center for Quality and Clinical Effectiveness

Fran Schlaefer, RN, MN, Johnson Center Service Line Director

Susan Crowe, MD

Lou Filoteo, RN, BSN, Patient Care Manager Maternity

Beth Faulkner, RNC-NIC, MN, CCNS, Clinical Nurse Specialist, Maternity

Nicole Kangas, PhD, Department of Family Centered Care Representative

Approved by: Maternity LIT members and Quality/Performance Improvement colleagues

Approval/Revision Dates: 6/29/12

Appendix J



Spaghetti Chart indicating path of RN's (4th and 5th responders)

Responder #4 (Green) went around the unit several times looking in several different areas for PPH supplies.

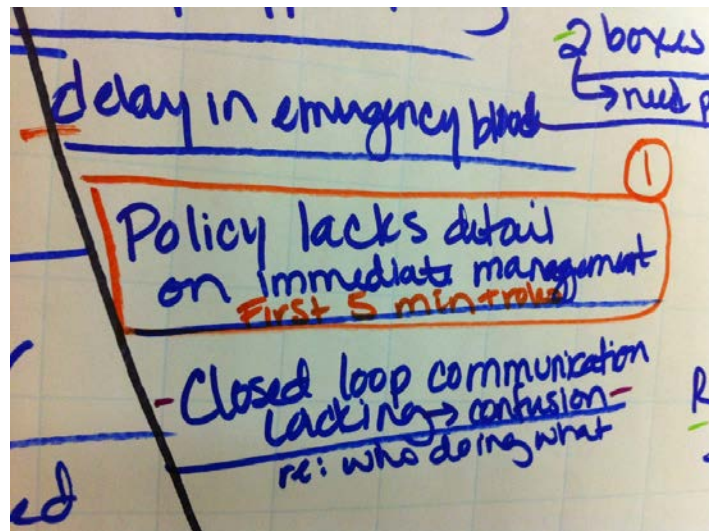
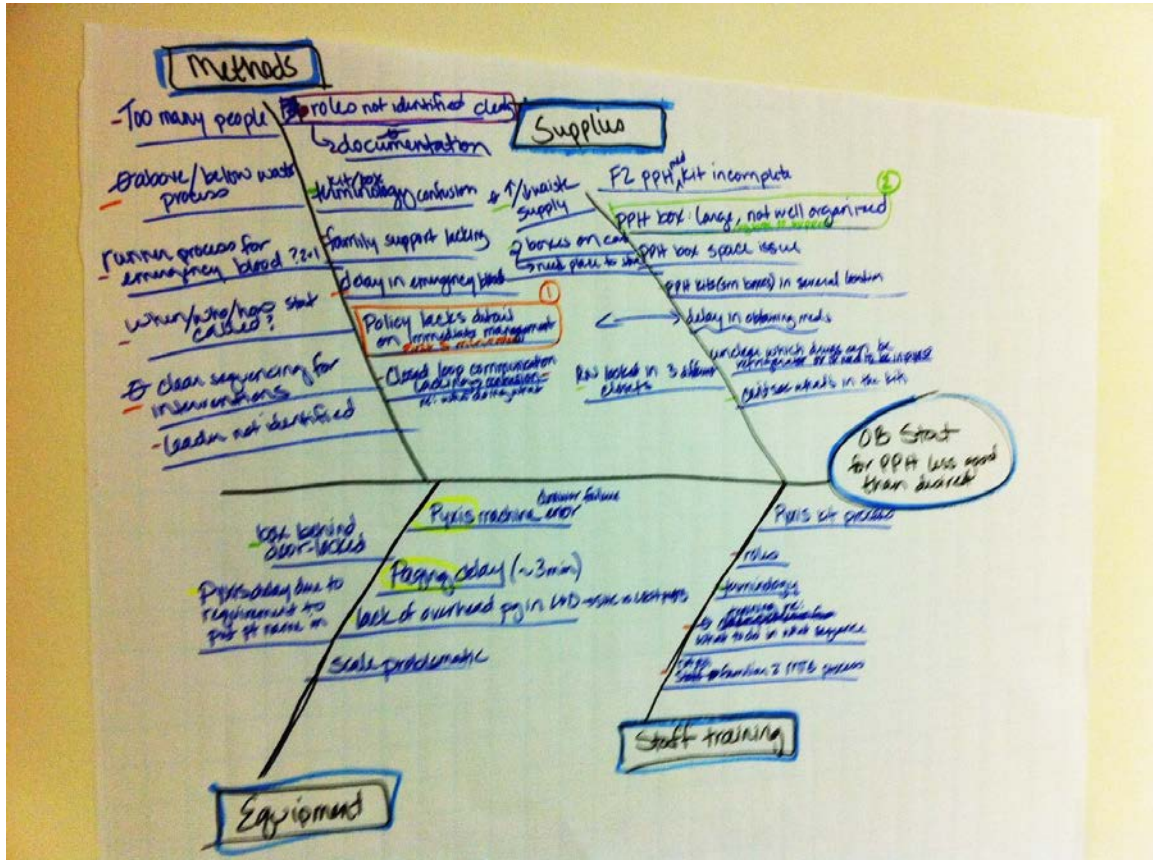
Responder #5 (Blue) went to the medication-dispensing machine and then had to go back because he/she did not access the kit correctly and it only provided some of the medications needed.



Process Map (Who responded, when, what did they do, where did they go and how much time did it take?)

Appendix K

Fishbone Diagram



Appendix L
A3 for PPH LIT

Date/Version:



Owner: Beth Fawikner
 Sponsor(s): Paul Sharek, Frasschhofer
 Team: Susan Crowe, Lou Filoteo, Nicole, Denesia, Melissa, Kay Weather, Margie, Kevin

Title: Support Management of Postpartum Hemorrhage providing excellent Patient Care + Service

<p>Background:</p>	<p>Recommendations/Proposed Changes:</p>
<p>Current State:</p>	<p>Action Items:</p> <p>What: Ascum Phone use for "211" - training RN's Preprogram 211 in phones. Pharmacy - establish in 2013. PPIX one way. TRAIN RN's and RN's on lead role - Huddles, meetings, Annual Skills Fair. Practice + TRAINING Closed Loop Communication. February Rapid Process Improvement training - communication.</p> <p>Who: RN's, MD's</p> <p>When: December 2013</p> <p>I identify how many MD's respond and who is Lead (December 2013) DR Crowe</p>
<p>Problem Statement:</p> <p>Time - 60% under goal Quality - 60% under goal Cost - ↑ LOS, ↑ cost</p>	<p>Measures and Follow-up:</p> <ul style="list-style-type: none"> - Initiation of "OB STAT" by calling 211 on Ascum phone within 30 seconds of recognition of hemorrhage - Able to identify what MD's respond to OB STAT and who is the Lead. They will be the only ones asking questions of the Lead RN. - Sustain 100% Family centered care - Sustain no response time - Improve address of medication & time by 50% - Establish closed loop communication and implement 100% of practice PPH management monthly - sustain improve the time
<p>Goal/Aim:</p> <p>100% completion of all PPH Bundle elements by the RN Staff on maternity within 5 minutes of recognition of patient hemorrhaging by end of Jan. 2013</p>	
<p>Analysis of Problem:</p>	

Performance Improvement - Last updated 7/20/11

2nd end of 2011

Appendix M

Maternity (F1 and F2) Postpartum Hemorrhage (PPH) Bundle

Process: PPH Bundle Elements and order of implementation

Job and Role: Designation of who will implement each element of the Bundle

Equipment: Emergency Call Button, BP Machine, PPH Medication (Kit), and PPH Supply Box

<p>MAJOR STEP “What”</p> <ul style="list-style-type: none"> • Does the step “advance” the work? • Typically, you can describe a job in 5 to 7 major steps. 	<p>KEY POINTS “How”</p> <ul style="list-style-type: none"> • Safety of patients, staff, or providers • The knacks and best practices that: a) ensure quality, and b) make the step easier to do • A step may have no key points 	<p>REASONS “Why”</p> <ul style="list-style-type: none"> • Explain why the job should be done in the particular way described in the key point. • Not all key points require reasons.
<p>1. Initiate OB STAT & Massage Uterus</p> <p>1st Responder RN</p> <p>RSN Responds delegates Bundle elements</p>	<p>1.1 presses “Emergency Call Light” button in patient room</p> <p>1.2 massages uterus and determine need for Foley</p> <p>1.3 assigns 1st responder to call OB STAT page</p> <p>1.4 reassures family we are doing everything possible to care for patient</p> <p>1.5 RSN arrives, assumes lead role, begins documentation, and delegates roles for the following steps</p>	<ul style="list-style-type: none"> • Receive help from multidisciplinary team • Uterine massage to decrease bleeding • Patient centered & decreases anxiety, increases trust • Primary RN task saturated RSN able to delegate Bundle tasks in order or simultaneously • Decreases confusion, improves response time, and improves patient safety

<p>2. Measure Blood Pressure & Pulse, Cycled Every Minute</p> <p>2nd Responder</p>	<p>2.1 retrieves BP machine 2.2 obtains reading and sets cycle for Q 1 minute 2.3 takes over documentation from RSN</p>	<ul style="list-style-type: none"> • Need vital signs first to determine urgency and rule out contraindication for Methergine • Improves Closed Loop Communication • Ensures accurate documentation of events
<p>3. Administer Pitocin Then Methergine</p> <p>3rd Responder</p>	<p>3.1 retrieves PPH Medication Kit and Pitocin from Pyxis 3.2 administers Pitocin IV/IM 3.3 administers Methergine 0.2mg IM (do NOT give IV and if BP > 140)</p>	<ul style="list-style-type: none"> • Improves patient outcome • Decreases need for transfusion • Improves patient safety
<p>4. Start IV & Draw Labs</p> <p>4th Responder</p>	<p>4.1 retrieves PPH Supply Box 4.2 inserts IV line 4.3 performs lab draw 4.3.1 Complete blood count 4.3.2 Coagulation Screen 4.3.3 Types & Cross 4.4 labels and sends labs with SUPER STAT</p>	<ul style="list-style-type: none"> • Allows access for administration of fluids and/or blood • Get accurate blood samples prior to transfusion
<p>5. Determine Need For MTG</p> <p>5th Responder</p>	<p>5.1 gets form for MTG 5.2 asks if MTG should be initiated 5.3 If yes, inputs order in Cerner 5.4 calls blood bank and double-checks of MTG initiation 5.5 runs to blood bank</p>	<ul style="list-style-type: none"> • It takes 10-15 minutes to receive emergency blood • Initiating the process as soon as possible will improve patient safety • Will help prevent bad outcome

Appendix N

Uterotonics (medications to treat PPH)

	Oxytocin	Ergometrine/Methyl-ergometrine
Dose and route	IV: Infuse 20 units in 1 L IV fluids at 60 drops per minute	IM or IV (slowly): 0.2 mg
Maximum dose	Not more than 3 L of IV fluids containing oxytocin	5 doses (Total 1.0mg)
Precautions/ contraindications	Do not give as an IV bolus	Pre-eclampsia, hypertension, heart disease

IV= intravenous

IM= intramuscular

L= liter

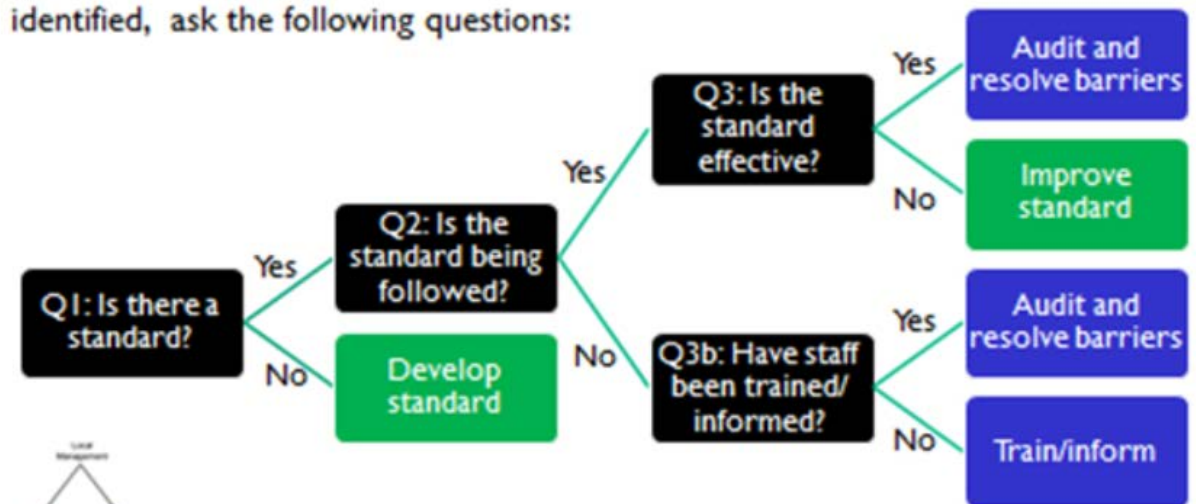
Source: WHO (2009)

Appendix O

Effectively Managing a Problem

We have a PROBLEM! How should it be managed?

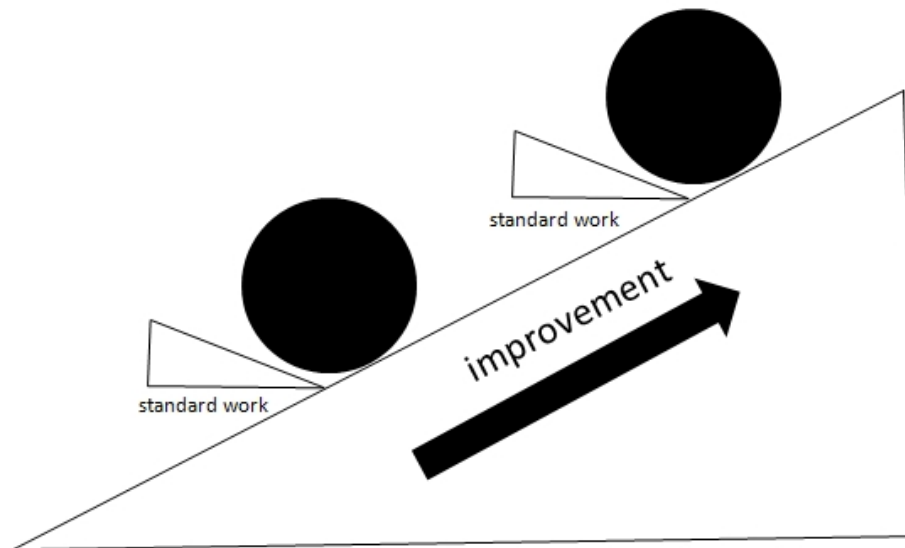
After a specific process has been identified, ask the following questions:



(Freeman, 2012)

Appendix P

Improvement Ramp with Standards

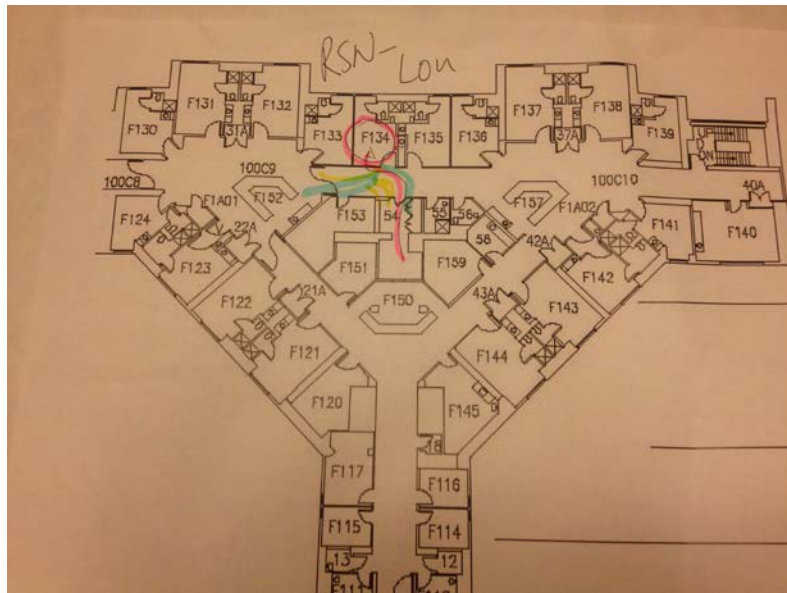
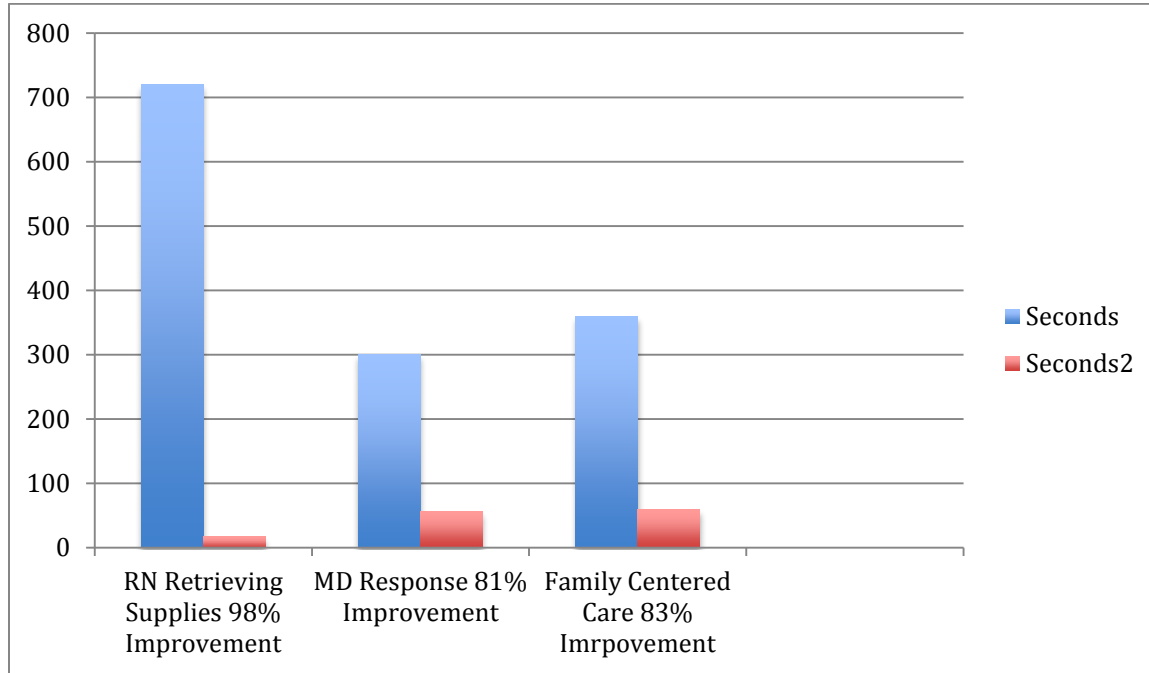


Without a standard, there can be no Kaizen (improvement):

1. Standards are the basis for comparison (before/after)
2. With no standard, can't objectively tell what has changed or what has improved

Appendix Q

PPH Bundle Implementation Improvements – First Test of Change



Spaghetti diagram demonstrates improvements after the new standards were implemented. A significant difference in the ability for the RN to find supplies quickly as compared to the spaghetti diagram in (Appendix J)

Appendix R

PPH Prevention Bundle Build Day

DMS for HAC Build Day Agenda		
Description	NOTES	Supplies
Welcome & Introductions	High-level overview of day's agenda (flip chart), expectations, and constraints.	Day's agenda, flip chart, markers
Tour of unit	Unit leadership to tour build group through unit to discuss current DMS, vision for visibility boards, etc.	Post-it pad, pens
Break down current viz boards (if applicable)	Deploy 1-2 people to break down/rearrange current viz boards	Staple removers, manilla envelopes for storage,
Bundle/standard work review	Review elements of bundle, related policy, group consensus on what will be written in the standard work	Bundle for specific HAC, policy, laptops, access to colored printer on unit
Group work	Create task log, assign roles & responsibilities, deploy team	Flip chart, markers, access to 5S kit
Lunch		
Group work	Check in with team for status updates, deploy/redeploy team members as needed	Flip chart, markers, access to 5S kit
Wrap-up	Final status checks with team members, create task log of remaining items, create newsletter, level-set with unit leadership when PI/QI will return, discuss next steps	Flip chart, markers, laptop (w/ access to Microsoft Publisher for newsletter)

Appendix S

Build Date:
March 7, 2013

Provide Extraordinary Family-Centered Care

QUALITY
SAFETY
EFFICIENCY

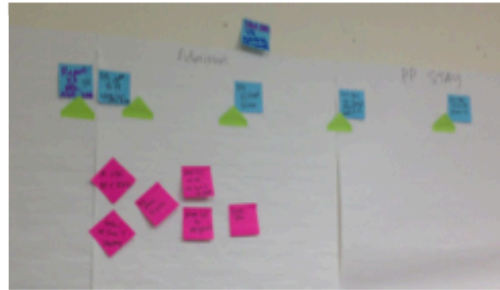
Innovation and Education
Respect for People

LUCILE PACKARD CHILDREN'S HOSPITAL

Maternity DMS Build: Postpartum Hemorrhage Prevention

Daily Management System Build Targets

- Standardize the monitoring and communication of postpartum hemorrhage (PPH) risk upon the mother's arrival in Maternity
- Create a system to support those standards



Progress to date

- Developed a standard for PPH prevention through risk assessment and communication of risk
- Assessed methods, equipment, staffing and supplies (MESS) issues that may inhibit standard compliance
- Designed an Andon escalation system for reporting issues that inhibit staff from complying with the standard
- Created a job aid for following the standard PPH risk assessment process
- Generated a process flow map to help leadership empower nurses to communicate PPH risk to the MD when appropriate
- Created a DMS for PPH risk assessment and communication training plan
- Standardized the leadership process checking schedule and created a tool to track standard compliance and whether process checks are occurring as scheduled
- In the support phase, we will be posting tools in the unit to make visible successes and issues with the PPH prevention and risk assessment process

Appendix T




PPH Prevention Bundle MESS

Methods	<p>Transfer: Ask for MD during pt transfer</p> <p>During Assessment: Check fundus and take vitals Contact MD if first time up, NA helps RN</p> <p>During PPH Primary RN massages fundus and call RSN RSN delegates tasks Primary RN gives report to MD Support RN retrieves meds USA/NA retrieves PPH Box and IV equipment</p>
Equipment	<p>BP machine next to bedside Ascom phone (MD phone number/pager #) Scale</p>
Supplies	<p>Admission bags Gloves by bedside Urine hat - will be in new admit bags IV pole Alaris Pump PPH Box Medications Report Sheet</p>
Staffing	<p>Primary RN - provides care and calls RSN RSN - delegates tasks MD USA/NA - Runner Support RN - massage fundus, insert IV,</p>

Appendix U

PPH Prevention Bundle Standard

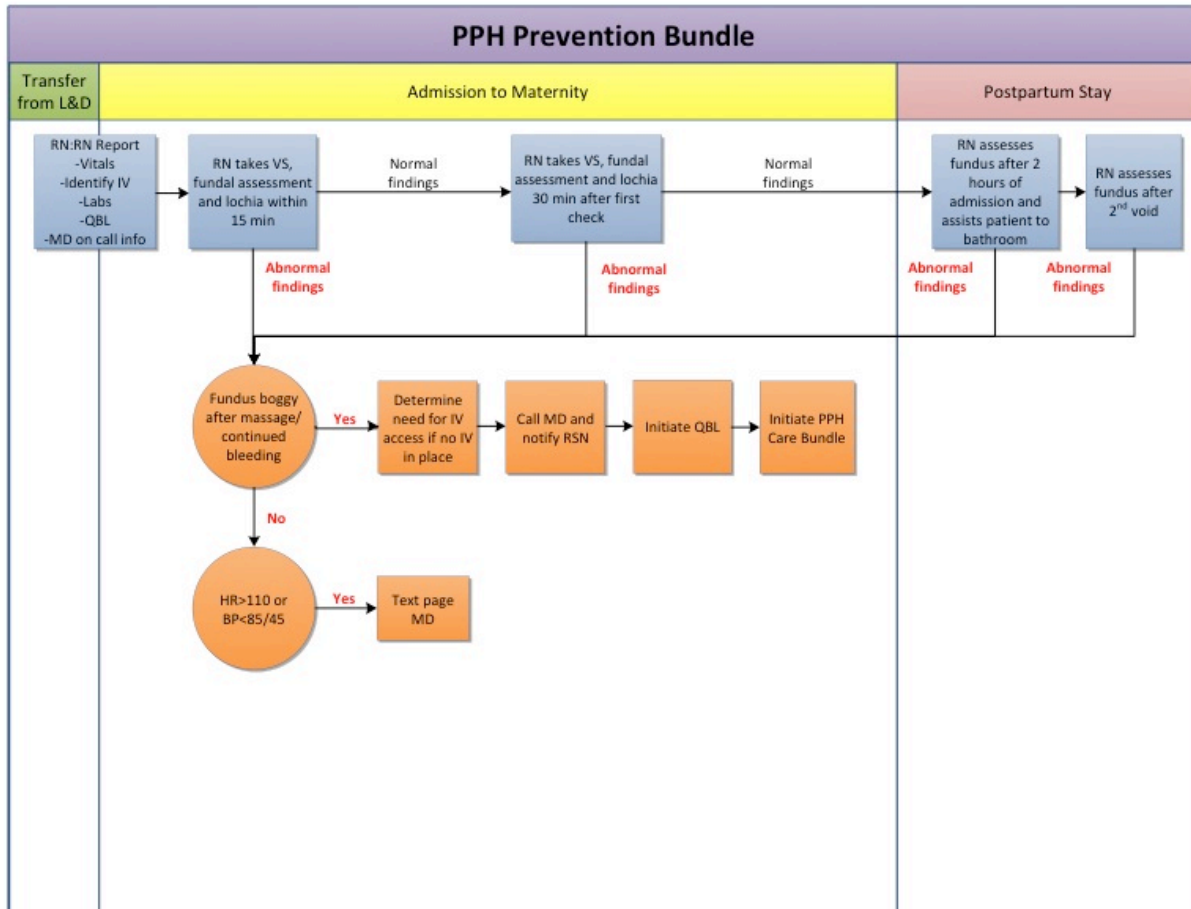
PPH Prevention Bundle

Step	Rationale	How
<p>1. Report form L&D complete:</p> <ul style="list-style-type: none"> a. QBL b. VS and last void c. d. Labs e. IV status f. MD name & number 		<p>Need data points to assess if there is risk for PPH and if you have an IV to respond to a PPH</p> <p>Ensure report sheet is complete and request missing data</p>
<p>2. VS, fundus, lochia check within first 15 minutes of admission*</p>		<p>To assess risk of PPH and intervene if necessary</p> <p>HR, BP, fundal height, amount of lochia assessed</p>
<p>3. VS, fundus, lochia check 30 minutes after first set done*</p> <p>4. RN assesses pt (fundus, lochia) and assist getting up with first void*</p> <p>5. RN assesses pt (fundus, lochia) after second void*</p>		<p>To assess risk of PPH and intervene if necessary</p> <p>Fundal height, amount of lochia</p>

*If fundus boggy after massage and continued bleeding, determine need for IV, call MD, and initiate QBL. If vital signs not WNL (HR > 110, BP < 85/45) send text page to MD.

Appendix V

PPH Prevention Bundle Process Flow Diagram



Appendix W

F1/F2: Daily Management System for (OB-AE) PPH Prevention

Running Task List				
Interview Planning Checklist Items	Done	Outstanding	Assigned to	Comments
Review New Policy.	<input type="checkbox"/>	<input type="checkbox"/>	All	
Look at the root cause of recent OB-AEs.	<input type="checkbox"/>	<input type="checkbox"/>		
Please send hand off documentation & receiving unit assessment process.	<input type="checkbox"/>	<input type="checkbox"/>		
What is the standard for RN-to-RN handoff (specifically L&D to maternity)?	<input type="checkbox"/>	<input type="checkbox"/>		
Talk with Kit about QI standard OBAE recording.	<input type="checkbox"/>	<input type="checkbox"/>		
Root cause analysis of 12 > 4 liters	<input type="checkbox"/>	<input type="checkbox"/>	Maternity Team	24 months, excluding unavoidable cases.
Establish current state by auditing RN-to-RN hand offs....Is the maternity RN getting the QBL?	<input type="checkbox"/>	<input type="checkbox"/>	Maternity Team	
Send Denise Laabs digital copies of any DMS elements: huddle agendas, gemba round agendas, kata (routine), andon escalation process, audit/process checks in use around HAC, leader standard work....	<input type="checkbox"/>	<input type="checkbox"/>	Maternity Team	
Root cause analysis of last 2-3 PPH on F1/F2	<input type="checkbox"/>	<input type="checkbox"/>	Maternity Team	

Appendix X

Running F1F2 PPH Prevention Follow Up Items

Please email Denise Laabs (dlaabs@lpc.org) if any of the tasks look incorrect or were incorrectly assigned.

(Type an 'a' in the "Done?" column to mark as completed.)

Done?	Discussed?	Task	Owner(s)	Follow Up On or By	Notes
	✓	Discuss STP for PPH	Follow up in LIT	3/18/13	
	✓	Follow up on L&D to F1/F2 handoff SBAR Report		3/18/13	Inviting Sara Catalano, Jeri & Andrea to next week's LIT to discuss.
	✓	Add box to debrief form to capture whether standard is helping/working			Fran says to pilot and send to code committee if working.
	✓	Further explore adding standard to orders or nurse communication orders			
	✓	Does the standard algorithm need updating?			We discussed changing the form to address time from delivery rather than admission to Maternity. We talked about adding a phone # for those physicians without texting capability and adding clarifications on when and how to communicate with physician. Beth requested that Marion Flores (& Journal Club?) look into evidence on timing of first void/stand.
	✓	Process Checks			If monthly drills implemented (as requested by both trained groups), this would be an opportunity to check process. From last week's observations, it appears the first vital signs checks are occurring according to the standard.
	✓	Notify DMS for HACs team when training is complete	Amber?		100% has received email. 35% has been trained as of 3/12. If standard is updated, that 35% will need more training. Further discuss monthly drills and RN training.
	✓	Notify DMS for HACs team when training is at least 75% complete	Amber?		
	✓	Capture verbal feedback on the process in training and after events.	Unit		We can start a document and house it on our shared drive folder.
	✓	Let Denise know if/when you need help posting DMS visibility tools in the unit	Unit		
	✓	Post process check tracker	Unit	3/13/13	Please let Denise know if/when you want help posting
	✓	Post andon tracker	Unit	3/13/13	Please let Denise know if/when you want help posting
	✓	Display outcome visibility	Unit	3/15/13	Please let Denise know if/when you want help posting
	✓	Improving nurse/physician communications			Susan suggested residents conduct 15 minute nurse training segments.
	✓	Add to override capabilities during a PPH event for access to Pit in the Pixis			

Support Goals: Support through 75% Trained, Regular Audits, Tiered Accountability, Outcome by Month Improvement

Appendix Z

Andon Tracker (escalation tool)

Andon Escalation			Week of: _____
Specific Problem	Tally	Comments	Further investigation required?
1. L&D report is incomplete or missing			
2. Unable to take vital signs within 15 minutes due to staffing			
3. Unable to take vital signs within 15 minutes due to supplies issues (blood pressure machine etc.)			
4. Appropriate parties not available for 1st and 2nd void fundus assessments			

PPH Prevention Bundle Process Checks Plan

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Night Shift	Laura	Laura/Kaye	Laura/Kaye	Kaye	Laura/Kaye
Day Shift	Melissa	Millie/Melissa	Melissa/Millie	Millie/Melissa	Millie

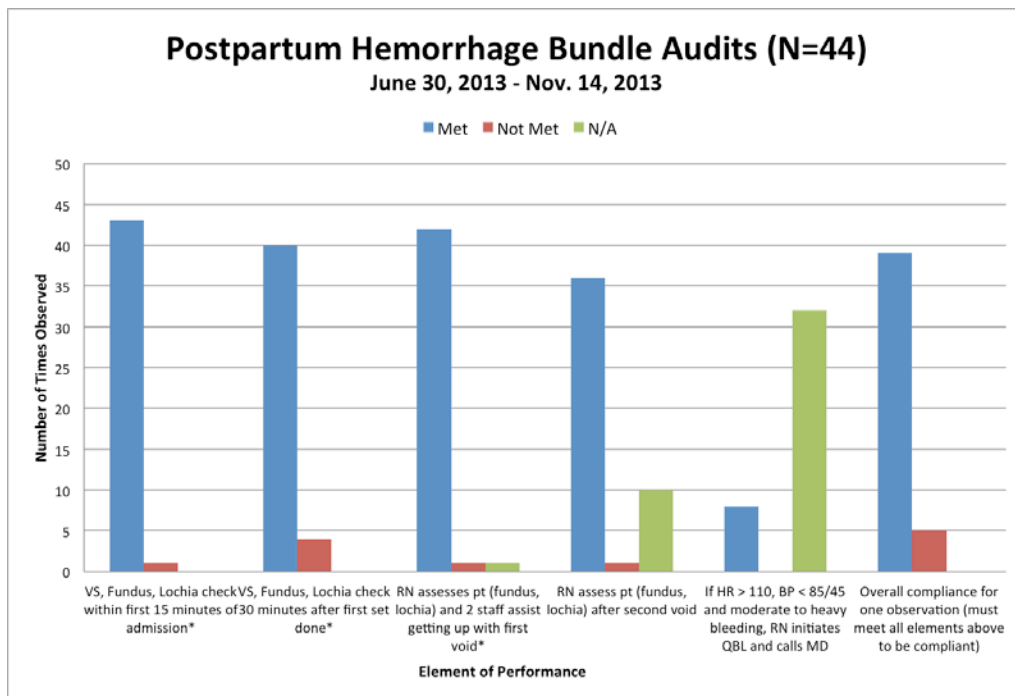
Daily checks by leadership

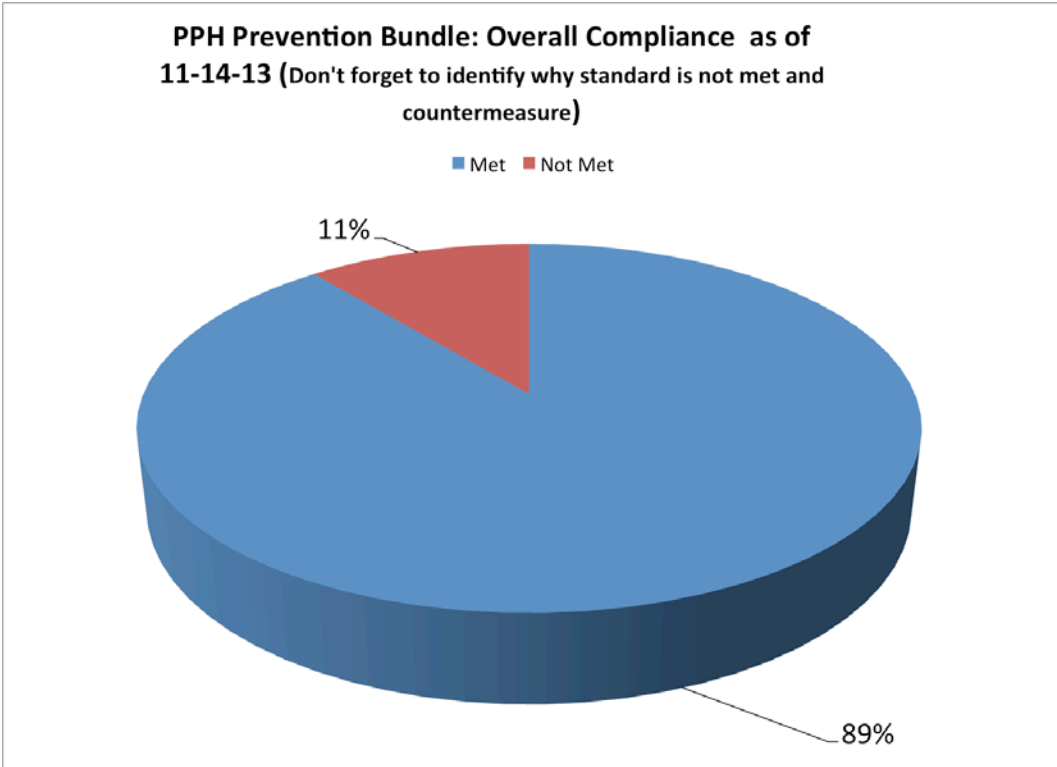
(Assistant Nurse Manager, ANM or Resource Nurse, RSN):

Aiming for at least 1 a shift on weekdays, 10 per week

Tactic: on admissions, be the second person helping to get the patient settled

Appendix AA





Appendix BB

RN L & D to Maternity Handoff New Standard

Maternity - Process Check Log

	<u>#</u>	<u>%</u>
Handoff standard Met:	238	84%
Handoff Standard Not Met:	47	16%
Total sample size	285	100%

Most Frequent issues

	<u>#</u>
1 NA Not Available	10
2 F (up arrow) 3/4 RT on admission	6
3 RN Handoff not done by L&D	3
4 No QBL on Pt Summary	3
5 IV/Fundus charted different from assessment -> but corrected	3
7 No PP orders, delivery summary no sign off	3
8 Med not given- motrin	3

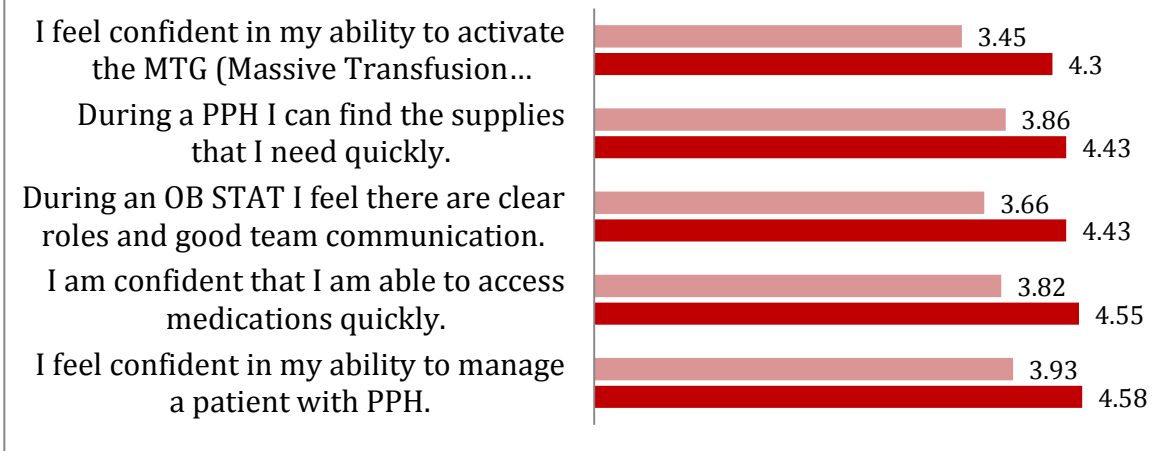
Appendix CC

Maternity LIT PPH Simulation Training

Maternity LIT Postpartum Hemorrhage: Average Scores* from Pre- and Post-Surveys

*1 meaning strongly disagree and 5 meaning strongly agree

■ Pre ■ Post

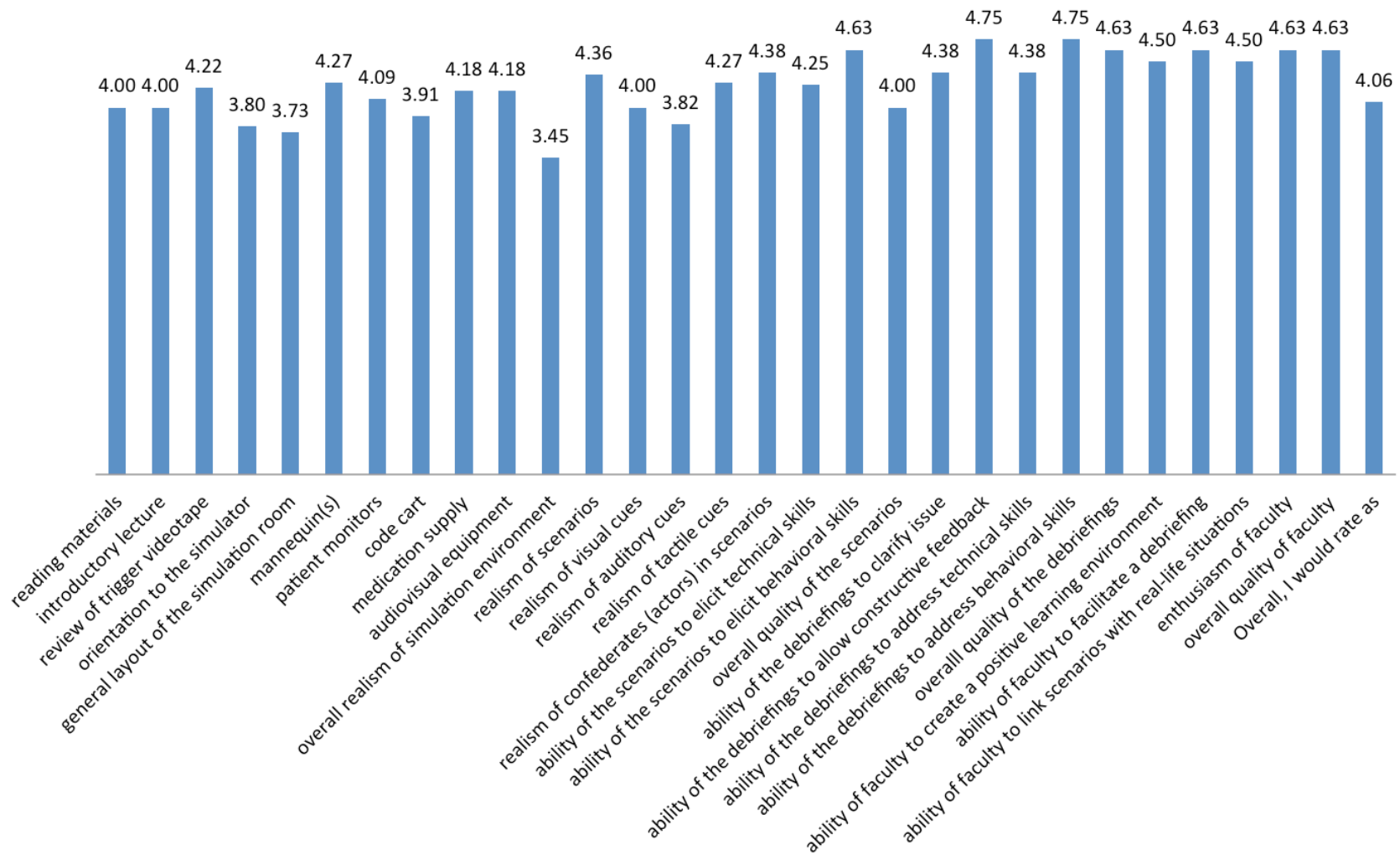


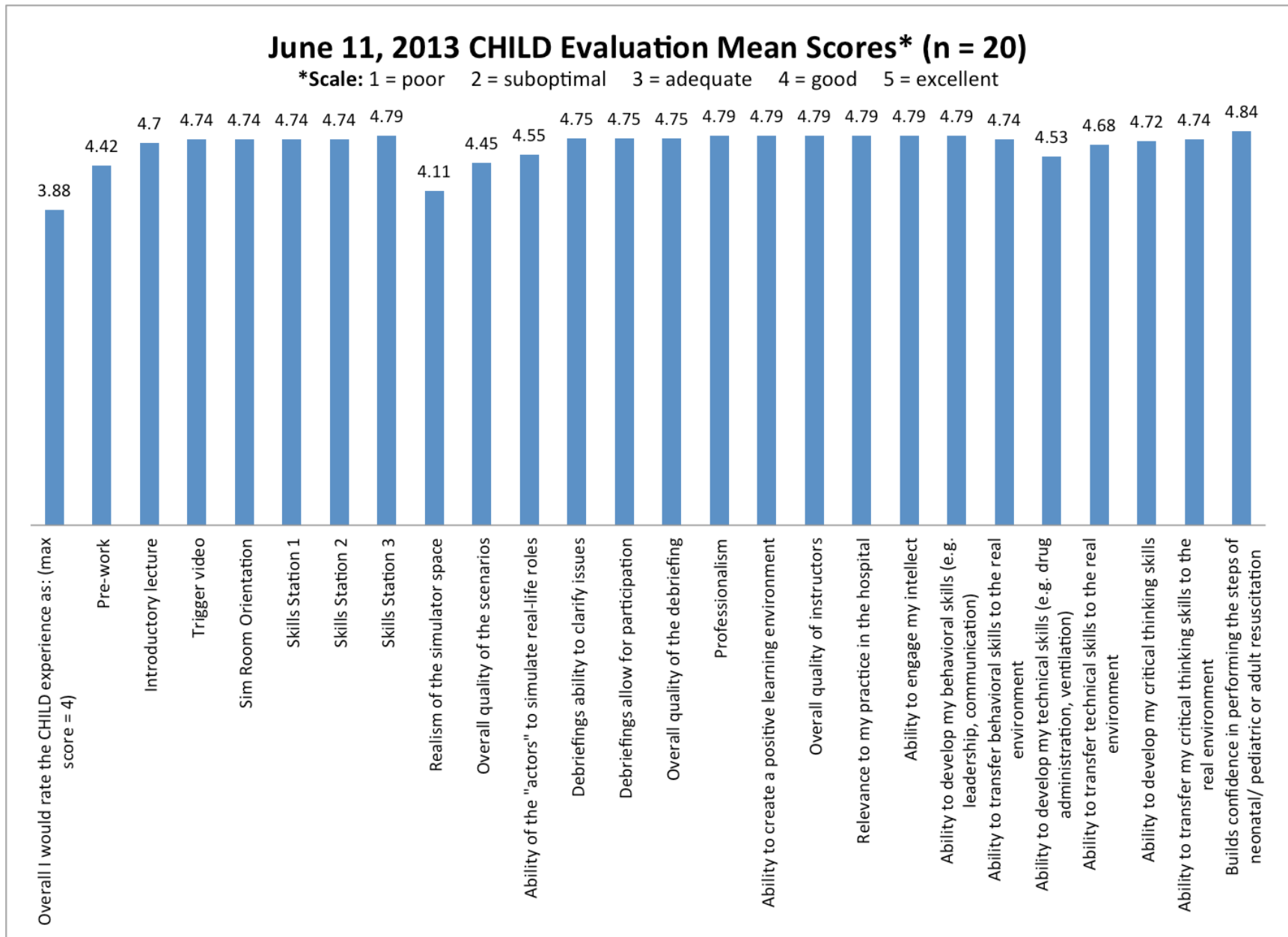
Appendix DD

Simulation Evaluation Mean Scores

March 12, 2013 OB Simulation Evaluation Mean Scores*

*Scale: 0 = not applicable 1 = poor 2 = suboptimal 3 = adequate
4 = good 5 = excellent





Appendix EE

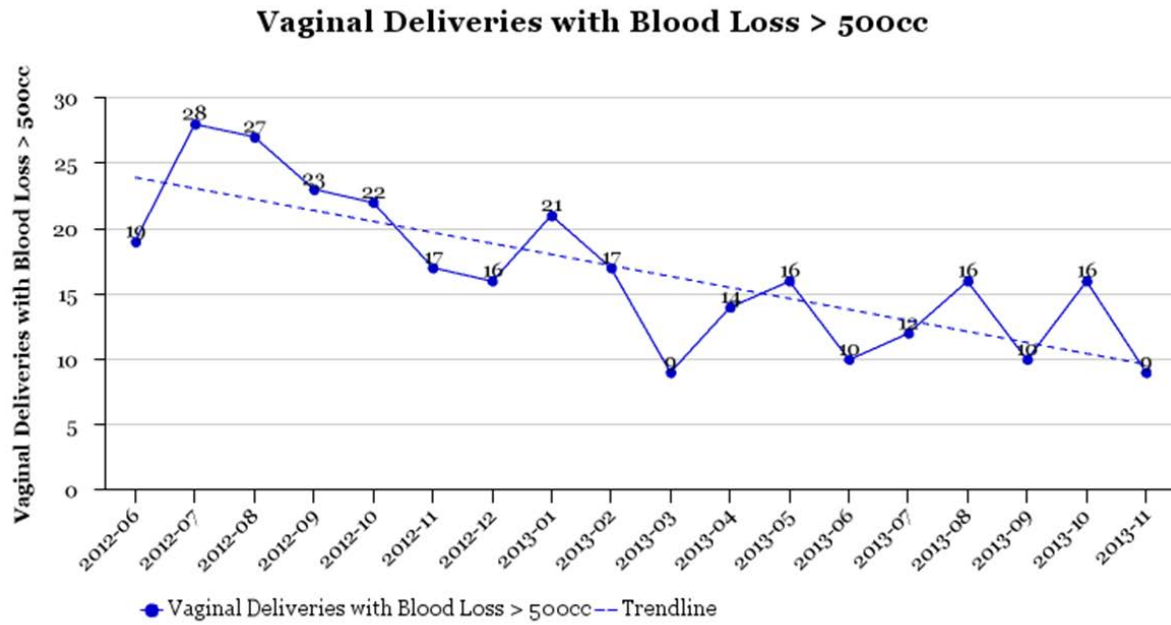
Creating Visibility Board for DMS



Appendix FF

Summary of Outcomes

Overall Decrease in Total Number of PPH's for Vaginal Deliveries



Appendix GG

Actual Budget for Implementation

PPH LIT Budget

Activity	Cost Breakdown	Estimated Cost
Initial Training	Salaries	3600.00
Lean Study Trip	Per person	\$5500.00
DMS Implementation	Leader SW	Hard to calculate cost
Weekly Meetings	Salaries	Minimal Cost-Exempt
Visual Boards	Whiteboard supplies	500.00
Reports outs	Salaries	Minimal
Communications	Posters	100.00
Food for meetings	Per Meal for Team	150.00
Education	In Situ Drills	Minimal
Build Days	PPH Prevention RN Coach and Build Day	7280.00
Total		17,130.00

Appendix GG

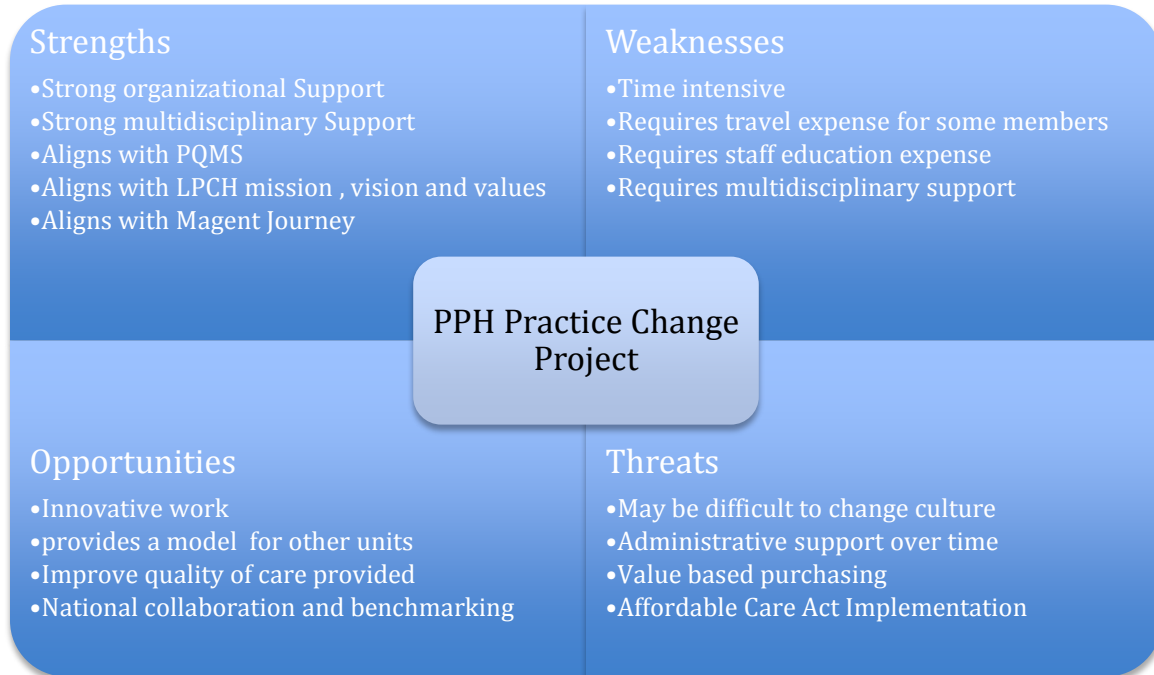
Projected Budget for Implementation

Activity	Operational Expenses	Per Month	Annual Cost	Already Budgeted
3 Day LIT Training (salary non-exempt)	\$1200	\$0	\$1200	
Weekly Meetings (salary non-exempt)	\$120	\$120	\$1,440	
In Situ Sims (salary non-exempt)	\$120	\$120	\$1440	
Lean Study Trip (2)	\$5500pp	\$0	\$11,000	
Prevention Build Day (salaries non exempt)	\$960	\$0	\$960	
Simulation Training for RN Staff Salary (4 HR x 97 RN's)	\$26,384	\$0	\$26,384	\$26,384
CAPE Simulation Center Cost (10 Sessions)	\$12,500	\$0	\$12,500	\$12,500
Visuals and DMS Boards	\$400	\$0	\$400	
Physician (,2 FTE)		\$5200	\$62,400	

Totals	\$34,684	\$240	\$55,564	\$38,884
			(38,884)	
Total Cost to Implement			\$16,680	

Appendix HH

SWOT Analysis



Appendix II

See Separate Attachment Gantt chart