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Implementing AWHONN's Evidence Based Guidelines for Managing the Second Stage of Labor

George S. Knapp
University of San Diego, gsknapp@sandiego.edu

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George Knapp, BSN, DNP Student, University San Diego

Mary Barger, PhD, MPH, CNM, University of San Diego

Douglas Fenton, MD, Scripps HealthCare

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Abstract

Objective: To improve cesarean rates without worsening perineal tissue integrity or neonatal 5 minute Apgar score. **Design**: Quality improvement project evaluated with descriptive statistics. **Setting**: A 24-bed perinatal floor at a general acute care hospital in San Diego County California. **Patients**: Nulliparous term mothers with a vertex singleton pregnancy (NTSV) with or without epidural anesthesia (EA). **Intervention/Measurements**: To implement the Association of Women's Health, Obstetrical, and Neonatal Nurses' (AWHONN) evidence based clinical practice guidelines, *Nursing Care and Management of the Second Stage of Labor* and *Nursing Care of the Woman Receiving Regional Analgesia/Anesthesia in Labor* and measure the outcomes of cesareans, episiotomy, third and fourth degree lacerations, and 5 minute Apgar scores less than 7. **Results**: A 2.23% decrease in cesareans was realized with a corresponding increase of 0.19% in 3rd and 4th degree lacerations, a 0.23% increase in episiotomies, and a 0.72% increase in 5 min Apgar less than 7. **Conclusions**: Instituting AWHONN's evidenced based practice guidelines in managing the second stage of labor can improve cesarean rates even after recommended benchmarks are achieved. Balance outcome measures must be monitored within the context of appropriate cesarean benchmarks in helping to determine their significance. A collaborative approach when instituting professional evidence based practice guidelines is recommended.

Keywords: NTSV, cesarean section, evidence based practice, labor and delivery

Précis Statement

Cesarean rates improve when instituting AWHONN's evidenced based practice guidelines in managing the second stage of labor, but may worsen balance outcome measures when cesarean rates fall below benchmarks.

Background

Cesarean delivery (CD) is necessary to reduce morbidity and mortality in both the mother and newborn when appropriately applied. Between 1998 and 2008, the cesarean rate in California increased from 22% to 33**%** without a corresponding improvement in neonatal outcomes and in the face of increasing maternal mortality (Main et al., 2011). Recognizing the optimal cesarean rate is difficult; Srinivas, Fager, & Lorch, (2010) found a correlation between lower than expected cesarean rates with higher rates of maternal and neonatal morbidity - meaning there is likely a lower safety limit when additional cesareans will improve outcomes. The World Health Organization sets this number between 10% and 15% (World Health Organization, 2015). Accordingly, rates somewhat greater than 15% do not impart better outcomes on neonates and mothers, at least on the world stage. Main et al., (2011) indicate that this goal is unrealistic in the U.S., but notes 15% may be realistic for low risk first time mothers identified as nulliparous, term, singleton, and vertex pregnancies (NTSV). Healthy People 2020 objectives set a NTSV cesarean goal at 23.9% (HealthyPeople.gov website, n.d.), but acknowledge this goal is above the optimal rate. Hospital specific cesarean rates are indicators of quality care (Joint Commission PC-02, 2015; Main, Moore, Farrell, & Sterling, 2006). Balance measures such as neonatal Apgar scores or umbilical cord blood gas values can theoretically be used to find an institutions optimal cesarean rate.

Unnecessary cesareans convey additional costs and negatively impact subsequent pregnancies with "increased risk of major morbidity" for the mother (Marshall, Fu, & Guise, 2011, p. 262e7) and increased morbidity and mortality for the next neonate (Huang et al., 2011). Understanding the causes of cesareans may lead to safe reduction in their numbers. Labor dystocia (34 percent) and fetal distress (23 percent) account for nearly 60% of the CDs in the United States (American College of Obstetricians and Gynecologists [ACOG], 2014).

Although most attention is directed towards obstetrical providers in reducing unnecessary CDs, nursing care and management also influence these outcomes (Simpson, 2005). It has been argued that nurses have a cesarean rate that is independent of the physician (Regan & Liaschenko, 2007; Edmonds, Hacker, Golen, & Shah, 2016). In 2002, AWHONN first published nursing evidenced based practice (EBP) clinical guidelines for the management of the second stage of labor that support vaginal delivery and center care and decision making around a well-informed patient. Important areas addressed include duration of the second stage of labor, pushing techniques, patient positioning, and bladder management. AWHONN also published an adjunct EBP clinical guideline for laboring women who receive regional (epidural/spinal) anesthesia. Both clinical guidelines have been updated, but despite their availability - nursing practice remains outdated and cesarean rates remain above recommended benchmarks.

The California Maternal Quality Care Collaborative (CMQCC) Maternal Data Center offers data collection and reporting services to birth facilities in California by combining maternal and neonatal hospital discharge data and birth data within one system. Hospitals can access their data through a secure website and compare their data

to state, region, or by similar hospitals. Limited data, such as cesarean rates and episiotomy rates, are available to the public via the internet http://calhospitalcompare.org.

Needs Assessment

The NTSV cesarean rate at the hospital rose from 27% in 2013 to 30.2% in 2014. Although it dropped to 24.7% in 2015, it remained above the State average of 23.5% and the benchmark of 23.9% set by Healthy People 2020. The dangers associated with CD have more recently been appreciated and include psychological and physical risks associated with surgery which are then compounded by subsequent cesareans the mother will likely endure should she become pregnant again (Smith, Peterson, LeGrew, & Main, 2016). In addition to health risks are the burden of increased healthcare costs associated with CD which some have estimated at an average of $10,200.00 per each procedure (National Quality Forum, 2008) or 30% more than vaginal delivery (Kozhimannil, Law, & Virnig, 2013); Controlling unnecessary CDs is in the best interest of patients and the healthcare system.

Review of the Literature

The AWHONN evidence based guideline for the management of the second stage of labor was last updated in 2008 and the guidelines for analgesia/anesthesia for labor in 2011. To improve engagement and ensure the guidelines were appropriate as an education tool for bedside labor and delivery nurses, it was important to ensure the evidence was both high quality and current. The following is a synthesized review of the literature and supporting evidence for the AWHONN guidelines.

Duration of the Second Stage of Labor: The period between complete dilation of the cervix and the birth of the newborn is known as the second stage of labor;

historically the normal length of time for a singleton, vertex, primigravida was about two hours (Friedman, 1955). If delivery took longer, then the patient would be diagnosed with "labor dystocia" or prolonged second stage of labor. The heightened risk to the fetus during this period is well recognized (Hellman & Prystowsky, 1952; Caldeyro-Barcia, 1979). Many of the pioneers in obstetrics attempted to shorten this period by various means in the belief it would decrease fetal risks, i.e., brute force such as in the now obsolete Kristeller's procedure (fundal pressure), the use of instruments such as forceps and vacuum assist, and CD) if delivery had not occurred within two hours. Proponents of a time limited second stage still exist (Leveno, Nelson, & McIntire, in press; Cohen & Freidman, 2014). There is a sizable sum of evidence that supports longer periods considered safe for both the mother and neonate.

In a healthy mixed population of women in New Mexico, Albers, Schiff, & Gorwoda (1996) found that Friedman's curve did not fit their observed longer second stage and advised that the curve be revised accordingly. Zhang, Troendle, & Yancey (2002) renewed attention to Freidman's curve and found similar results to Albers, Schiff, and Gorwoda but more compellingly advised practitioners not to make a diagnosis of protracted or arrest of labor leaving the readers to infer that unnecessary intervention such as CD would result. In their systematic review of the literature, Lieberman & O'Donoghue (2002) confirmed a longer second stage of labor for those with epidurals and consequently the American College of Obstetricians and Gynecologists (ACOG) adjusted the upper time limit for those with epidurals to three hours (2003). Looking more closely, Laughon, Branch, Beaver, & Zhang (2012) compared data from two large and historically separated data sets, the Collaborative Perinatal Project 1959-1966 and the

Consortium on Safe Labor 2002 - 2008 and reported that modern day interventions such as induction of labor, the use of oxytocin, labor epidurals, and fetal heart monitoring all had influenced the timing of labor stages. Furthermore, they found that operative deliveries (mid and low-forceps) were no longer commonly practiced which historically would have hastened the second stage. They recommended lengthening the time for what was considered normal in the first and second stages.

Cheng, Hopkins, Laros, & Caughey (2004), found in a large retrospective study that after four hours there were increases in the number of operative vaginal deliveries, extensive perineal lacerations, and CD. Importantly, an increasing length of second stage, even greater than six hours, was not associated with poor neonatal outcomes. Subsequent studies have concluded similarly that timing of the second stage of labor, in and by itself, is not cause for CD (Rouse et al., 2009) and periods greater than three hours for the second stage of labor "does not increase the risk of adverse neonatal outcome" (Le Ray et al., 2009, p. 361.e5).

After considering the available evidence, ACOG removed the time limits placed on the second stage of labor and instead wrote management strategies and indicators for appropriate interventions noting "what constitutes an appropriate duration of the second stage is not straightforward" (ACOG, 2014, p. 9). ACOG's liberation of the second stage of labor from a strict time limit mirrors practice demonstrated by midwives whose guidelines, for more than a decade, have reflected an individualized approach to mitigating the risks associated with the second stage of labor and the significant impact those decisions will have on the labor's outcomes (American College of Nurse-Midwives, 2012; Royal College of Midwives, 2012). Midwife led birth-center care

demonstrates very low CD rates, lower intervention rates, and comparable neonatal and maternal outcomes to obstetrical/hospital based care (Stapleton, Osborne, & Illuzzi, 2013).

Pushing Technique: The "when and how" to push has historically been to commence pushing upon complete dilation of the cervix and to use a closed glottis (Valsalva) or directed technique for pushing by taking in a deep breath and holding it whilst pushing with great effort for a count of ten (Simpson, 2006). Timing is arguably the impetus for this practice by maximizing the amount of time that the patient is actively pushing as a ratio of the overall length of the stage, but this may place undue and unnatural stress on the fetus. Caldeyro-Barcia, (1979, p. 17) found that a woman's pushing effort "spontaneously lasted 5 to 6 seconds" and that the fetus tolerated this well, however, when directed to push for longer periods of 10 to 15 seconds, there was a compounding negative effect on the fetus (Caldeyro-Barcia et al., 1981). Aldrich et al. (1995) demonstrated that directed pushing creates significant fetal hypoxia. More recently, Yli et al. (2012), showed that the risk to the fetus was more closely associated with the accumulative minutes of active pushing and not necessarily by the total length of time for the second stage of labor.

Fraser et al. (2000) looked at the effects of waiting to initiate pushing for up to 2 hours "passive descent" in women with epidural anesthesia and found decreased cesarean and mid-forceps deliveries (no longer practiced for medico-legal reasons) but noted lower neonatal cord blood pH results. These cord blood gas results were above an acceptable cut-off threshold and thus may be insignificant in terms of clinical practice. In their prospective random controlled trial (RCT), Hansen, Clark, & Foster (2002) demonstrated

that passive descent in laboring women with epidurals can safely decrease the overall pushing time and stress on the fetus despite increasing the length of time for the second stage. Roberts (2003) described two phases within the second stage of labor which brought needed promotion for women to delay pushing until a strong urge was sensed. This urge, or Ferguson's reflex, is associated with advanced fetal station. The guidelines published by AWHONN referenced a well-designed RCT (Simpson & James, 2005) that showed improved fetal heart rate and fetal oxygen saturation (a technique no longer used) with the use of passive descent or "delayed pushing." In addition to identifying less time pushing and less stress for the fetus, Brancato, Church, & Stone (2008) reported that passive descent also decreased operative deliveries and increased spontaneous vaginal births. More recently and after AWHONN published their most recent edition guidelines, Lemos et al. (2015) reviewed 20 mixed methodology studies indifferent to epidural status and concluded similarly that delayed pushing shortened total pushing time and lengthened the second stage of labor without negatively effecting important clinical neonatal outcomes. Women may also experience less incontinence with passive decent. Prins, Boxem, Lucas, & Hutton, (2011) in their review of RCTs found an early urge to void at three months' post-partum in those directed to push (i.e. decreased bladder capacity).

Patient Positioning: The position of the laboring woman can have a profound effect on the fetus as well as maternal comfort and birth associated maternal injuries. Avoiding the supine position has long been known to improve placental perfusion through improved blood flow to the uterus (Ueland & Hansen, 1969). The AWHONN guidelines (2008 P. 14) promote an upright "greater than 30 degrees" position important

for maternal-fetal hemodynamics and optimizing fetal heart rate patterns (Gupta, Hofmeyr, & Smyth, 2004). Gupta et al. (2012) updated their systematic review of risks associated with the upright position without epidurals and maintain that, despite an increased risk of hemorrhage, the position to labor and deliver in should be of the woman's choosing. Use of the non-supine position to deliver can reduce perineal injury and edema (Terry, Westcott, O'Shea, & Kelly, 2006), decrease the number of episiotomies performed and lessen the use of oxytocin (Bodner-Adler et al., 2003; De Jonge, Teunissen, & Lagro-Janssen, 2004). Frequent position changes promote fetal alignment in the pelvis (Fenwick & Simkin, 1987) and can be especially advantageous when combined with a hands and knees (quadruped) position or a lateral Sims position for rotation and delivery of the occipital posterior fetal lie (Ridley, 2007; Reitter et al., 2014). Gravity aides some positions, i.e., standing, kneeling, sitting, and squatting, while gravity neutral positions, such as a lateral Sims, "modified squatting," or quadruped position may be more relaxing and can be used with epidurals (Bianchi & Adams, 2009, p. 42). Women who use an upright position report less discomfort and use less pain medications (De Jong et al., 1997; Shilling, Romano, & DiFranco, 2007). A reduction in back pain is seen using the quadruped position (Stremler et al., 2005); it can also be accomplished in women with epidurals which may improve birth outcomes (Stremler, Halpern, Weston, Yee, & Hodnett, 2009). Wong et al. (2003) found that pushing in a lithotomy position increased the risk of lower back nerve injuries. The delivery in lateral position offers a protective effect over recumbent from anal sphincter injury in the nulliparous patient (Elvander, Ahlberg, Thies-Lagergren, Cnattingius, & Stephansson, 2015); Schirmer, Fustinoni, & Basile, (2011, p. 749), report lower risk of "serious

perineal traumas" and Meyvis et al., (2012) note fewer episiotomies. Use of a standing position for delivery may increase the risk of third degree perineal laceration significantly (Gareberg et al., 1994).

Bladder Management: The AWHONN Practice Guidelines note that maintaining an empty bladder is important to prevent bladder injury (Cunningham et al., 2005) and reducing the bladder from impeding fetal descent (Sprague et al., 2006). Keeping the bladder relatively unfilled through frequent emptying can also prevent postpartum urinary and anal incontinence (Birch, Doyle, Ellis, & Hogard, 2009). Additionally, the guidelines recommend minimally invasive techniques for assisting the woman to empty her bladder by promoting in and out catheterization (straight catheterization) of the bladder over indwelling catheters, and spontaneous bladder emptying over catheterization when possible. Those with indwelling catheters are more likely to have denser epidurals and a need for augmentation of labor (Rigini, Evron, Sadan, Szmuk, & Ezri, 2006). Nearly two thirds of women will not be able to void spontaneously after receiving an epidural (Mayberry, Clemmens, & De, 2002). Wong (2009) notes the ability to illicit an urge to void is dose-dependent. The risk of bladder infection seems unequivocal for straight catheterization compared to indwelling catheters (Rigini et al., 2006; Evron et al., 2008). More recently Wilson, Passante, Rauschenbach, Yang, & Wong, (2015) found that women who were induced and had epidurals had increased rates of cesarean when an indwelling catheter was placed versus those who had intermittent catheterization.

Epidural: The AWHONN guidelines consider regional analgesia an elective procedure but one that should be provided upon request unless medically contraindicated.

In the U.S., this consists of an epidural or combination epidural/spinal. Mortality is extremely rare (Hawkins, Chang, Palmer, Gibbs, & Callaghan, 2011); more commonly are morbidities associated with sensory and motor nerve blockade and the placement of the catheter. Anim-Somuah, Smyth, & Howell (2005) chronicled associated morbidities that included reduced maternal movement, a *moderate* increase in the length of the second stage of labor, increased risk of instrumented delivery, decreased perception of an urge to push, noninfectious maternal fever, increased use of indwelling urinary bladder catheterization, and increased use of oxytocin – but no increase in cesarean. In an update of their review, Anim-Somuah, Smyth, & Jones (2011) reported no changes in these findings. O'Hana et al., (2008) likewise found an increase in labor dystocia and use of vacuum delivery but no increase in CD. The lack of epidural impact on CD results are contradicted by Klein's (2006) evaluation of the systematic reviews, which when stratified by initiation of epidural anesthesia before versus after the onset of active labor, demonstrated a greater than two-fold increase in CD. Eriksen, Nohr, & Kjaergaard, (2011) also found higher risks of emergency cesarean and vacuum delivery when looking specifically at low risk labors. Cheng, Shaffer, Nicholson, & Caughey, (2014) identified an increased length in the second stage of labor of up to four hours for nulliparous women with epidurals. Le Ray et al., (2005) noted an association between OP fetal lie and high fetal station at the time of epidural placement. Lieberman, Davidson, Lee-Parritz, & Shearer (2005) postulated that a reduction in pelvic tone from regional anesthesia was responsible for the association they identified between epidurals and occiput posterior (OP) position of the fetus at birth.

Epidural related maternal fever is a developing concern that has long been recognized (Wong, 2009; Anim-Somuah et al., 2011; Greenwell et al., 2012) and can be differentiated clinically from infection, albeit not easily; any maternal fever presents a risk to the neonate. Shatken, Greenough, & McPherson, (2011) report an increased need for neonatal resuscitation and incidence of neonatal encephalopathy, regardless of the etiology, which has more recently been supported by Törnell et al., (2015) who found a correlation between maternal fever and neonatal seizures and cerebral ischemia. The magnitude of epidural related maternal fever is estimated by Goetzl et al., (2007) to affect up to 33% of those receiving epidurals. Sharma, Rogers, Alexander, McIntire, & Leveno, (2014) substantiate an inflammatory cause of epidural fevers which Wang et al., (2011) attribute to elevated interleukins and successfully treated with dexamethasone. Such treatment in the presence of infection poses a potential danger to both mother and fetus and may be impractical. The AWHONN (2011 p. 11) guidelines report that the rise in temperature starts "two to five hours after epidural placement" which Goetzl et al., (2007) also saw. The AWHONN guidelines do not provide recommendations for either mitigating or preventing epidural associated maternal fever, however Shatken, Greenough, & McPherson, (2011) believe that avoiding or delaying initiation are the current best options.

Discussion

This project took place at an acute care hospital in San Diego County California within the labor and delivery department which averages 1500 deliveries annually. The management team consists of a nurse manager, two assistant nurse managers, and a nurse educator. There is not a clinical nurse specialist (CNS).

In 2014, a performance improvement team was created to address department clinical practice issues. The team consisted of twelve members that included clinical nurses from intrapartum and postpartum units, an administrative specialist from quality improvement, and the nurse educator and nurse managers from both units. The team met three times in as many months but were unable to formulate a project to address voiced concerns. Evidence for practice change remained debated without consensus and the group disbanded.

In early 2015, this project was envisioned by the first author as part of a Doctor of Nursing Practice Capstone requirement and received approval for implementation by the nurse manager and the medical director, who was also the chief of obstetrics. The goal was to improve cesarean rates without worsening perineal tissue integrity or neonatal outcomes and to support a culture that sought to practice evidence based labor management.

Project Plan

Having learned from the previous experience, the Advancing Research and Clinical Practice Through Close Collaboration (ARCC) model was chosen to help guide the project. ARCC is designed to improve evidence based practice (EBP) through collaboration amongst clinicians who are motivated to improve clinical outcomes and exist in a culture open to change but lack important expertise. The model requires administrative support and an EBP champion – which the department now had. Implementation was planned to occur from June 2016 through November 2016 (See Appendix A – timelines). The medical director had already begun addressing the cesarean rate within the department amongst medical providers. His interest in lowering

the CD rate likely motivated his support for the project which consisted of nursing education, patient education, and adoption of evidenced based nursing interventions and practice.

Nursing Education: Each of the 44 intrapartum nurses within the department were met with individually and presented the materials used in the project. Each were given a bound copy of AWHONN's evidence based clinical practice guideline, *Nursing Care and Management of the Second Stage of Labor*, 2008, 2nd edition which is packaged as a continuing education course. Attached was a cover letter (Appendix B – colleague letter) describing the details of the project. Additionally, the supporting literature that had been printed and placed into a binder, was reviewed along with a copy of AWHONN's evidence based clinical practice guideline *Nursing Care of the Woman Receiving Regional Analgesia/Anesthesia in Labor*, 2011, 2nd edition. These additional materials were placed on a bookshelf in the nurses charting station and remained available as references.

In the ARCC model, making the evidence available overcomes barriers to EBP such as a lack of skill, time, or access to, or the ability to critically appraise, the evidence. Additionally, it promotes sustainability through discussions, dissemination, and adoption of the evidence as actionable.

Participation was not mandatory; however, nurses were incentivized with the offer of free continuing education (CE) credits. In the end twelve nurses, representing 27% of the staff, completed the post-test and each earned 2.3 CEs. This may be sufficient to have the knowledge disseminate throughout the department to those who may not have completed the course.

The entire labor and delivery staff were then invited to attend a no cost dinner conference where expert speakers presented additional supporting evidence regarding bladder management, epidural related risks, provider and nursing collaboration, and nurses' influence on cesarean rates. The conference was designed to be motivational and present evidence in support of the project. Three additional nursing CE hours were provided to those who attended. Additionally, two free raffle tickets were given to each nurse for the opportunity to win one of three gift baskets each - valued at 150 dollars. Twenty-one intrapartum nurses attended along with the nurse educator and three nurse managers representing 51% of the nursing staff. Feedback on the continuing education critiques was very positive.

Patient Education: At the onset of labor, AWHONN (2008, p. 21-22) recommends assessing patient education needs and providing patients and their families with necessary information regarding duration, phases, sensations and discomforts, pushing techniques, positioning, breathing management, and pain management options for the second stage of labor. AWHONN further recommends that nurses educate patients regarding the risks and benefits associated with analgesics and anesthesia (AWHONN, 2015). Patient's should receive accurate and current information regarding the risks and benefits of medications, testing, and procedures recommended to them (Lothian, 2007).

To encourage consistency in patient information dissemination and engage the patient directly, a patient education tool "position card" was created that informed patients of key evidence based strategies for improved outcomes. It was designed to encourage evidenced based interventions and initiate conversations between patients and

all care providers (see Appendix C - position card front/back). One hundred laminated reusable position cards were made and placed in the patient rooms and at the nurse's station where patients arrived for admitting. Administrative clerks were asked to give each admitted patient a position card with the instructions "have your nurse discuss this information with you."

Patients were instructed to vary their position often, as pictured on the front of the card, and to use the helpful "tips" noted on the back. There was general agreement amongst the providers and nursing staff that the front of the card was a needed and useful tool for helping to get patients in optimal positions and improving communications between the patient and healthcare team. Although the "ten tips" were based on the AWHONN guidelines, care had to be taken to word information in such a way as to overcome the barriers that exist in supporting physiologic birth (Austin, 2013) and yet still educate the patient with evidence based interventions. Specific education point that AWHONN stresses are: duration of the second stage of labor, pushing technique, patient positioning, bladder management in the second stage, and risks associated with epidural anesthesia. These less controversial tips were easily approved by the nurse managers and chief of obstetrics:

1. *Get up and move during early labor – movement helps the baby align and descend through the pelvis.*
2. *Stay well hydrated – to help muscle efficiency and body cooling.*
9. *Perineal massage during labor does not appear to reduce perineal trauma and may be harmful.*

(10) *This is your birth experience – we believe that your active participation in decision making will ensure the best possible outcomes and be most satisfying to you and your family.*

More controversial statements that required convincing discussion of the literature and modifications to arrive at the current wording were:

6. *Initiate pushing when you have an urge to do so. If you have an epidural, delay pushing until the fetus has descended sufficiently to minimize the length of time pushing is required and to reduce stress to your baby and on your body.*
7. *When it is time to push – use a non-directed technique; discuss the various pushing techniques with your nurse.*
8. *Never push in the supine or lithotomy position.*

Interestingly, even though there is agreement on the science and practicality of item eight, most nurses – presumably due to the overwhelming common practice, felt that this statement should not be on the card since many providers use this position. It remained on the card at the insistence of the project leader and champion.

Concerns from the anesthesia providers required discussions of the evidence and a strong voice from one of the anesthesiologist who had agreed to speak at the dinner conference. Although contention remained – as a compromise, it was agreed that a patient desire to have an epidural upon request would take precedence over information recommending delay.

3. *Delay an epidural until your cervix is 4 cm and is demonstrating change.*

5. *If you have an epidural – watch your temperature and try to keep cool. Many women overheat with epidurals which can be mistaken for infection or lead to fatigue.*

Bladder management was most controversial among the intrapartum nurses who were mostly unaware of the evidence in support of AWHONN's recommendations. Although the wording remained, it was decided that this would also be a topic at the dinner conference.

4. *If you have an epidural – you may have an indwelling urinary catheter that should be removed when your cervix is completely dilated and prior to your pushing.*

Nurses were asked to refer to the position card when providing instructions throughout labor.

Cost Benefit Analysis

Three financials are discussed for this project. (1) Cost of materials: These are the minimal cost which are essential or unavoidable cost that the budget minded organization would need to invest. This project realized a material cost of $413.74. (2) Cost of Project: The actual outlay of cash spent on this project for which receipts are available. This project cost $2617.44. (3) Healthcare Savings: Most importantly is the overall cost savings to the healthcare system. A reduction in cesareans can lead to cost savings for all parties. This project estimates an annualized reduction solely in maternal hospitalization costs of $85,000.

Cost of Materials: The material costs associated with the project are tangible and unavoidable and require a cash outlay. They do not represent the costs associated

with manpower hours for planning, preparation, and material assembly. Additionally, it does not capture the costs of nurse's time actively engaged in learning. Some organizations pay nurses for these activities or reimburse them for the costs of continuing education courses. Although a conference hall and meeting rooms were readily available for this project, those may be additional considers. We invited two expert speakers associated with the university to speak at the dinner conference; they did so without remuneration; expert speakers are often paid. Lastly, it does not cover the cost of incentives used to celebrate successful milestone achievements or food and catering for professional conferences. In the author's experience, and in reviewing how other organizations have implemented similar projects, these intangible costs are real and often realized, if not by the organization then by outside corporate and non-profit groups in support of the mission or desiring access to the attendees (see Figure 1. Project Costs).

Project Costs		
Material Costs		
AWHONN Guidelines		$83.94
Printing/Binding Materials		$329.80
	Total	$413.74
Added Costs		
Catering		$1,300.00
AWHONN Continuing Education Fee		$300.00
Conference Handouts		$47.70
Incentive and Awards		$420.00
Gifts for Speakers		$136.00
	Total	$2,203.70
Total Project Costs		$2,617.44

Figure 1. Project Costs

Cost of this Project: The dinner conference and attendance incentives comprised a full 66% of the total project costs. Although the dinner conference was conceived early in the project planning, the incentives were added after poor commitment from the nursing staff to attend was realized through lagging sign-ups. The actual realized cost for this project was $2617.44.

Healthcare Savings: This facility lost a third-party payer contract and the associated revenues in 2015 along with those contracted patients. Lowering birth costs saves third party-payers money and makes a hospital organization more attractive for them to carry as a plan option while at the same time increasing utilization for the hospital through increased subscribers. Birth cost estimates vary and are ever increasing. It is estimated that the average cesarean costs in California are $10,200.00 more than a vaginal birth – i.e., total inpatient and outpatient care associated with a pregnancy (National Quality Forum [NQF], 2008). Kozhimannil, Law, & Virnig (2013) estimated that cesareans costs on average 30% more than a vaginal delivery. In a national market review by Truven Health Analytics (2013) the average commercial intrapartum (hospitalization) payments were $9,048 for vaginal births and $12,739 for cesarean births. These costs are less for Medicaid where payments were $3,347 for vaginal births and $4,655 for cesarean births. Main et al. (2011) calculated that the cost saving for the state of California for unnecessary cesareans amounted to $240 million dollars annually. The burden of birth healthcare costs is carried by families through insurance co-pays and by the greater U.S. society since more than 50% of births are paid for by Medicaid

(Watkins, 2014). Controlling unnecessary CDs is in the best financial interest of patients and the healthcare system.

Using the Truven data from 2013, this project calculated an annual savings for avoided cesarean maternal hospitalization at $85,000. Since it is estimated that half of all deliveries are paid through Medicaid, the calculation for cost avoidance was derived by averaging the cost difference of commercial and Medicaid hospitalization costs between cesarean and vaginal deliveries and then multiply this by the number of cesareans that were avoided (see Figure 2. Healthcare Savings). For the project facility,

Healthcare Savings			
	Cesarean	Vaginal	Difference
Commercial	$12,739	$9,048	$3,691
Medicaid	$4,655	$3,347	$1,308
Sum of difference			$4,999
Average Cost Difference	[SUM of difference ÷ 2]		$2,500
Number of Avoided Cesareans			34
Annual Cost Savings	[33 x $2500]		$85,000

Figure 2. Healthcare Savings

that number was 2.23% of total annual deliveries or 34 deliveries. Although this represents a fraction of the real savings to the healthcare system, those calculations are beyond the scope of this project.

Results

Data collection and reporting: Control charts are often used to monitor intended outcomes of EBP improvement projects by plotting outcomes progressively on a graph

where the x-axis represents time and the y-axis delineates the outcome in relation to an upper and lower limit set apart by three standard deviations. The plotted progress can then identify when interventions need reassessed or, alternatively, when change is unwarranted. Control charts require a minimum input of data as they use calculations of variance – this project did not meet those minimum requirements; therefore, data were reported using a standardized system used by the California Department of Public Health (CDPH).

Results for the project were provided by the California Maternal Quality Care Collaborative (CMQCC) Maternal Data Center (MDC). CMQCC is contracted by the California Department of Public Health to collect and report important hospital maternity health outcomes. As such, hospitals are required to provide maternal and neonatal patient discharge data to CMQCC. The MDC then combines the hospital discharge information with birth and death certificate information into a single database. Thirty-two quality outcomes metrics are then made available through a web-based interactive portal about sixty-days after patient discharge. For a fee, hospitals can gain access to their patient data. A demonstration site (https://demo.datacenter.cmqcc.org/hospitals/1) is available to the public. This hospital subscribes to the MDC service.

The main objective of the project was to lower cesareans. It is important to monitor balance measures that have the potential of identifying harmful cesarean avoidance. Of the available metrics, episiotomy, third and fourth degree perineal lacerations, and 5 minute Apgar scores less than 7 were chosen as suitable balance measures.

Outcomes data: Data were collected over a five-month period from July 2016 through November 2016. Comparison data from the previous six months was also gathered and presented for trending and comparison.

Cesarean rate: This project saw a 2.23% decrease in the NTSV cesarean rate compared to the first six months of the year (see Figure 3.).

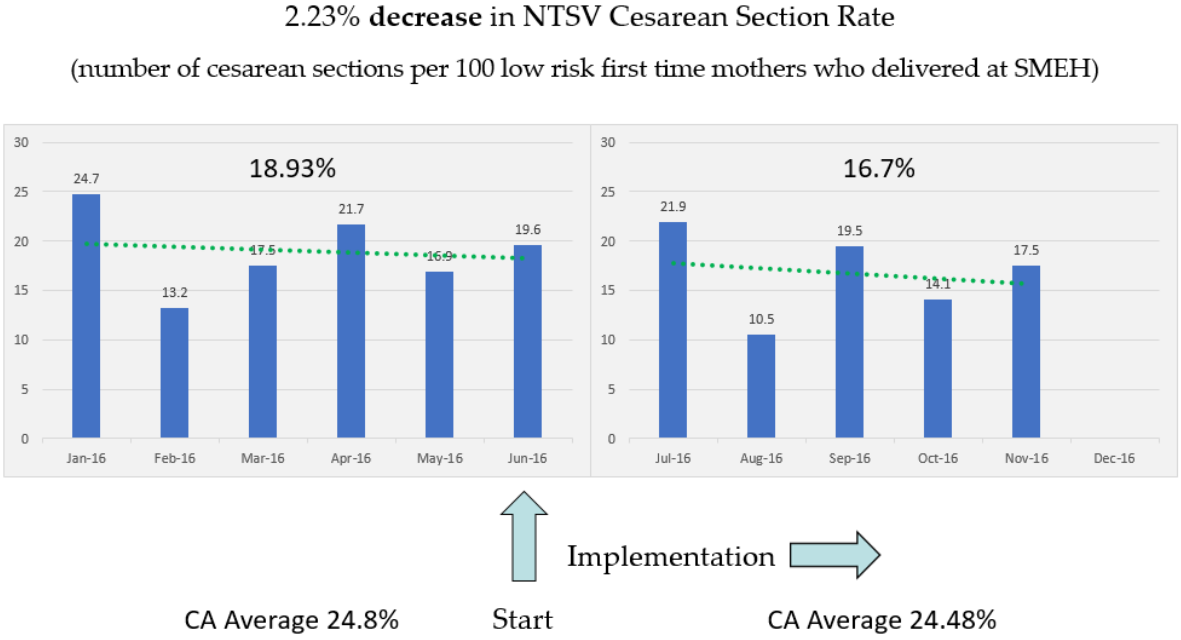

Figure 3. Cesarean Rate

Because physicians and nurses were both working to improve cesarean outcomes, the improvement realized cannot be attributed specifically to nursing interventions. The impact of collaboration, communication, and the entire staff having a common goal needs to be considered. An acceleration in the rate of improvement, delineated by the steeper slope of the trendline during the implementation period may represent this synergistic effort.

Episiotomy rate: In reviewing the balance measures, although there was a 0.23% increase in episiotomies, this may well be within acceptable and normal variance. Variability ranged from 1.9 to 6.1% in the six months prior to the program implementation and 4.3 to 5.7% after the intervention (see Figure 4.).

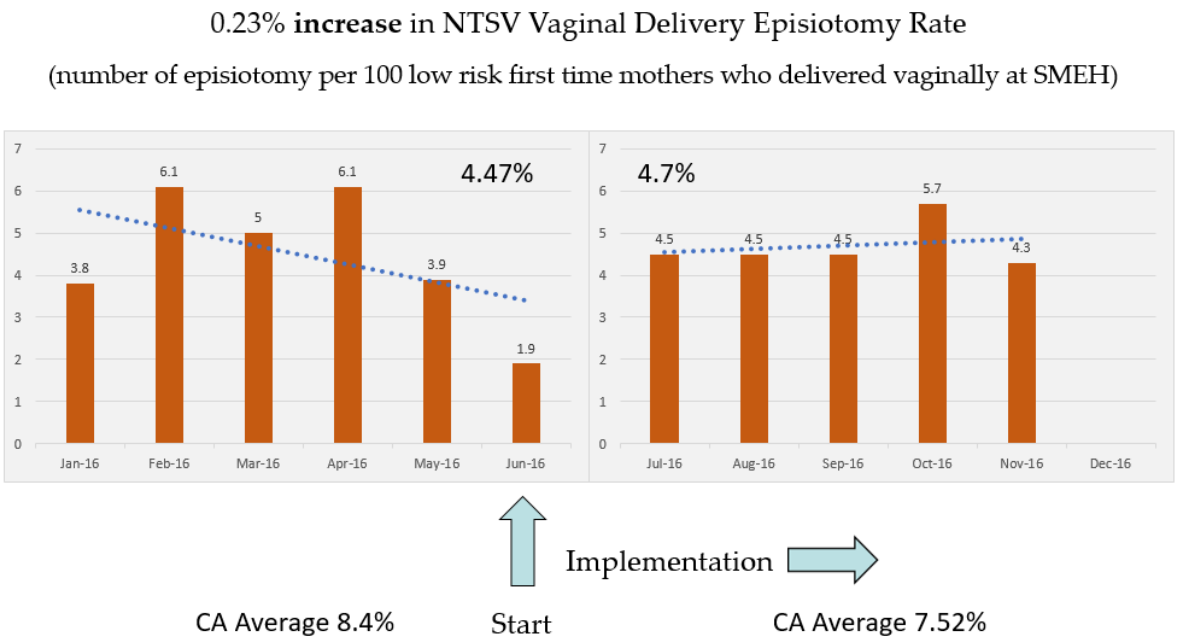

Figure 4. Episiotomy Rate

Severe Perineal Laceration: In the first month of the intervention there was a spike in the 3rd and 4th degree perineal lacerations. This accounts for all of the corresponding increase of 0.19% seen in the balance measure. The last three months saw no 3rd and 4th degree perineal lacerations (see Figure 5.). Given more time and data, this would likely be a successful improvement in balance measures as is demonstrated in the literature regarding delivery in lateral positions and fewer instrumented deliveries. Collecting maternal birth position and reviewing MDC data for operative deliveries

would be valuable in further describing important interventions and associated outcomes with respect to severe perineal lacerations.

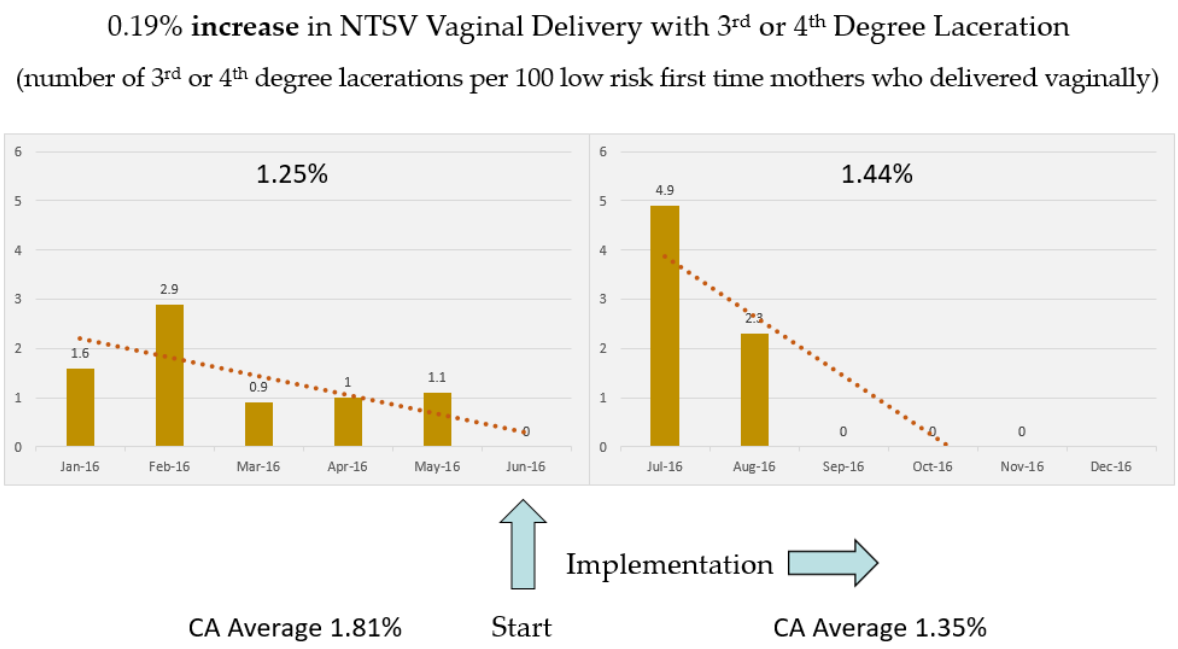

Figure 5. 3rd and 4th Degree Perineal Lacerations

Five minute Apgar less than 7: Neonatal Intensive Care Unit (NICU) admissions are used as a quality indicator for birth outcomes. Five minute Apgar less than 7 has also been reported in the literature as a measure of birth outcomes but this use has been questioned regarding its clinical significance. Although not optimal when used in isolation, due to the availability it was chosen as a neonatal balance measure for the project. A concerning increase of 0.72% in the 5 min Apgar less than 7 was appreciated with a significant trend upwards (see Figure 6.). The significance of this rise should be explored further. Areas to consider are not only NICU admissions, but should include

morbidities associated with resuscitation and additional resources required at the time of delivery.

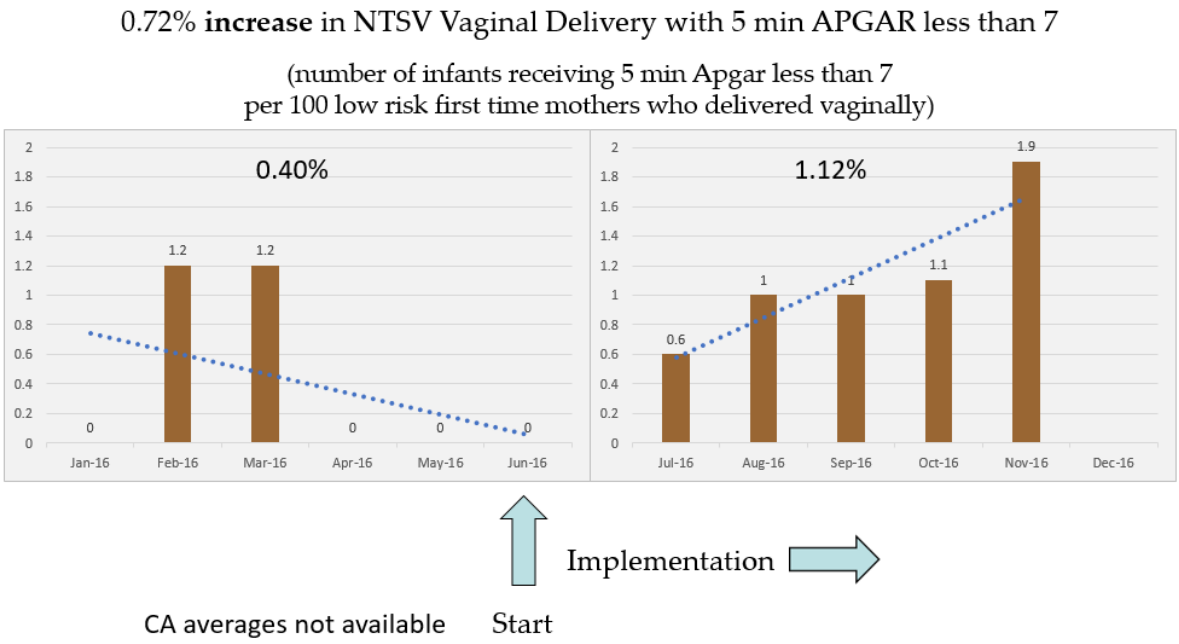

Figure 6. Five Minute Apgar less than 7

Conclusion and Implications for Practice

The goal of this project was to ensure nurses have the knowledge and preparation to manage the second stage of labor with resulting optimized neonatal and maternal outcomes. In doing so, a lower cesarean rate without an unacceptable increase in maternal and neonatal morbidity should follow. The current evidence continues to support AWHONN's EBP Guidelines for the management of the second stage of labor. There are now many respected quality organizations producing evidenced based guidelines and toolkits supporting vaginal birth to lower cesarean sections but barriers to

implementing them still exist. Instituting AWHONN's evidenced based practice guidelines in managing the second stage of labor can improve cesarean rates even after recommended benchmarks are achieved. Balance outcome measures must be monitored within the context of appropriate cesarean benchmarks in helping to determine their significance. A collaborative approach is recommended when instituting professional evidence based practice guidelines. The use of evidence based practice champions, such as doctoral prepared clinical nurse specialists, nurse leaders, and nurse practitioners are well positioned to lead these projects to successful implementation.

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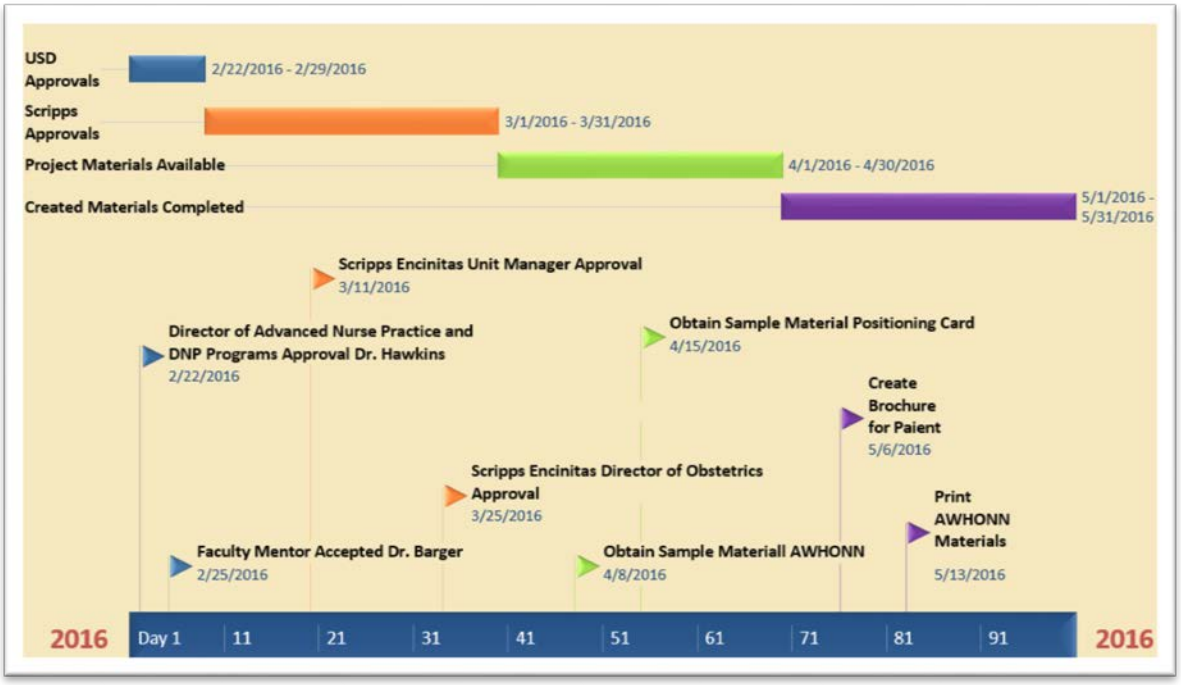
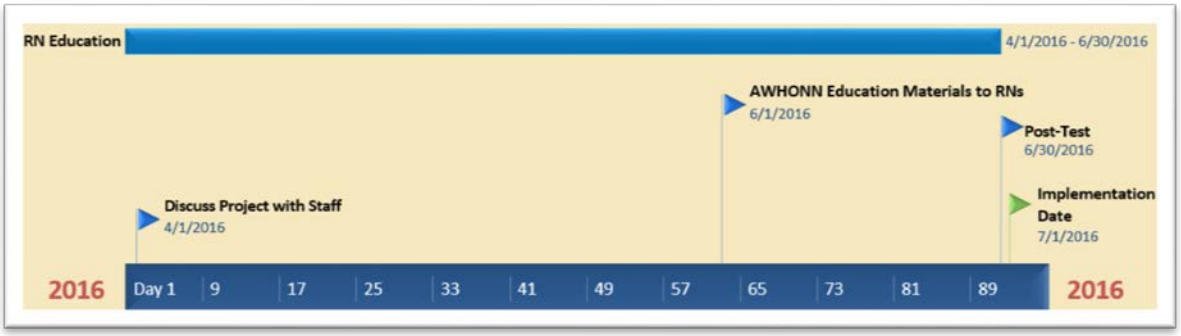
Appendix A
"timelines"

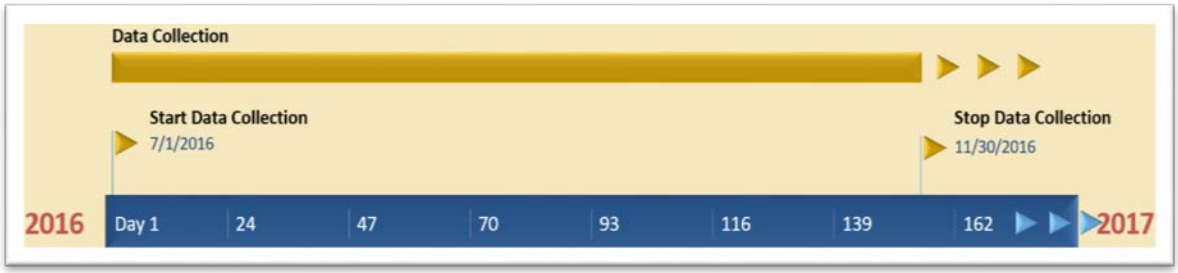
Approvals



Intrapartum Nurses Education



Data Collection



Appendix B
"colleague letter"

George S. Knapp
Hahn School of Nursing
University of San Diego
5998 Alcalá Park
San Diego, CA 92110
Tel: 858-395-4361

To: Labor and Delivery Nurses

From: George S. Knapp

Re: Doctor of Nursing Practice Final Project

Dear Colleagues,

As a requirement for graduation, I have embarked on a two-part project that provides labor and delivery nurses with current evidence to support our practice in managing the second stage of labor in the hopes that we can improve perinatal and maternal outcomes at Scripps Encinitas; outcomes such as a decrease in cesarean section rate, a decrease in 3rd and 4th degree perineal lacerations, and a reduction in unnecessary neonatal resuscitation and NICU admission.

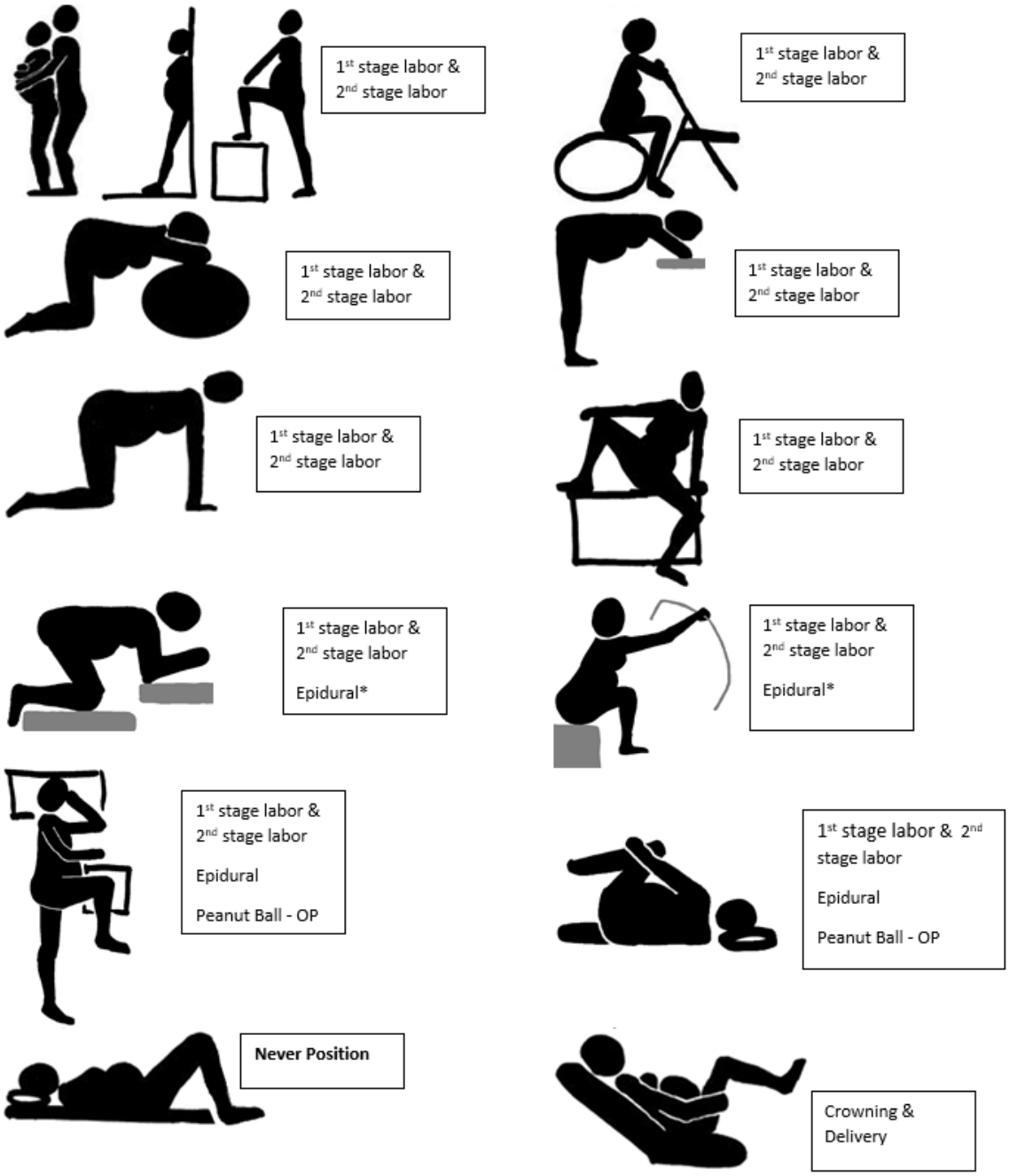
Specifically, I am asking you to complete the AWHONN continuing education course *Nursing Care and Management of the Second Stage of Labor*, an evidence-based clinical practice guideline. In addition to this course, I am asking you to attend a dinner conference at Scripps Encinitas - Conference Room on the 8th of December 2016, from 5:00 P.M. to 7:30 P.M. where expert speakers will address some specifics concerning these guidelines and how to best implement them. Nurses who complete both parts will receive 4.5 continuing education units at no cost and be eligible to win one of many great prizes to be given away at the dinner conference.

Thank you for your commitment to high quality nursing and ensuring our patients have the best chance for a beautiful delivery experience.

Sincerely,

George S. Knapp, RN, BSN, MS, CPHQ
Doctor of Nursing Practice Student
Family and Pediatric Nurse Practitioner Program
University of San Diego

Appendix C
"Patient Position Card - front"



* Epidural must be "light" enough to allow muscle control – most discomfort will be alleviated but not all, active position changes can be helpful during prolonged second stage

Appendix C
"Patient Position Card - back"

Ten Tips for Best Outcomes

1. Get up and move during early labor – movement helps the baby align and descend through the pelvis.
2. Stay well hydrated – to help muscle efficiency and body cooling.
3. Delay an epidural until your cervix is 4 cm and is demonstrating change.
4. If you have an epidural – you may have an indwelling urinary catheter that should be removed when your cervix is completely dilated and prior to your pushing.
5. If you have an epidural – watch your temperature and try to keep cool. Many women overheat with epidurals which can be mistaken for infection or lead to fatigue.
6. Initiate pushing when you have an urge to do so. If you have an epidural, delay pushing until the fetus has descended sufficiently to minimize the length of time pushing is required and to reduce stress to your baby and on your body.
7. When it is time to push – use a non-directed technique; discuss the various pushing techniques with your nurse.
8. Never push in the supine or lithotomy position.
9. Perineal massage during labor does not appear to reduce perineal trauma and may be harmful.

(10) This is your birth experience – we believe that your active participation in decision making will ensure the best possible outcomes and be most satisfying to you and your family