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Use of the Peanut Ball to Reduce Cesarean Rate

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USE OF THE PEANUT BALL TO REDUCE CESAREAN RATE

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has been approved as meeting the requirement for the Degree of Doctor of Nursing Practice in College of Natural and Health Sciences, School of Nursing, Program of Nursing Practice

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EXECUTIVE SUMMARY

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The high rate of cesarean section deliveries in the United States is greatly concerning for the health of our laboring women and their babies. Many physical, emotional, and financial risks are linked to this surgical procedure. This author felt the labor care model has been narrowed in many instances, creating an atmosphere where laboring women become fixed in a cycle of medical actions mostly due to continuous electronic fetal monitoring. Labor and delivery activities can be viewed as compulsory and integral pieces of care but in themselves are not always required. Methods to minimize unnecessary cesarean deliveries are being explored, especially interventions that improve pelvic opening, thus allowing the fetus to traverse the birth canal. The peanut ball is one such innovative intervention being offered in labor management in the past few years. Educational methods for utilization of the peanut ball vary and might be lacking among labor attendants. The intention of this project was to develop a clinical practice guideline for use of the peanut ball for those patients in labor to assist with opening the pelvis to facilitate fetal rotation, thereby shortening labors and ultimately reducing the rate of cesarean deliveries. To improve the efficacy of use, a retrospective analysis of articles on laboring women was performed to obtain statistical data of value for this project. Surveys distributed to experts in the care of laboring women were issued

in two waves. They were collected and evaluated to determine education points necessary for inclusion in the guideline. The PICOT for the project with plans for a future research project was, “In pregnant women, how does the use of the peanut ball compared to no use of the peanut ball influence the rate of cesarean section during labor and delivery? Once the guideline was developed, an accompanying education document was created along with a pelvic positioning visual sheet. A succinct step-by-step instructional sheet explaining proper implementation of the guideline along with a policy template were created. Through development of the guideline, it was desired to facilitate a successful vaginal delivery, shorten labor times, decrease the discomfort of the woman, and promote satisfaction with her experience. By accomplishing these goals, it was projected a reduction in the cesarean rate would also be present. A research project could occur with the guideline and would be an undertaking of the organization. If a research project is completed, a data collection and analysis could be carried out to determine whether the expected objectives were met and continued use of the guideline would be beneficial for laboring women within the institution and whether the guideline could be disseminated to outside organizations. This research area could provide the catalyst to increase awareness and restructure the rigid, task-oriented processes currently being noted in labor care.

ACKNOWLEDGMENTS

I would like to briefly take this opportunity to offer up my gratitude for all those individuals supporting me along my occupational journey. My family has provided the backbone for a foundation of educational inquiry and this was developed at a young age. My husband has encouraged and sustained me even when life would become more complex. He made a promise and never gave up on me. My children have endured the long hours I have spent away from them during this process as well as the hours I was physically present but was unable to be mentally present. When I could no longer put words together and my mind wanted to rest instead of work, you would help me develop a sentence. The hard work and dedication placed into my education have resulted in an accomplishment, which I share with my family. To my friends, thank you for your support. You are all amazing. You allowed me to lean on you and I will offer you the same gesture in the future. Fellow students have provided me with a collegial environment and the backdrop to develop lifelong friendships. Coworkers, thank you for lifting me up when I felt there were not enough hours in the day and reassuring me that this process would all be worth it.

Although the development of my capstone project has been a long and arduous undertaking, my project committee members have been powerfully influential in keeping me mindful of the process and grounded. They provided guidance and expressed an interest in seeing the results of this project come to fruition.

Nursing was not my first choice for careers; yet, sometimes opportunities present on a larger scale. Without a doubt, I knew the first time I walked into an obstetrics clinical setting, this was where my future career would begin. It was as if I was being welcomed home. My patients have been rooting me on from the sidelines. Not only did they offer support but provided the motivation to keep pushing forward. As a midwife, my interactions with patients created the drive to seek my doctoral degree. I aim to be the best healthcare provider I can and offer my patients the best of my self.

Without all of you, my journey through the doctoral program would not have been as smooth. Again, I say thank you for your support and offer my gratitude for your ability to help me accomplish this goal.

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CHAPTER I

STATEMENT OF THE PROBLEM

Background and Significance of the Problem

According to the Agency for Healthcare Research and Quality (AHRQ; 2015), cesarean section is experienced by one in three women in the United States; as the most frequently performed surgical procedure in the United States, it represents a high cost and growing risk of morbidity and mortality. This rate is higher than 50% in some hospitals. In a study conducted by Spong, Berghella, Wenstrom, Mercer, and Saade (2012), 68% of cesarean deliveries were the result of a lack of progress in cervical change, fetal head failing to descend, or concern for fetal oxygenation status. Cutler (2012) discussed how the supine or recumbent position has become the mainstay for labor and delivery over the last two centuries; this movement was introduced by Francis Mauriceau in 1738. The use of the upright position is in fact the most frequently occupied position for childbirth worldwide currently and historically. The supine position, while providing an advantage for the delivering practitioner to implement obstetric procedures from vaginal exams, use of forceps, and control of delivery did not offer any benefit to the woman (Caldeyro-Barcia, 1979). Immobilization of the woman in childbirth is perpetuated in the United States through continuous fetal monitoring, induction of labor, artificial rupture of membranes, and use of epidural anesthesia (Walker et al., 2012). Attempts should be made to increase the mobility of the woman in labor to open the pelvis. Magnetic

resonance images of the non-pregnant female pelvis were discussed in work by Michel et al. (2002) who determined specific measurements necessary for fetal passage were significantly larger in the hand-to-knee and squatting positions in comparison to the supine position. Women who were able to actively perform frequent position changes during the first and second stages of labor might benefit from better control of discomfort, increased blood flow, shortened length of labor, and increased satisfaction with their experience (Priddes, Dahlen, & Schmied, 2012). Appropriate use of the peanut ball in laboring women might facilitate improved fetal passage and subsequently shorten labor, decrease discomfort, improve satisfaction with the experience, and ultimately reduce the cesarean rate. The peanut ball is a physiotherapy ball that can be placed between the legs of a woman in labor to increase the likelihood of opening the pelvis (Grant & Clutter, 2014). This type of ball was introduced in the past decade as a physical therapy tool for use with positioning, exercise, and therapeutic activities (RehabMart, 2017). The peanut shape provides increased control and stability and allows for mostly unilateral movement in two planes. The primary movement provides a forward and backward motion with a subtle up and down movement due to the oblong shape. Motion and safety of use are controlled at the center via the peanut shape.

Purpose Statement

With the cesarean delivery rate hovering at approximately 32% in the United States, a few national programs have been instituted to reduce this trend through limiting the number of non-medically indicated cesarean deliveries and induction of labor prior to 39-week gestation (American College of Obstetricians and Gynecologists [ACOG], 2013; Conway, 2016). Methods to further reduce this number were the purpose of this capstone

project. The peanut ball has been a new addition to labor and delivery units at the community hospitals this author has been exposed to and inconsistent use among nursing staff was noted. The peanut ball had been introduced to staff but they had not received a formal didactic explanation of use to explore the why and how of proper use. When attempting to elicit whether a guideline or policy was being utilized by other institutions, this author contacted a variety of labor and delivery units across the country to compile an inclusive list of recommendations but did not find a comprehensive peanut ball recommendation among the organizations that fit the true definition of a healthcare guideline. The policies received were simplistic and did not employ a step-by-step process or explanation of use. To better serve nursing staff, labor attendants, and patients, it would be appropriate to develop a standardized peanut ball guideline. Without standardization, use of the peanut ball might be lacking; thus, inappropriate use or lack of use could be present due to lack of confidence regarding the tool. Common practices with use might vary between users and among institutions. Confusion might exist related to this variation. The intention of this project was to develop a protocol for use of the peanut ball for those patients in labor to assist with opening the pelvis to facilitate fetal rotation, thereby shortening labors and ultimately reducing the rate of cesarean deliveries. The population, intervention, comparison, outcome, and time (PICOT) stated for the project with plans for a future research project was as follows: In pregnant women, how does the use of the peanut ball compared to non-use of the peanut ball influence the rate of cesarean section during labor and delivery?

CHAPTER II

LITERATURE REVIEW AND SYNTHESIS

Cesarean Section in Low-Risk Laboring Women

With the rate of cesarean section in the United States occurring in one in three women (AHRQ, 2015), a burgeoning desire exists to decrease this rate. The 2014 rate of cesarean deliveries was 32.2%, which has been declining since 2010 (Hamilton, Martin, Osterman, Curtin, & Mathews, 2015). The majority of cesarean deliveries resulted from three different factors: failure to make cervical progress, failure of the fetal head to descend, and fetal oxygenation related concerns (Spong et al., 2012). The American College of Obstetricians and Gynecologists (2013) discussed not only the risks associated with the current pregnancy but also relayed the effects on future pregnancies. During an interview with DONA-approved (2017) birth doula trainer, Jessica English (Personal communication, May 15, 2017), she emphasized the essential need for avoidance of the first cesarean and that it was imperative women receive appropriate collaborative support in labor. Many dynamics can contribute to the decision to proceed with a cesarean section in the laboring woman and efforts could be made to improve the intention of having a vaginal delivery.

As the number one performed major abdominal surgery, there is a financially driven reason to reduce this rate as well. When considering the allowable payments per the Truven Health Analytics study (2013), there is a discrepancy in the cost of these

procedures, the care necessary for the mother and the baby, and what is paid. In 2010, the costs of maternal newborn care in a vaginal delivery submitted to Medicaid were $9,800 and the allowable payment received was $9,131. The discrepancy in the bill for a cesarean and the payment received for these services is quite evident. The costs of maternal newborn care in a cesarean delivery submitted to Medicaid was $50,373 and the allowable payment received was $13,590. The cost of the cesarean procedure was significantly higher for the woman and the baby and was only a 26.9% payment for services rendered.

Beyond the financial effect this has had on the healthcare system, cesarean delivery carries with it many physical risks including increased risk for infection; hemorrhage; damage to the surrounding organs including the bowel, bladder, and ureters; anesthesia complications; and an extended recovery time (Tussey & Botsios, 2015). The Healthy People 2020 (U.S. Department of Health and Human Services, 2013) objectives provided a reduction target rate of 23.9% from the current rate of 32% for cesarean deliveries. Continued efforts are being employed to reach this goal specifically in low-risk females with a full-term, singleton, vertex pregnancy.

Pelvimetry and Positioning

When an epidural is in place or the woman is confined to bed, the ability of the laboring woman to move freely is limited. Her movements are primarily directed and carried out via the staff in the laboring unit. On their own, these movements do not adequately open the pelvis to allow for rotation and descent of the fetus. Maternal positioning can be altered to facilitate labor progress via improved maternal-fetal blood flow and contractility of the uterus, decrease pain and length of labor, and allow for fetal

descent (Zwelling, 2010). Placing a peanut ball between the parturient's legs while in labor can increase pelvic diameter and allow additional room for fetal descent (Premier Birth Tools, 2015).

Simkin and Ancheta (2005) provided an overview of good positioning for labor and discussed the ability of the uterus and the patient to achieve appropriate relaxation between contractions. The C-curve positioning permits optimal effect from gravity and pelvic widening. They discussed the ability of the antero-posterior diameter of the pelvis to increase as the coccyx and sacrum have less restriction and can move back with this positioning. Better alignment of the uterus and the pelvis are achieved and consequently alignment is present for the fetal head within the pelvic inlet. In the side-lying position when the upper leg is moved further away from the lower leg, there is a resultant increased transverse diameter of the pelvic outlet. To better understand this position, consider the dog raising its hind leg to urinate on a fire hydrant. This position is optimally achieved with the use of a peanut ball.

Epidural Use in Labor for Pain Management

Pain control in labor has been greatly assisted with the use of epidural analgesia. It is the most common pain relief method in the United States for laboring women as reported by Osterman and Martin (2011) in a 27-state national vital statistics report wherein epidural analgesia was used by 61% of women in labor. Patient satisfaction in the labor and delivery experience is strongly correlated to fear of labor and achieving the picture a woman has painted in her head of how the experience should go. Her comfort level in labor colors this satisfaction. The advent of the epidural has done much to alleviate this fear and improve comfort. Besides the effect on maternal discomfort

present, the epidural also provides decreases in hyperventilation, hemoglobin desaturation, uterine vasodilation, and release of maternal stress hormones (Hasegawa et al., 2013). These effects are present when the patient can use a relaxed breathing pattern and as pain and muscle tension are decreased. While positive effects are related to the use of epidural analgesia, there is also the potential to produce a prolonged first and second stage of labor, persistent occiput-posterior fetal mal-presentation, increased need for oxytocin augmentation, instrumental labor, and fever and hypotension (Caruselli et al., 2011). Caruselli et al. (2011) went on to discuss the limited pelvic mobility of the patient with the epidural in labor, restricting the descent of the fetus.

Cheng, Shaffer, Nicholson, and Caughey (2014) performed a retrospective cohort study on the effect of epidurals during the second stage of labor. They evaluated nulliparous and multiparous laboring women with and without epidurals. Nulliparous women with epidurals had a second stage labor lasting 336 minutes in comparison to those without an epidural having a 197-minute second stage, resulting in a prolonged second stage of labor of 139 minutes. Multiparous women also had a prolonged second stage of labor by 144 minutes when an epidural was utilized. Those with an epidural had a 225-minute second stage and those without an epidural had an 81-minute second stage. Agrawal, Makhiga, Arora, Harwital, and Gurha (2014) studied nulliparous women in labor and the effect of epidural analgesia upon these women with a subsequent prolonged second stage of labor noted. Zhang, Bernasko, Leybovich, Fahs, and Hatch (2016) also confirmed a prolonged second stage of labor in women utilizing epidural analgesia via a meta-analysis of prospective and retrospective studies. Methods for increasing the

movement of the laboring pelvis for those with an epidural or confined to a hospital bed would be beneficial.

Shortened Labor

The strength of uterine contractions is directly related to the amount of pressure applied to the cervix, resulting in cervical dilation and efforts toward assisting with passage of the fetal head through the pelvis. Caldeyro-Barcia (1979) elaborated on this process and measured strength of contractions in the upright and recumbent positions. Evidence showed the upright position increased contractile strength to 160 Montevideo units while the recumbent position netted 129 Montevideo units. This work also showed the first stage of labor for primiparous women in the upright position was 78 minutes shorter and the second stage of labor was 45 minutes shorter. The shortened first and second stages of labor were also supported by Gizzo et al. (2014); Lawrence, Hofmeyr, Dowswell, and Styles (2013); Liu (1974); and Thies-Lagergren, Kvist, Christensson, and Hildingsson (2012).

The upright position alone might not provide adequate comfort for the patient and did not allow a greater range of mobility. Tussey and Botsios (2011) employed the peanut ball in their research with the left lateral, right lateral, and semi-fowlers positions and noted a 90-minute decrease in the first stage of labor and a 22-minute decrease in the second stage of labor when compared to the control group not utilizing the peanut ball after epidural placement in laboring women. Tussey et al. (2015) performed a randomized controlled trial utilizing a peanut ball with laboring women with an epidural; study results showed a shortened first stage of labor by 29 minutes and the second stage of labor was shortened by 11 minutes. Grant, Craig, and Rice (2014) noted in a

retrospective analysis that those women using a peanut ball with and without epidural use also had a shortened first and second stages of labor. Shortened labor stages could decrease the likelihood of maternal exhaustion, reduce the prolonged work needed by the uterus, and improve maternal pushing efforts.

Peanut Ball

Recent use of the peanut ball in the labor and delivery arena can be linked to the advent of the Pezzi ball. The Pezzi ball was created in the early 1960s by Aquilino Cosan (1960) in Italy. The round ball was originally developed as a gymnastics support item but a European physical therapist discovered the benefits soon after. Not until the 1980s when physical therapists from the United States journeyed to Europe to expand their knowledge on new rehabilitation techniques did the Pezzi ball catch their eye. They brought it back to the United States and renamed it the Swiss ball. The Swiss ball became popular in the early 1990s as there was an increased concentration on the fitness and physical therapy world regarding core stability and posture (Heffernan, 2016). The use of physiotherapy balls increased in childbirth education classes and the labor and delivery setting in 2001 (Heffernan, 2016). The round ball could aid in maintaining an upright position or keeping the laboring woman mobile, thus assisting in descent of the fetal head through the pelvis with gravitational effect. The peanut ball was introduced in the past decade as a physical therapy tool for use with positioning, exercise, and therapeutic activities (RehabMart, 2017). The saddle or peanut shape provides increased control and stability. It allows for mostly unilateral movement in two planes. The primary movement is forward and backward with a subtle up and down movement due to the oblong shape. Motion and safety of use could be controlled at the center via the

peanut shape. The inward center slope can cradle the abdomen. Increased traction exists as well as ringed grooves. The earliest documented research and use of the peanut ball for labor care was noted in work performed by Tussey and Botsios (2011).

Peanut Ball and Cesarean Rate

To reduce the cesarean rate among laboring women, the peanut ball might provide the direction necessary to achieve this goal. The peanut ball is a physiotherapy ball that can be placed between the legs of a woman in the side-lying or scissor-lying position to increase the likelihood of opening the pelvis (Grant & Clutter, 2014). Tussey et al. (2015) used the peanut ball with laboring women; their research produced a cesarean rate of 10% in the intervention group compared to 21% in the control group not utilizing the peanut ball. In the first two months of a research capstone project performed by Payton (2015), there was an 8.2% and a 3.19% decrease in the primary cesarean section rate for women using a peanut ball in labor and delivery after an epidural.

Gap Analysis

To meet the expected Healthy People 2020 (U.S. Department of Health and Human Services, 2013) goal of a reduction of cesarean delivery to 23.9%, methods are being considered to lower this rate further. Most national hospital protocols do not provide for elective induction of labor at less than 39-week gestation unless there is a medical or fetal necessity. The national rate of cesarean delivery is 32.9% (U.S. Department of Health and Human Services, 2013) and the rate of epidural use for labor and delivery is 62% (Osterman & Martin, 2011). Common themes existed among hospitals where this author previously held a nursing position and revealed specific findings. After epidural use for patients in labor, continuous electronic fetal monitoring

is instituted. The nurse to patient ratio varies daily but many times the labor patient to nurse ratio falls in the 1:1 or 2:1 category, which is consistent with the nurse staffing for perinatal units recommendation per the Association of Women's Health, Obstetric and Neonatal Nurses (2010). Typical position changes include the side-lying position with a pillow between the legs, high-fowler's position, and the semi-fowler's position every 30 minutes to every two hours. Occasionally, the recovery position is utilized and minimal use of hands to knees position is encountered as these are difficult to utilize when the regional effect of an epidural on the lower extremities leaves the patient partly immobilized. With the maternal mobility reduced, the ability of the fetus to traverse the pelvis might subsequently be slowed or halted.

It would be desired for all organizations to follow best practice guidelines to assist in meeting the Healthy People 2020 (U.S. Department of Health and Human Services, 2013) goals. The Healthy People 2020 report stated best practice calls for labor to initiate in the parturient rather than induction of labor to help promote better outcomes for the woman and the newborn. If a non-medically necessary induction of labor is utilized, national promotions encourage the patient reach at least 39 weeks pregnant. A weakness of concern could be the labor patient to nurse ratio as the number of labor patients and available staff might flux. Another weakness could be the nursing staff's lack of understanding of the need to assist the laboring patient primarily in bed to facilitate appropriate pelvimetry to allow for rotation and descent of the fetus and the unfamiliarity with the peanut ball. Jessica English (Personal communication, May 15, 2017), DONA-approved (2017) birth doula trainer, discussed her first-hand exposure to instances of improper knowledge among nursing staff. She confirmed that increased knowledge

regarding the peanut ball and how it works to facilitate labor remains an important education area; use of a certified peanut ball trainer within the organization was a step in the right direction. If a peanut ball is not available within the institution, then financial redirection would be necessary to accrue one or more of these devices.

If no intervention is provided, it is expected the cesarean section rate could continue to remain above the Healthy People 2020 (U.S. Department of Health and Human Services, 2013) desired 23.9% target percentage. Increased financial burden would be assumed by the patients and healthcare institutions alike. Physical risks associated with a cesarean delivery for the current pregnancy and future pregnancies would continue to exist, thus placing the patient in a higher-risk category for future pregnancies and snowballing the financial effects in the process. With the use of the peanut ball guideline, benefits exist for the nursing staff, providers, patients, and the using institution. The nursing staff would be better educated on the intervention and pelvic positioning regarding the stages of labor. This education would ensure safe use of the peanut ball. Nursing staff at the bedside would be encouraged for use as labor attendants within this guideline. Implementation of the peanut ball in labor has the potential to decrease the cesarean rate due to improved fetal descent and rotation. With a drop in the cesarean rate, the Healthy People 2020 goal would be achieved. Lower cesarean rates would provide a low-risk status for many women in current and future pregnancies. The overall financial impact would be improved for the patient, the hospital, and insurers. The final benefit would be improved patient satisfaction via a decrease in discomfort and the ability to reach her goal of having a normal vaginal delivery.

To address the gaps between what many community organizations currently offer their labor patients and what evidence-based practice encourages for improved outcomes education would be a large portion of the peanut ball protocol. Patient education should be initiated in childbirth education classes, during tours of the labor and delivery unit, and addressed during the labor encounter. Staff nurse and labor and delivery technicians would receive education reviewing the pelvic anatomy in relation to labor and delivery and fetal rotation and descent. They would be instructed on the benefits of better attentiveness to maternal position change and their ability to maximize labor support. Education would include an instructional component on the use of the peanut ball. The educational piece for the nursing unit staff would include the peanut ball protocol and a template policy for use. The research component of this project could contain inclusion/exclusion criteria and scripting for recruitment of participants. The providers would be educated on the protocol to obtain better buy-in for use of the peanut ball. A purchase of an adequate number of peanut balls to be utilized by more than one patient would also be necessary.

With a successful research project, it was hoped that not only would the evidence support use of the peanut ball among community hospitals but the literature would be disseminated to a larger audience and improvements in the cesarean section rate would be notable. Improved education to both pregnant women and their providers could have the potential to limit the number of primary cesarean deliveries. Along with a reduction in this rate, there could be a reduction in the length of labor; minimal risk for the maternal, fetal, and neonatal patient; improved comfort levels; and an increase in the maternal satisfaction component (Tussey & Botsios, 2011; Zwelling, 2010).

CHAPTER III

PROJECT PLAN

Project Objectives

A peanut ball guideline was created to specifically address community and national institutions. The plan was rolled out as an incremental implementation of the following steps:

1. Development of the guideline for use of the peanut ball on laboring patients. Step one was broken down into two sub-segments. A retrospective analytical article review was performed to collect data on laboring patients. The primary item assessed was the rate of cesarean section. Secondary data included the time of first stage and second stage of labor. The second sub-segment was accomplished via a two-wave Delphi survey with an expert panel. Results from these surveys helped develop the necessary items for inclusion in the peanut ball guideline. Subsequent steps would be carried out by a hospital organization.
2. Education of staff and providers on the use of the peanut ball in labor was distributed to participating survey respondents. Once information was distributed to respondents, they could review the education and offer a short in-service along with the step-by-step bullet point instructional sheet, laminated positioning sheet, and template policy.

3. Implementation of a research-based project on the peanut ball in laboring patients would be a beneficial entity carried out by a hospital organization to assess the cesarean rate change. Organizations were instructed to document use of the peanut ball within their current records. The electronic health record could be updated to include a checkbox for use of the peanut ball and the amount of time of use in the delivery summary.
4. A comparison evaluation of the retrospective data to the research-based project results to determine if use of the peanut ball supported evidence that cesarean rate could be decreased for women would be a continuation of Step 3.
5. Reporting of the data collected and determination of whether continued use would be beneficial for these institutions or the implementation was unsuccessful were also institutional-based considerations. This could also offer up recommendations for future nursing projects for reduction of cesarean sections or the use of the peanut ball in laboring women.

Project Timeline

Table 1 provides a timeline for the rolling out this evidence-based capstone project.

Table 1

Timeline for Evidence-Based Capstone Project

Step	Action	Timeline
One	Development of the Guideline for Use of the Peanut Ball	October 2016-April 2017
	Retrospective Analytical Article Review to Collect Data for Laboring Patients	October 2016
	Expert Panel Discussion	March 2017-April 2017
	Formulation of the Peanut Ball Guideline	April 2017
Two	University Institutional Review Board approval for capstone project and Delphi study on the use of the peanut ball in labor	March 2017
Three	Possible implementation of research-based project of laboring patients and use of the peanut ball	
Four	Comparison and evaluation of the data	
Five	Reporting of the data	

Resources for Implementation

- Time was needed to assess and review the policies and procedures for labor and delivery among community hospitals for peanut ball use. The retrospective collection of data comprised 27 research and non-research resources for inclusion. The search was completed in March and April of 2016. Databases utilized to conduct the search included CINAHL Plus with Full Text, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, EBSCOhost, Nursing and Allied Health,

ProQuest, PubMed, SAGE Journals Online, and Springer Link. Key words queried were peanut ball, cesarean section rate, statistics, labor, delivery, shortened first stage, second stage, maternal positioning, pelvimetry, and patient satisfaction. A month was dedicated to discuss via surveys with experts in the field of labor and delivery and those utilizing the peanut ball. This information contributed to the development of the Peanut Ball Guideline.

- Institutional Review Board approval secured over an 18-day period (see Appendix A).
- Thirty minutes of time per staff member would be assumed for education regarding the project guideline and use of the peanut ball. This time could be associated with their monthly unit meeting.
- Purchase cost of peanut balls of varying sizes priced $45 to $70 each (Premier Birth Tools, 2015).
- Time and resources invested by the institution or organization during the research implementation, evaluation, and communication of the results.
- Cost of time for researcher hours worked on the implementation of the research component of the project.
- Cost of time for evaluation, analysis, and comparison of the data.
- Cost of time for dissemination of the results of the project.

Frameworks

Iowa Model

The Iowa model of evidence-based practice (EBP) is utilized to help guide the use of evidence to improve healthcare outcomes as it considers the practitioner and the organization (Titler et al., 2001). A diagram of the Iowa model of EBP is provided in Appendix B (Titler et al., 2001). This model incorporates knowledge-focused and problem-focused triggers to evaluate whether current practice and patient care trends could be improved or advanced. The Iowa model (Titler et. al, 2001) provided the organizational framework for the project concentrating on the need to reduce the cesarean rate among pregnant laboring women locally and nationally. Stakeholders considered for this project included providers, nurses, labor and delivery techs, nursing unit management and patients as well as corporate financiers, risk management personnel, and the developers of the peanut ball. A team of members was created to analyze previous organizational data and obtain input from experts to develop the guideline for use of the peanut ball to reduce the cesarean rate. A retrospective analysis of articles of laboring women was performed to obtain statistical data of value for this project. The expert panel of those experienced with laboring women was developed and queried via the Delphi method. Their input was utilized to develop the guideline. Once the guideline was developed, appropriate education was created for staff and providers on the use of the peanut ball. A succinct step-by-step instructional sheet explaining proper implementation of the guideline and a policy template was created and made available to survey respondents. Evaluation of the guideline could be explored via an organizational EBP research study.

Stetler Model

The Stetler (2001) model of evidence-based practice was also utilized to identify barriers to implementation of this project. The risks of not interfering with the labor management education status and the benefits of implementing this change were provided to the stakeholders on the need for change within labor care was identified. Through development of the guideline, it is expected to facilitate a successful vaginal delivery, shorten labor times, decrease the discomfort of the woman, and promote satisfaction with her experience. By accomplishing these goals, it was projected a reduction in the cesarean rate would also be present. A research project could likely occur to investigate the rate of cesarean delivery after utilization of the peanut ball guideline in a community hospital setting. After the project data collection and analysis are completed to determine whether the expected objectives were met within these organizations and whether use of the guideline was beneficial for patients and the organization, the results and recommendations could be disseminated to outside organizations.

Critical Analysis of Evidence Links

Resources were evaluated utilizing the Johns Hopkins Medicine (2016) research and the non-research evidence appraisal models; matrices were developed (see Appendices C and D).

Objectives and Planned Evaluation

The peanut ball guideline was developed and implemented in the following increments:

1. Development of the guideline for use of the peanut ball on laboring patients. Step one was the main component of this capstone project and was broken into two sub segments.
    a. A retrospective analytical article review was performed to collect data on laboring patients. The primary outcome assessed was the rate of cesarean sections. In those women requiring a cesarean section, the etiology for the surgical necessity was recorded if available. Secondary data included the time of first stage and second stage of labor. National prevalence and incidence rates were obtained.
    b. The second sub-segment was accomplished via a discussion with an expert panel. Use of the peanut ball for laboring women is a newer tool and there is no evidence-based guideline for most community hospitals. The literature review was utilized to assist in development of this guideline and elicit survey questions. Delphi survey results from the expert panel were incorporated into the guideline. This method was utilized to increase the exposure to the peanut ball, remove personal bias, and allow free expression of opinions. The panel provided insight into important components to include in the guideline.

        The Delphi method produced data and outcomes in a valid manner due to the structured format of the group rather than an individual response (Helmer-Hirschberg, 1967). This process was carried out in two waves. Panel participation was requested from

experts regarding peanut ball use and laboring women. Day and night shift nurses were queried as their experiences might differ within an organization, the labor and delivery unit, and among providers and fellow nurses. Twelve nurse panelists were surveyed from two different organizations in the United States. Three physicians and three midwives were queried to improve the validity of the results. Input was also obtained from an experienced doula. While the total number of participants was low, the responses of each expert type were assessed in an unbiased manner. Participation was requested in the form of a project explanation letter. Returned surveys were considered consent for participation. Reminder emails were sent out at two weeks for those individuals who had not returned their surveys. This reminder was issued to obtain a higher rate of feedback from participants. Data were collected in the form of yes/no answers. Majority consensus was present when respondents agreed at a rate of 70% (Linstone & Turoff, 2011). Answers were issued a numerical assignment: 0 = No and 1 = Yes. These binary variables were statistically analyzed with a chi-square test. Open-ended responses were assessed for common themes and incorporated into the guideline. Statistical analysis was carried out by the author and attending school.

2. Education of staff and providers on the use of the peanut ball in labor included a step-by-step bullet point instructional sheet. Educational components for use of the peanut ball in laboring women were obtained via

a review of current literature on the peanut ball from the manufacturer to those using the peanut ball in practice. Nursing staff members and providers had input into the education via the panel surveys as well. This information could be disseminated to nursing staff during their monthly unit meetings. Attention concentrated on the maternal pelvis, fetal descent, epidural and lack of mobility in the first and second stages of labor, and safe and effective use of the peanut ball. Attendance at the meeting and a return demonstration were considered competence of use. Questions and concerns were addressed during the meeting. A concise step-by-step guide and instructional sheet was provided to respondents for distribution to the nursing staff and providers along with a policy template. Day shift and night shift nurse champions were encouraged to be utilized for further assistance if staff had further inquiries into the use. Subsequent steps could likely be carried out by a community organization.

3. Implementation of research-based project on the peanut ball in laboring patients.
4. Comparison and evaluation of the retrospective data to the research-based project results to determine if use of the peanut ball supported evidence that cesarean rates could be decreased for laboring women. Reporting of the data collected and determination of whether continued use would be beneficial or the implementation was unsuccessful along with recommendations for future nursing interventions in labor.

CHAPTER IV

RESULTS

Delphi Survey Round One

Delphi survey results were assessed in their respective waves of questions but information was also reviewed by respondent type to differentiate between experts and nursing users as well as to assess the level of understanding amongst each group. The list of survey questions is available for review in Appendix E (Peanut Ball Questions for Guideline Development--Delphi Study Round One) and Appendix F (Peanut Ball Questions for Guideline Development--Delphi Study Round Two). Respondents were categorized as either a physician, a midwife, a doula, or a staff nurse. Yes and no questions were asked along with open-ended questions that assessed for common themes. The second wave of surveys was issued to obtain clarification and address concerns the respondents identified in the first wave. Answers varied among respondent type and within each group as well.

Three physicians consented to participate in the survey and contributed as expert panelists. Individuals were asked if they were familiar with the use of the peanut ball in labor and, if so, did they use it in their practice? Two of the physicians were familiar with the peanut ball for use in labor; the third was not familiar. While not familiar, this physician trusted the midwives within the practice to utilize the peanut ball as appropriate. This respondent opted out of answering any further questions in Delphi

Survey: Round One. Physicians were asked if they felt the nursing staff understood the importance of pelvic positioning in labor. The remaining physicians felt most of the nursing staff understood the use of the peanut ball for pelvic positioning. When asked if they thought the staff had been given appropriate education on the use of the peanut ball for the first and second stages of labor, one of the surveyed physicians stated the nurses sometimes "listen but do not hear." The physicians were queried on barriers to using the peanut ball in labor; the respondents stated the central barriers to implementation of the peanut ball were issues regarding compliance among nursing staff and the ability of nurses to utilize the ball in addition to the many other items on their list of tasks. Computers and technology along with nurse-to-patient ratios were also listed as hurdles to promoting bedside patient care. One of the physicians offered patient compliance and their desire to remain immobile as a potential concern for peanut ball use. Benefits for use of the peanut ball were assessed and both physicians were aware of the advantages of the peanut ball to increase mobility in the active management of labor. They also offered their understanding of the device to facilitate rotation of the fetal head, assist in mal-presentation, and reduce the cesarean section rate. Both physicians were in agreement with the "yes" or "no" questions specific to the feasibility of changing maternal positions every 30 to 45 minutes while in labor, usefulness of a laminated positioning sheet for the nursing staff, and the ability to check the pressure and ensure appropriate care of the peanut balls with a monthly checklist. Maternal position changes every 30 to 45 minutes would be feasible if staffing permitted. A maintenance checklist and monthly peanut ball air pressure checks would also be appropriate as respondents were concerned about proper cleaning and care of the peanut ball. They felt a laminated positioning sheet

would provide great utility for nursing staff. The physicians were asked if there were any other items, questions, or concerns that should be addressed or added to the guideline and education protocol. Respondents were interested in viewing the statistics regarding peanut ball use and cesarean rate reduction.

Three certified nurse midwives (CNMs) were also included in the expert panel and expressed familiarity with the peanut ball. They felt nursing staff had a somewhat appropriate understanding of the reasoning behind the use of the peanut ball in labor. One CNM reported provider encouragement was sometimes necessary to spur nurses to employ the peanut ball. Two of the midwives felt the education provided to the staff was informal; they cited this lack of education for nurses and patients as a significant barrier to use of the peanut ball at the bedside. Like the physicians, the midwives also considered the nurse-to-patient ratio to be a hindrance. A broad understanding of the benefits was reported from the midwife panelists. They acknowledged use of the peanut ball in labor was valuable for patients with and without epidural analgesia. Specifically related to the maternal pelvis, benefits noted by the CNMs included the opening of the pelvis for rotation and descent of the fetal head, decreased use of instrumental delivery, and peanut ball use had the potential to drive down the cesarean section rate. All three CNMs felt a laminated positioning sheet for the nursing staff and a cleaning and maintenance checklist were beneficial adjuncts to the current use of the peanut ball. The change in maternal positioning every 30 to 45 minutes was also considered practical for most of the midwives.

One certified labor doula replied to the survey questions. The doula was familiar with the use of the peanut ball in labor and used it in practice. This responder felt nursing

staff needed further information on the importance of pelvic positioning in labor and did not feel nurses had not been provided with enough education on the use of the peanut ball in the first and second stages of labor nor the benefits of use. No barriers to use were discussed by this individual. Benefits of the peanut ball for labor were described by the doula as evidenced by research on the use of the peanut ball to decrease the length of first and second stages of labor. This responder also supported the peanut ball as a useful tool to open the pelvic outlet for women who utilized the epidural or needed to stay in bed due to exhaustion. Maternal positioning every 30 to 45 minutes was supported by the doula. The respondent noted it was beneficial to keep movement during labor to help the baby descend and recounted a personal experience of having a laboring woman progress in cervical dilation after receiving an epidural and switching her from side to side in this time increment. Use of a laminated position sheet was desired by this individual, not only for the nursing staff but also for the laboring women in attempts to find alternative positions to improve their comfort. The doula felt a monthly maintenance checklist was feasible for proper care and cleaning of the peanut ball in labor practice.

All the nurses queried were familiar with the peanut ball in labor as it was in use within their institutions where they currently worked but four respondents felt they did not have an appropriate understanding of the peanut ball to promote pelvic positioning. The majority of nurses also felt their overall education was inadequate. Self-directed activities were employed to learn more about the peanut ball. Their answers reflected a desire for more hands-on training to obtain proper positioning of patients. “Mimicking other nurses” was an honest response from one nurse to exhibit how she learned to use the peanut ball with her patients. Six nurses reported a lack of familiarity with the peanut

ball and proper use as impediments to possible patient safety and use of the peanut ball. No experienced users were available for assistance; thus, nurses reported feeling uncomfortable with the practice. Patient willingness and compliance was cited as an area of concern from three nurses due to newness or lack of awareness of potential peanut ball benefits. Nurse-to-patient ratios was discussed as a barrier by only one nurse in the survey. Two nurses felt a barrier to use was related to the lack of a covering over the ball as a reason for not employing the ball; they were concerned regarding cleanliness and wanted to promote comfort for the patient. Fetal intolerance to consistent position changes was considered an issue for one nurse and another nurse felt some epidurals provided an almost complete motor block, making it difficult to position patients frequently. Independently, most of the nurses covered the benefits of the peanut ball use in labor. The majority of nurses noted the peanut ball could help open the pelvis via appropriate positioning to allow fetal head rotation and descent, especially for those women with limited mobility. Two nurses noted women would have faster labors when the ball was employed and two other nurses reported the benefit of a reduced cesarean delivery rate. Improved maternal satisfaction was also noted by two of the nurses. None of the nurse respondents listed a decrease in instrumental forceps or vacuum-assisted deliveries, which were noted to be present in research completed by Tussey and Botsios (2011). Eleven nurses felt a 30- to 45-minute turning schedule was feasible. The remaining nurse stated this might not be achievable due to patient resistance of movement. A laminated positioning sheet was desired by 100% of the nurses; they felt a checklist for maintenance and care of the peanut ball was appropriate. Additional information and concerns nurses wanted to address were the need for education regarding

pelvis size to peanut ball size and how to choose the appropriate ball to be utilized. They also wanted education on the use of the peanut ball prior to arrival in labor. Two nurses wanted to know how to appropriately document use of the ball in the patient medical chart and to address fall precautions and contraindications (see Table 2 for Delphi study round one results).

Table 2

Delphi Study Round One Results

Question	Priori Mean Code	
	0 = No	1 = Yes
Familiar with peanut ball in labor? Used in practice site?	1	18
Nursing staff understand pelvic positioning in labor?	2	16
Staff given appropriate education on the peanut ball?	8	10
Feasible to change maternal positions every 30 to 45 minutes?	2	16
Laminated positioning sheet be useful for the staff?	0	18
Feasibility of monthly maintenance and care checklist?	0	18
Barriers to use of the peanut ball for labor?		
Unfamiliar with proper use (9)		
Patient compliance (4)		
Nurse-to-patient ratios (5)		
Sanitation (2)		
Too many nursing tasks (2)		
Fetal intolerance (1)		
Difficulty in moving immobile patients (1)		
Nursing habits (2)		
Benefits for use of the peanut ball in labor?		
Improved mobility (3)		
Lowers cesarean rate (4)		
Helps with occiput posterior presentation (1)		
Rotation and opening pelvis (12)		
Shortened labor (3)		
Maternal satisfaction (2)		
Lowers instrumental delivery rate (1)		

Note. Participant total = 19

Delphi Survey Round Two

A second round of questions was disseminated to survey participants to address additional information necessary for the development of the peanut ball guideline and education. Answers were again separated by respondent type to evaluate the similarities and differences among the participants to better gauge the education and information needed for the guideline. Only one physician participated in the second round of surveys. This respondent was asked if he/she felt use of the peanut ball could be improved with appropriate scripting from providers and nursing staff. This physician felt this could be improved via succinct phrasing to potential laboring patients. The participant was asked if the peanut ball was discussed in his/her current practice setting. The physician reported he/she did not have conversations regarding the peanut ball with their patients in the office but was willing to do so in the future. When asked about awareness of contraindications to using the peanut ball in labor, this physician was aware there were potential contraindications to use. When asked if he/she felt competence of use could be ascertained via a formal education session and a return demonstration, he/she felt this type of education program would be beneficial.

All the participating CNMs felt appropriate scripting would increase the likelihood of peanut ball use among laboring patients; 100% of the midwives currently discussed the peanut ball with their patients. One of the midwives stated this discussion occurred in the labor and delivery setting but was not reviewed in the office during antenatal visits. Interestingly, the CNMs noted they were lacking awareness of the contraindications for use of the peanut ball in laboring women. These participants felt

competence could be obtained through a formal educational offering along with a return demonstration component.

When asked about whether use of the peanut ball could be improved with appropriate scripting from providers and nursing staff, the doula noted the peanut ball is underutilized and felt if staff were better educated on the usage and benefits, there would be a resultant increase in use of the peanut ball in the labor setting. The doula reported discussion on the peanut ball in childbirth classes and with doula clients but was not aware of contraindications to use. This individual felt nursing staff could be easily and adequately trained via a formal education session that included a return demonstration.

Overall, nursing participants felt scripting of the benefits of peanut ball use would be beneficial for obtaining buy-in from patients. All participants reported discussing the peanut ball with patients when they presented in labor. Some respondents reported discussions occurring during childbirth education classes and occasionally during tours. Only one nurse participant was aware of the contraindications to use of the peanut ball in labor. All nursing participants indicated formal education and a return demonstration model would showcase their ability to provide safe care and use of the peanut ball with laboring women. All participants desired further information on the peanut ball (see Table 3 for Delphi study round two results).

Table 3

Delphi Study Round Two Results

Question	Priori Mean Code	
	0 = No	1 = Yes
Could peanut ball use be improved with scripting?	2	9
Do you discuss use of the peanut ball in your practice setting?	1	10
Aware of contraindications to using the peanut ball?	8	3
Ability obtained via formal education and return demonstration?	0	11
Would you like more information on peanut ball use in labor?	0	11

Note. Participant total = 11

CHAPTER V

-DISCUSSION

Results of the Delphi surveys produced interesting information. While it was noted all but one participant was familiar with the peanut ball being utilized in labor, answers varied on how comfortable they were with use or whether they felt the education received was adequate. Pelvic positioning was noted as an important aspect of labor care and management of the parturient by most participants. Respondents were conflicted on whether they had received appropriate education with approximately 50% reporting a lack of necessary education on the peanut ball in labor. Many reported their instruction was incomplete and mostly obtained via self-directed learning activities. There was a desire among participants to acquire further information including handouts, hands-on training, and an understanding of the proper positioning of the patient during peanut ball use. Most surveyed individuals discussed the peanut ball in their practice setting but scripting was desired by participants. This information would not need to be in a rigid form but with improved knowledge, care providers could appropriately discuss use of the peanut ball. The highest rated barrier to use was unfamiliarity and lack of education. Without this education, it could not be expected labor caregivers would be able to make women more aware of the peanut ball and improve bedside use. Two participants were concerned the labor tool was not hygienic to be utilized for multiple laboring women. The peanut ball is made of a durable, non-latex material and could be cleaned with a

sanitation wipe. A cover could be utilized as both a comfort measure and to help absorb bodily fluids. Most participants were not aware of the contraindications for peanut ball use; this would be a necessary education point to ensure no harm is encountered by the laboring woman. Knowledge of proper care and management would allow the nurse to feel confident the peanut ball could be safely utilized. This confidence would also be present as labor attendants utilize the peanut ball; they should be able to discuss the benefits of this tool in achieving good labor outcomes with pregnant women and, thus, improving patient compliance. Nurse-to-patient ratios was a fear for five survey respondents and two others were concerned nurses had too many tasks and might not employ the peanut ball due to time constraints. The manufacturer's guidelines recommend laboring women have an attendant present when the peanut ball is being utilized (Premier Birth Tools, 2015). Use of the peanut ball would not be hindered by the nurse-to-patient ratio and task list if proper instruction was provided to labor support persons but should comply with hospital protocol. Epidural use and immobile parturients could present a challenge to use of the peanut ball. Assistance would be needed in assuming different positions to ensure the patient did not move or roll the labor tool off the bed and can be provided by ancillary labor support persons. It is assumed there will be instances when the peanut ball is not suitable for labor management and judgement must be utilized in determining those occasions.

Knowledge of the benefits of the peanut ball for use in laboring women were addressed well and lent to an improved understanding and ability to offer this labor tool to women. Most respondents cited the ability of the peanut ball to assist with fetal rotation and opening the pelvis during labor. The results provided evidence of areas of

need for increased education specifically related to decreased cesarean section rate, shortened labors, and decreased instrumental delivery rates among users. Most participants were unable to cite a decrease in instrumental deliveries for those women laboring with the peanut ball. A small number of respondents listed benefits of a shortened labor, improved mobility, and maternal satisfaction. Most survey participants also considered pelvic repositioning every 30 minute to 45-minutes as a sustainable timeframe. This repositioning helps ensure mobility and pelvic opening are being implemented and reassessed in a frequent manner of time. Formal education and return demonstration would assist with competence and improved knowledge of these advantages, was desired by all survey respondents, and would increase promotion to patients and hopefully greater patient satisfaction. All participants desired a laminated positioning sheet to reinforce the appropriate use of the peanut ball and wanted more data on the subject matter. This information gave the author assurance that care attendants desired a better understanding and improved labor outcomes for laboring women.

Implications and Recommendations

Staff Education

Patient satisfaction is incurred with peanut ball use as there is a desire to have a vaginal delivery, a shorter labor and pushing phase, and to achieve a better grasp on discomfort associated with labor. Satisfaction with use is not only a patient consideration but must be obtained from providers, nursing staff, and labor attendants. They receive satisfaction when their patients are happy; with a lower cesarean section rate, this is possible. Nursing staff obtain satisfaction when they feel more comfortable with a new tool or intervention. With a shortened labor, it is assumed less chart notations would be

needed and time could be increased at bedside. The burden associated with the cesarean rate falls as well. Cesarean deliveries create an eye-opening cascade of events and can be addressed via soaring healthcare costs. This surgical procedure is the number one performed major abdominal surgery (Mathai, Hofmeyr, & Mathai, 2013). The National Vital Statistics Reports for 2013 showed a repeat cesarean delivery occurred in 89.4% of all women after receiving a primary cesarean section (Curtin, Gregory, Korst, & Uddin, 2015). Having a primary cesarean not only has a personal effect for most women but also leads to a higher risk designation for future pregnancies, closer surveillance methods that require a rise in the amount of antenatal surveillance, increased time requirements to discuss additional risks in subsequent pregnancies and to review the benefits, and precautions of proceeding with a trial of labor after a cesarean or a repeat cesarean delivery.

Staff could become more familiar with use of the peanut ball in labor and delivery via a formal education in-service. Those utilizing the peanut ball for laboring women would better serve their patients if they completed an educational offering on use of the peanut ball and provided a return demonstration. Knowledge of the importance of pelvic positioning in labor and how it could facilitate appropriate changes necessary to allow an open pelvis would be encouraged. Diverse ways in which to obtain mobility in the laboring woman and her pelvis should be addressed. Among these items, the peanut ball could be introduced. Maternal positioning helps facilitate labor progress, improves maternal-fetal blood flow and contraction strength, decreases pain and length of labor, and allows for the fetal head to descend in the pelvis, ultimately helping prevent cesarean delivery (Priddes et al., 2012; Zwelling, 2010). With proper positioning, the fetal head is

better aligned with the pelvis. This is not achieved when the patient is confined to the bed or movement is limited. The peanut ball widens the diameters of the pelvis better than the traditional side-lying position or the use of props such as pillows.

The female parturient can be placed in many different positions when employing the peanut ball. It would be important to discuss the role of the peanut ball and appropriate mobility with staff members, patients, and support persons. Placement and use might vary and would be dependent upon fetal presentation, cervical dilation, fetal descent, pelvic narrowing from maternal positioning, and maternal discomfort. The patient could use many positions with the peanut ball in bed--side-lying, tuck, semi-sitting lunge, fire hydrant, and the forward lean (Grant & Clutter, 2014)--during the first stage of labor or during the second stage of pushing. As an alternative, if a peanut ball is not available and the patient is confined to the bed, a bed stirrup or support person could assist in holding one leg out and open to facilitate a widening of the pelvis.

Use of the peanut ball might be ineffective if the size of peanut ball is not appropriate for the position to be occupied by the laboring woman or the height of the woman. Injury might also incur if the wrong sized ball is utilized. Different sizes for the peanut ball must be considered for use with the patient. For women under 5' 3", the 40-centimeter ball is recommended. For women 5'3" to 5'6", the 50-centimeter ball is recommended. For obese women with a body mass index (BMI) greater than 35 and those women 5'7" or taller, the 60-centimeter ball is recommended (Premier Birth Tools, 2015). Depending upon the position used with the patient, one might need to consider a different size. Injuries to the hip could result if the incorrect peanut ball is used. The ankle must be correctly supported as well to avoid injuries and to keep the pelvic outlet

opened appropriately. Labor attendants should familiarize themselves with each of the positions. Through this familiarization, laboring staff would be better able to discuss the peanut ball and offer it to their patients and their support person(s). It would be helpful to communicate the benefits and positive effects to obtain buy-in for many patients. If discussed during birthing tours, childbirth education classes, and antenatal visits, the patient could become familiar with the laboring tool might may be better informed of how it could be utilized. A positioning guide at the bedside would be helpful for laboring attendants, nursing and ancillary support, along with patients. The peanut ball is indicated for women in active labor with a vertex fetus and no present contraindications. These contraindications are typically in place for offering a vaginal delivery and could include placenta previa, herpes simplex virus with active lesions, previous classical or T-incision uterine surgery, and untreated human immunodeficiency disorder. Absolute contraindications include previous or current hip/pelvis injury, pubic symphysis dissection, and current ankle or leg injury (Family Practice Notebook, 2015; Premier Birth Tools, 2015). Once the attending provider has identified the laboring woman as obtaining potential benefit, the peanut ball can be offered for use. This could be assumed by including this intervention in antepartum labor standing orders.

Proper safety must be employed to avoid creating an injury. A blue chux pad, hospital gown, sheet, or cover should be applied to the peanut ball prior to patient use. This prevents direct contact with the peanut ball's non-latex material, protects the skin of the patient, and promotes comfort (Premier Birth Tools, 2015). The woman could be assisted with positioning, and education regarding safety precautions could be provided to patients and labor support persons. While peanut ball is in use, it is recommended a

support person or staff member be present at the bedside. Women might not be able to thoroughly move in and out of positions without assistance or might not be able to control the labor tool. Repositioning of the patient is recommended every 30 to 45 minutes to facilitate fetal rotation and descent (Premier Birth Tools, 2015).

Nursing staff should document use of peanut ball and positioning changes in the medical record. This is an intervention and should be recorded as such. When reviewing statistics on labor outcomes, this notation might be useful in determining its effect on cesarean and vaginal delivery rates, first and second stage of labor length, instrumental delivery rates, and maternal satisfaction.

It is imperative that care of the peanut ball complies with the accompanying manufacturer's instructions. Premier Birth Tools (2015) provided an overview of the care and maintenance of the peanut ball. The air pressure should be checked regularly; it is recommended this check occur monthly to ensure appropriate inflation. The peanut ball should be cleaned with sanitation wipes prior to use, after use, and as needed. Keeping a liner on the ball limits contact with the non-latex material and provides a barrier for body fluids. Regarding storage, the ball would be preserved if it is kept out of direct sunlight, at less than 80 degrees, and stored off the floor. Keeping peanut balls in a central location could assist in increasing availability for all laboring women and less time is spent searching through labor room closets or storage rooms. Four short videos and two longer videos can be viewed on YouTube regarding appropriate use of the peanut ball and sizing; viewing these videos could increase awareness on the subject. Website links are provided within the education guideline (see Appendix G).

Guideline Development

The results of these queries were reviewed to formulate a succinct step-by-step guideline to be employed by those providing bedside care to laboring women (see Appendix H--Bullet Point Guideline for Peanut Ball Use). Appropriate education and template peanut ball policy were developed as an integral part of the guideline. The guideline provides a concise checklist of items to be employed in care of the laboring woman while utilizing the peanut ball. The peanut ball should be discussed and offered to the patient and her support representatives. Appropriate cleaning techniques are to be completed before the peanut ball is used at the bedside. Positioning of the peanut ball is addressed and references the use of a laminated imaging sheet to assist with proper placement (see Appendix I--Pelvic Positioning for the Peanut Ball). Sizing recommendations for women of different heights and weights are addressed as well. Education on being present at the bedside and not leaving the laboring woman alone is reinforced and encourages more time with the patient. Per a Cochrane meta-analysis (Hodnett, Gates, Hofmeyer, & Sakala (2013), continuous labor support promotes the reduction in cesarean section rates and improves maternal satisfaction as noted. The appropriate timeframe for repositioning the patient is discussed. Staff, patients, and support persons become aware of the need to facilitate movement in the pelvis. The final component of the guideline addresses the need for the laboring staff members to document this intervention in the medical record. For ease of use and transition in an organizational setting, a template policy was created and can be integrated and modified to be congruent with the organization (see Appendix J for the Peanut Ball Policy Template). It would be appropriate to review current literature along with

recommendations and opinion statements from gold standard experts in the field of obstetrics to update the peanut ball guideline every two years or as evidence becomes available.

Enhances, Culmination, Partnerships, Implements, and Evaluation Method

A guideline produced for use in nursing practice should be comprised of specific components. These components are essential and should exemplify knowledge at the doctoral level incorporating evidence-based research and innovative technologies and tools into practice. To assess whether this guideline development met Doctor of Nursing Practice standards, the enhances, culmination, partnerships, implements, and evaluation **(**EC as PIE; Waldrop, Caruso, Fuchs, & Hypes, 2014) method was utilized.

The Enhances criteria were employed to investigate the project to determine whether health or practice outcomes were reflected (Waldrop et al., 2014). The use of the peanut ball to reduce the cesarean rate capstone project attempted to address the rising cesarean rate and offered a low-risk intervention to stave the increasing number of surgical procedures worldwide, specifically related to laboring women.

The Culmination factor incorporated the need for practice analysis in an area of interest to promote change (Waldrop et al., 2014). A synthesis of the literature including statistics and supporting evidence to support the need for intervention amongst this population of women was completed. With one-third of laboring women receiving a cesarean section delivery, the literature was reviewed to determine the commonalities that could potentially lead to this outcome. Cesarean delivery increases the likelihood of adverse effects associated with major abdominal surgical procedures. Risks for laboring women increase when the maternal pelvis becomes restricted. This is typically seen

when there is limited mobility. Use of the epidural in labor can add to this narrowing of the pelvis, leading to mal-presentation, prolonged labor, and maternal physiologic changes. Epidural analgesia has also been linked to an increased need for labor augmentation and instrumental delivery. Appropriate pelvic positioning in the laboring woman has been elicited as an area of importance in obtaining a normal vaginal delivery. When positioning is understood, and incorporated by those individuals at the bedside offering support during labor and delivery, patients have improved delivery outcomes. Utilizing appropriate positioning could lead to improved uterine blood flow and contractility. Evidence suggested first and second stages of labor length are shortened with proper pelvic positioning. The peanut ball is an innovative solution with the potential to improve labor outcomes and also has the potential to decrease pain and improve maternal satisfaction. Current evidence suggests changes in labor management and practice could be incorporated via the use of the peanut ball to improve the possibility of a sustainable decrease in cesarean deliveries (Waldrop et al., 2014).

Partnerships are an integral part of this process and differing levels of professional disciplines should be encouraged to participate in the formation of a guideline that has the potential to affect an aspect of the care they provide (Waldrop et al., 2014). The peanut ball is a relevant addition to the care of laboring women when incorporated by those with satisfactory knowledge regarding the importance of pelvic positioning. Staff need to be comfortable with employing this intervention. Not only must the positioning of the woman be considered but there should also be an awareness of the benefits and contraindications for use of the peanut ball. Proper care and maintenance of the peanut ball must be addressed to utilize the ball in a safe manner. Delphi studies were utilized in

this project to query providers and nursing staff regarding the current level of knowledge and education still needed by study participants. This information was obtained using two separate waves of questionnaires.

The Implement/Apply/Translate criteria represents the restructuring of the evidence into a tool or intervention, which offers a method for improving health care on a larger scale (Waldrop et al., 2014). A guideline for use of the peanut ball for laboring women is a vital item to address necessary education points. By integrating an easy to follow education guideline and visual aide, nursing staff can offer laboring women a method to encourage pelvic mobility and thus improve labor outcomes while reducing the cesarean section rate.

AGREE II

The Evaluates criterion of the EC as PIE acronym served to address outcome measures. With higher rates of pelvic mobility via use of the peanut ball, it was assumed a larger number of pregnant women would have improved labor outcomes. These outcomes would include a higher rate of vaginal delivery and a reduced rate of cesarean sections, shortened first and second stages of labor, decreased instrumental delivery, and improved maternal satisfaction.

Brouwer et al. (2010) described the Agree II Instrument as a guideline appraisal tool that assesses the relevance of a guideline to the clinical topic and its ability to address health screening, promotion and health promotion efforts, screening protocols, and diagnostic criteria. The Agree II Instrument is comprised of a 23-item questionnaire with a Likert scale divided into six domains (AGREE Next Steps Consortium, 2009).

The framework attempted to address the asset and quality of the guideline through a systematic process. The Domains are separated into six categories:

- Domain 1--Scope and Practice Specific Health Population. Related to the scope and practice specific to the health population and consists of questions pertaining to guideline intentions.
- Domain 2--Stakeholder Involvement. Ensures pertinent professional groups such as health practitioners, policy makers, and educators are involved in the process and the concerns of the target health population are addressed.
- Domain 3--Rigor of the Guideline Development. Contains questions surrounding the rigor of the guideline development. Specifically, this domain addresses the methodology of the data collection and synthesis process.
- Domain 4--Clarity of Presentation. Terminology use within the guideline along with the presentation structure, form, and stylistics are included in Domain 4 questions.
- Domain 5--Applicability. Seeks to acknowledge the barriers and facilitators to implementing and using the guideline with a concentration on applicability. Methods to increase and strengthen buy-in for the guideline utilization are also addressed.
- Domain 6-- Editorial Independence. Seeks to ensure the recommendations are not biased and are offered with editorial independence. A score is derived from the rapid appraisal questionnaire to determine the quality and strength of the information provided by the guideline. Recommendations

> are established regarding guideline relevance for practice and assist with the development of policies and protocols for that practice setting. Recommendations are also offered for stakeholders associated with the practice guideline. An appraisal can ease the manner in which practitioners make decisions regarding clinical care for specific health conditions.

The peanut ball guideline secured a 97.8% score via the AGREE II Appraisal tool (AGREE Next Steps Consortium, 2009) and served to create an education guideline that seemed to be employable in a clear and concise format. The complete AGREE II Appraisal can be viewed in Appendix K. The scope and purpose of the guideline are clearly presented in the capstone project and describe the intended populations the guideline sought to address to obtain a reduction in cesarean deliveries. The guideline development process considered the necessary stakeholders to provide a thorough list of recommendations via a literature review, surveys from experts, and independent interviews with experts. The literature search was described but the complete full search strategy did not include the total number of articles initially obtained and how these items were chosen for inclusion or exclusion, although evidence of each item selected was assessed in the project. The Delphi survey waves for expert panel questionnaires were discussed and included each question along with the priori coding for participant answers. This information was integrated into the guideline and provided reasoning behind the need for inclusion in the recommendations. The project addressed the necessary benefits of use, who should and should not utilize the peanut ball, and possible sequelae of use. Possible detriments for not using the implement in laboring women were also relayed.

To ensure employability, an external review was completed by more than one expert: one obstetrician and one certified nurse midwife. A change was incorporated regarding the order for the peanut ball in labor. To initiate peanut ball use, inclusion of a separate order was removed and use of the peanut ball could be addressed with application in a standing order set. Insertion in a standardized order set allows the nursing staff to initiate the peanut ball at the bedside for care management of a laboring woman without requesting a specific and separate order. References were also added in to the education guideline to provide sources for those utilizing the guideline to obtain further information on pelvic mobility and positioning, fetal tasks in the first and second stages of labor, management of labor, and peanut ball care and maintenance. Individual contraindications were removed from the succinct guideline as they were all concerns that precluded an individual from proceeding with a vaginal delivery. This removal made the guideline more concise and easy to view. The capstone project and guideline were also reviewed by the capstone community member (an obstetrician,) and the capstone research advisor (a certified nurse midwife) to increase applicability. The recommended timeframe for review and updates for the guideline were described. A step-by-step methodology was utilized for clarity, allowing the care provider to easily follow the recommendations without questioning the meaning of items.

The project provided multiple pelvic positions to perform with the peanut ball as well as alternatives to achieve pelvic mobility when a peanut ball was unavailable. Easy to read tables and a laminated pelvic positioning sheet were included in the project to provide the user with a comprehensive education tool.

Conclusions

It is important to recognize the need for changes to occur to effectively reduce the cesarean rate in the United States. The Healthy People 2020 goal is to reduce the current 32.2% cesarean rate to a 23.9% (Hamilton et al., 2015; U.S. Department of Health and Human Services, 2013). Pelvic mobility is an important tool in ensuring this outcome. The upright position assists in providing the appropriate condition for opening the pelvis (Caldeyro-Barcia, 1979). Women with decreased mobility are at risk for an increase in malpresentation, inefficient contractility, and a resultant slowing of fetal rotation and descent (Caruselli et. al, 2011). The culmination of these items could lead to prolonged first and second stages of labor and a higher instrumentation or cesarean section rate. Alternatives have been offered to assist patients including use of the shower, dancing, the rocking chair, and the round physiotherapy ball. Some women might not be able to assume these positions for many reasons and thus are confined to the bed, which further limits the mobility of the pelvis. For those laboring women with limited mobility, the peanut ball can offer an appropriate tool to achieve opening of the maternal pelvis and facilitating rotation and descent of the fetal head.

Women might be unfamiliar with this labor tool and lean on their labor support and nursing staff to assist them through the labor process. A well-informed labor provider can promote safe and effective care and education on available support and interventions--one being the peanut ball. It is assumed that better availability of labor support, a pelvic positioning tool, and standardized education on peanut ball use in relation to pelvic positioning could further reduce the number of cesarean section deliveries. The peanut ball guideline serves to offer these individuals with a concise and

easy to read checklist. Team members can review the guideline with patients and their support persons prior to use and use the visual aide to encourage mobility and position changes. With increased use in the care of labor patients, a subsequent drop in the number of cesarean sections is expected, thus increasing spontaneous vaginal deliveries and patient satisfaction. These expected results could potentially lead to a turnaround in the cost of a higher cesarean rate--both financially and health risk-wise. It is important to note that even with appropriate conditions for a normal vaginal delivery, situations and complications might arise on the maternal or fetal side, thus negating the opportunity to proceed with these implementations for a vaginal delivery. Instances of this included and were not limited to fetal intolerance, unstable or severe pre-eclampsia, antenatal hemorrhage, fetal-pelvic disproportion, or elective operative or cesarean delivery. A cesarean delivery might then become the safest or most effective route for a healthy outcome.

Innovative tools, services, and programs are offered worldwide to analyze data, improve administrative and management processes, forecast changes in social realms, and advance health care. Some of these items are intricate and complex while others only require a shift in thinking and a simple tool, i.e., the peanut ball. Somewhere along the line of physiotherapy, the peanut ball was offered up as a safe, low-cost intervention to improve the outcomes of laboring women. At times, change can be viewed as too forward or can be passed over and considered to be of no consequence when the idea being presented has merit. The beginning statistics on use of the peanut ball in laboring women have shown benefits across the board. Overall, shortened labors, reduced instrumental and operative deliveries, and maternal satisfaction have been cited in

research over the past six years (Grant & Clutter, 2014; Payton, 2015; Tussey & Botsios, 2011; Tussey et al., 2015). Peanut balls can be found in many institutions for labor and delivery practice. Their usage is evolving and growing in popularity as these benefits are becoming more well known. The nursing attendant has the potential to influence labor care. Utilizing words or phrases stated in a rehearsed manner could make the patient withdraw or become apprehensive. To invoke excitement or enthusiasm about a concept tool like the peanut ball, patients look to their nursing attendants to guide them through their experience. Laboring women are more willing to partake in activities if they are deemed beneficial. Trusted nursing staff touting the possibility of shortened labors and discussing the reduced time spent in the first and second stages of labor as well as the decreased risk for instrumental and cesarean section delivery could help sow the seeds for implementation of the peanut ball device. It is hoped this tool would not be considered as an anecdotal fad or trend due to the surge in use but rather as another tool with actual merit and worthy of consideration.

Future Research

The advent of the peanut ball use in laboring women has only been growing in use and acceptance over the past six years. Research thus far regarding the peanut ball has concentrated on generalized labor outcome, multiparous women, and the differences in use after an epidural has been placed. Most of these studies have been small scale and lack replication. Repetitive studies would help ensure validity and reliability. The possibilities for exploration with this specific tool are fertile and could allow for further sharing of data and improved communication among care providers, nursing and bedside labor attendants, and laboring women. This could be the impetus to further

understanding, exploration of the pelvic positioning in labor thought process, and improved health outcomes. Future helpful research queries should look to explore the specific differences of labor and delivery among those using the peanut ball and those not utilizing this method. The variance among nulliparous and multiparous women, epidural use for pain management, and those not utilizing the epidural should be represented in the peanut ball literature. A quasi-experimental relational study pairing two very similar pregnant women with mirrored antenatal courses entering labor in the same manner would provide great benefit. This could provide an investigative point-by-point analysis of the differences promoted by use of the peanut ball. Pregnancy courses can vary greatly among women and this uniqueness has the potential to influence delivery outcomes. Different peanut ball positions occupied by the laboring woman would also be a point of interest for further studies. The simplicity of physiology can be overlooked and as it is believed specific pelvic positions assist in correcting mal-presentation, descent, reduction in persistent cervical lip, and maternal comfort. Statistical data identifying and confirming these positions and results would reaffirm proper pelvic positioning techniques.

This author felt the labor care model has been narrowed in many instances, creating an atmosphere where laboring women become fixed in a cycle of medical actions mostly due to use of continuous fetal monitoring. Many of these activities are compulsory and integral pieces of care but in themselves are not always required. This research area could provide the catalyst to increase awareness and restructure the rigid, task-oriented processes currently being noted in labor care.

Editorial Independence

No funding body or source was involved in the development or implementation of this project. No competing interests were identified among guideline development group members.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

UNIVERSITY OF
NORTHERN COLORADO

Institutional Review Board

DATE:	March 2, 2017
TO:	Jennifer Klump, MSN, CNM
FROM:	University of Northern Colorado (UNCO) IRB
PROJECT TITLE:	[1024960-1] Use of the Peanut Ball to Reduce Cesarean Rate
SUBMISSION TYPE:	New Project
ACTION:	APPROVAL/VERIFICATION OF EXEMPT STATUS
DECISION DATE:	March 2, 2017
EXPIRATION DATE:	March 2, 2021

Thank you for your submission of New Project materials for this project. The University of Northern Colorado (UNCO) IRB approves this project and verifies its status as EXEMPT according to federal IRB regulations.

Your patience with the UNC IRB process is much appreciated. Thank you for submitting your well-written IRB application for this study. There are no requests for modifications, amendments or additional materials. Your protocols and documents are verified/approved exempt and you may begin participant recruitment and data collection.

Best wishes with this interesting and relevant research.

Sincerely,

Dr. Megan Stellino, UNC IRB Co-Chair

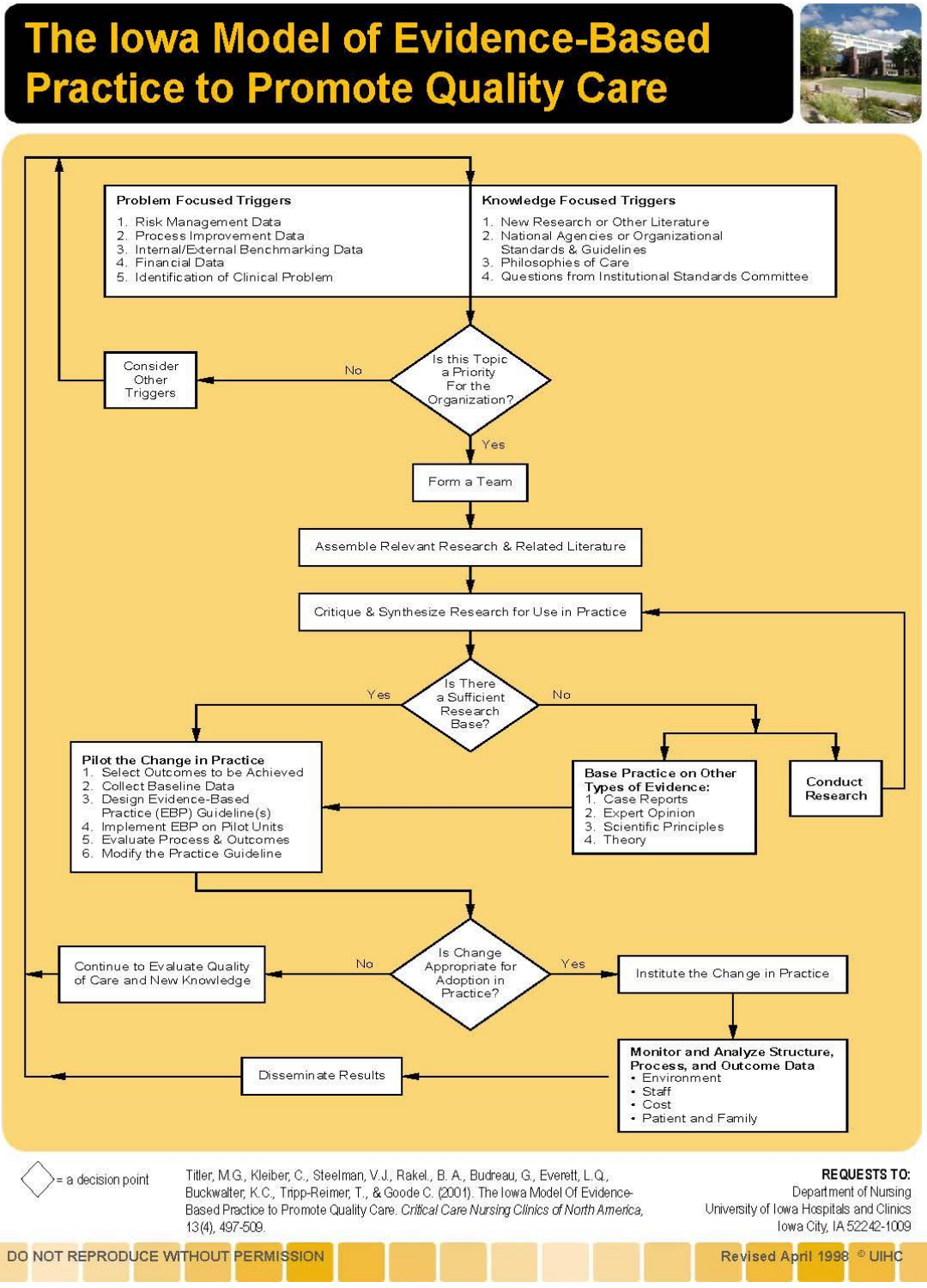
We will retain a copy of this correspondence within our records for a duration of 4 years.

If you have any questions, please contact Sherry May at 970-351-1910 or Sherry.May@unco.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.

APPENDIX B

IOWA MODEL



Used/Reprinted with permission from the University of Iowa Hospitals and Clinics. Copyright 1998. For permission to use or reproduce the model, please contact the University of Iowa Hospitals and Clinics at (319)384-9098.

APPENDIX C

EVIDENCE-BASED PRACTICE RESEARCH MATRIX

Evidence-Based Practice Matrix								
Research Title	Level of Evidence	Hypothesis	Design	Sample	Data Collection	Statistical Findings/ Results	Implications/ Conclusions	Quality Rating
Agrawal, D., Makhiga, B., Arora, M., Harwital, A. & Gurha, P. (2014). The effect of epidural analgesia on labour, mode of delivery and neonatal outcome in nullipara of India, 2011-2014. *Journal of Clinical and Diagnostic Research*, *8*(10), OC03-OC06. Doi: 10.7860/JCDR/2014/9974.4930	I	To evaluate the effect of Ropiviocaine epidural analgesia on the length of labor in nulliparous women.	RCT	120 full term nulliparous women in labor, with a single vertex fetus. Participants were categorized into two groups: epidural use and non-epidural use.	Adequate description of collection method.	First stage of labor was shorter for epidural users versus non-epidural users, while the second stage of labor was noted to be longer in epidural users.	A prolonged second stage of labor exists for those women using an epidural in labor.	A

Caldeyro-Barcia, R. (1979). The influence of maternal position on time of spontaneous rupture of membranes, progress of labor, and fetal head, compression. *Birth and the Family Journal, 6*(1), 7-15.	I	Appropriate positioning of the pregnant woman would have a positive effect on spontaneous rupture of membranes, the length of labor, fetal head molding and fetal heart rate.	Experimental Randomized Controlled Trial	225 women in labor, 145 utilized a position of their choice	Adequate description of collection methods.	Maternal position had no effect on the SROM. Labor was shorter in 36% of primiparas and 25% shorter in multiparas women in the upright position. Positioning had no effect on fetal head moling or Type 1 and Type 2 fetal heart rate patterns. The upright position was preferred by 95% of women.	Offering women the upright position while in labor can provide to be beneficial in reducing the length of labor and preventing fetal heart rate complications .	B

Caruselli, M., Camilletti, G., Torino, G., Pizzi, S., Amici, M., Piattellini, G. & Pagni, R. Epidural analgesia during labor and incidence of cesarean section: prospective study. *Journal of Maternal-Fetal & Neonatal Medicine, 24*(2), 250-252.	I	Will set guidelines for epidural analgesia duirng labor have an influence on maternal and fetal outcomes?	Prospective, RCT	239 women in labor, 119 requested epidural and 120 requested no analgesia	Adequate description of collection methods.	There was no statistical difference in labor times for participants. Labor had a slowed active phase, an increase in need for Pitocin and expulsion times were prolonged in the epidural group. The cesarean section rate and newborn Apgar scores was similar in both groups.	Epidural limits mobility of the female pelvis and shows a slowed labor and delivery experience for women.	B

Cheng, Y. W., Shaffer, B. L., Nicholson, J. M. & Caughey, A. B. (2014). 2nd stage of labor and epidural use: A larger effect than previously suggested. *Obstetrics & Gynecology, 123*(3), 527-535.	II	To assess the median length of the second stage of labor among women in the second stage of labor to determine whether there is a prolonged second stage of labor.	Quasi-Experimental, Retrospective Cohort Study	42,268 women in the second stage of labor, either using an epidural or not using an epidural.	Adequate description of collection method.	Nulliparous women without an epidural had a second stage of labor lasting 336 minutes and those without epidural had a 197 minute second stage. Multiparous women without an epidural had an 81 minute second stage and those with an epidural had a 255 second stage of labor.	Epidural use can prolong the second stage of labor. While there is a need to provide comfort, methods to reduce the second stage of labor should be explored.	A
Cutler, L. (2012). A consideration of the positions women adopt for labour. *British Journal of Midwifery, 20*(5), 346-351.	III	What positions do women utilize while in labor?	Non-experimental, Observation	8 women in total were included but only 5 were observed by the researcher. Limited sample size.	Adequate description of collection methods.	The women observed preferred to labor on hands and knees position or in the supine position. Maternal instinct was an important factor in their positioning not procedure or convenience.	Letting the laboring woman is optimal for positioning.	C

	III	Which position will a woman choose during labor?	Experimental, RCT, Observational Cohort Study	225 women in labor. 69 used the recumbent position. 156 used an alternative position.	Adequate description of collection methods.	Improvement were present when women labored in alternative positions with regard to the length of first and second stage of labor, vaginal deli-very and fetal head rotation. There was a decrease in the occiput-posterior position at delivery, need for operative delivery and cesarean section as well. Finally, the episio-tomy rate and maternal pain was reduced when allowed alternative positioning. Women chose the upright or sitting posit-ion over other positions.	Women should be offered multiple positions while in labor to facilitate vaginal delivery and rotation of the fetal head. Pain can also be reduced with position of choice.	B

Gizzo, S., Di Gangi, S., Noventa, M., Bacile, V., Zambon, A. & Nardelli, G. (2014). Women's choice of positions during labour: Return to the past or a modern way to give birth? A cohort study in Italy. *BioMed Research International*, Volume 2014, Article ID 638093, doi: org/10.1155/2014/638093	II	Assessment of different positions utilized by primiparous women in labor and delivery. To compare the recumbent and alternative positions.	Observational cohort study.	225 women in labor at the University of Padua, Italy.	Adequate description of the collection method.	Position change promoted a decrease in pain, decrease in operative delivery, decreased cesarean section rate and decrease in the need for an episiotomy.	Movement in labor should be promoted to assist less need for medical intervention.	B
Grant, C. B., Craig, B. & Rice, A. (2014*). Length of labor reduced through use of peanut ball: A retrospective analysis.* Unpublished raw data.	II	To determine whether the length of labor can be shortened when a peanut ball is utilized.	Retrospective analysis.	218 laboring women.	Inadequate details listed in document.	Results showed peanut ball use among epidural users and non-epidural users produced a shortened first and second stages of labor.	Reduction of labor can be produced via peanut ball use among parturients.	D

Hasegawa, J., Farina, A., Turchi, G., Hasegawa, Y., Zanello, M. & Baroncini, S. (2013). Effects of epidural analgesia on labor length, instrumental delivery, and neonatal short-term outcome. *Journal of Anesthesia*, *27*(1), 43-47.	1	Does the use of epidural have an effect on the length of labor, labor procedures and Apgar scores?	Retrospective, Case-Controlled Study	1,750 women in labor. 350 women with an epidural. 1400 women without an epidural.	Adequate description of collection methods.	The cesarean section rate was 11.1% in women without an epidural compared to 19.9% in those with an epidural. The use of a vacuum to obtain a vaginal delivery was also reduced by 3.6% in the non-epidural group. Labor was longer and Apgar scores were lower in the epidural group.	Better outcomes for the woman and the newborn were noted in those without an epidural during labor.	A

Hodnett, E., Hofmeyer, S. & Sakala, C. (2013). Continuous labor support for women during childbirth. *Cochrane Database of Systematic Reviews 2013*(7), 1-113.	I	What is the resultant effect of continuous labor support for women during childbirth?	Meta-Analysis, Cochrane Trials Review, Random Effect	22 Trials; 15,288 women. International review.	Adequate description of collection methods.	Continuous support resulted in an increase in SVD, decrease in analgesia and a decrease in dissatisfaction. Shorter labors were evident as well as a decrease in cesarean deliveries and instrumental deliveries. Regional analgesia need decreased. Apgars were improved as well.	Providing labor support for women plays an important role in labor care and maternal and newborn outcomes.	A

Lawrence, A., Hofmeyr, G., Dowswell, T. & Styles, C. (2013). Maternal positions and mobility during first stage of labour. *Cochrane Database of Systematic Reviews 2013(8)*, 1-164.	I	How does maternal positioning and mobility in the first stage of labor effect maternal and newborn outcomes?	Meta-Analysis, Cochrane Trials Review, Random and Quasi-Random Trials.	80 Meta-Analysis, 25 Studies; 5218 women. International review.	Adequate description of collection methods.	The upright position resulted in a shorter first stage of labor but no change in the second stage when compared to the recumbent position. The cesarean rate, epidural rate and Neonatal Intensive Care Unit (NICU) admission rate were all lessened in the upright position as well.	Only laboring in the recumbent or supine position limits mobility and being upright can result in lowering epidural use, cesarean rate and NICU stays for newborns. Bias may be present as position changes are varied among different countries as is the model of birth care.	B

Liu, Y. (1974). Effects of an upright position during labor. *The America Journal of Nursing, 74*(12), 2202-2205.	I	What are the effects of use of a thirty degree upright position during labor when compared to the recumbent position? Will uterine contractility and duration be present? Will first and second stages of labor be shorter? Will infants have a higher one-minute Apgar?	RCT, Observational Cohort Study	60 Primigravida women in labor. 30 women in the upright position; 30 degree angle. 30 women in the recumbent position.	Adequate description of collection methods.	The upright position increased fetal descent and shortened the first and second stages of labor. When patients were not given second stage instructions they had a resultant shorter second stage relying on instincts.	Women laboring in the upright position will have improved delivery outcomes. Directed pushing does not seem to be as effective as when the woman pushes upon instinct.	B

Mathai, M., Hofmeyr, G. J. & Mathai, N. E. (2013). Abdominal surgical incisions for caesarean section. *Cochrane Database of Systematic Reviews, 5*, CD004453. DOI: 10.1002/14651858.CD004453.pub3	I	To determine the benefits and risks of alternative methods of abdominal surgical incisions employed during cesarean section deliveries.	Systematic review of randomized controlled trials with meta-analysis	4 studies with 666 women undergoing cesarean section were chosen for inclusion.	Adequate description of the collection method.	Of importance, the physical risks associated with cesarean section were described, including fever, increased pain, need for blood transfusion, wound infection, and prolonged postoperative hospital stay.	This article reinforces the need to avoid the unnecessary cesarean section.	A

Michel, S., Rake, A., Treiber, K., Seifert, B., Chaoui, R., Huch, R., & Kubik-Huch, R. (2002). MR obstetric pelvimetry: Effect of birthing position on pelvic body dimensions. *American Journal of Roentgenology, 179*, 1063-1067.	II	Does the clinical pelvimetric dimensions change in the supine and upright birthing positions?	Quasi-Experimental Study	35 women were utilizied. 25 nulliparous women and 10 mutiparous women whom had given birth greater than nine months prior to the study.	Adequate description of collection methods.	There was a greater sagittal outlet and interspinous outlet diameter in the hands-knees and squatting positions. The intertuberous diameter was greater while the obstetrical conjugate was smaller with squatting. No change was noted in the transverse diameter in either of these positions.	With the expansion of the bony pelvis in the upright position, use can help facilitate vaginal delivery.	B

Payton, C. L. (2015). *Use of the peanut ball to decrease first and second stages of labor*. Graduate Thesis, Dissertation, and Capstones. Paper 14.	II and III	For laboring women, will use of a Peanut Ball for positioning, as compared to no use of a Peanut Ball, decrease length of first an/or second stages of labor?	Quasi-Experimental Study with Qualitative Components	200 laboring women identified via spontaneous labor, elective induction of labor, medically indicated induction of labor or spontaneous rupture of membranes.	Adequate description of collection methods.	First and second stages of labor were not shortened with use of peanut ball but this could have been due to study set up. Passive descent was encouraged instead of active pushing in second stage. Improved mater-nal satisfaction was present in those women using the peanut ball during labor. Incidental findings were a significant drop in the rate of cesarean deli-veries among those utilizing peanut ball by 8.2%. Study was not homogenous and did not separately investigate nulliparous and multiparous women.	Further studies involving the use of the peanut ball with different variables would be beneficial. Hopefully a stronger link between use of the peanut ball and decrease cesarean rate will be evident.	B

Priddes, H., Dahlen, H. & Schmied, V. (2012). What are the facilitators, inhibitors, and implications of birth positioning? A review of the literature. *Women and Birth, 25*, 100-106.	I and III	What are the facilitators, inhibitors, and implications of birth positioning.	Meta-Analysis of a combination of studies: 4 systematic reviews, 2 RCTs, 2 Meta-Analyses, 2 Secondary Analyses, 1 Prospective Cohort Study, 1 Opinion Paper and 1 Book Chapter	40 articles were analyzed with a large population base	Adequate description of collection methods.	It was determined that in the upright position there was a resulting shorter first and second stage of labor. It was also show that less intervention was required, women reported less pain and had increased satisfaction.	Support provided for the upright position to improve labor outcomes and improve maternal satisfaction.	B

Thies-Lagergren, L., Kvist, L., Christensson, K. & Hildingsson, I. (2012). Striving for scientific stringency: A re-analysis of a randomized controlled trial considering first-time mothers' obstetric outcomes in relation to birth position. *BMC Pregnancy Childbirth, 12*(135).	1	Will obstetrical outcomes vary among nulliparous women giving birth on a birth seat compared to other positions with regard to perineal outcome, postpartum blood loss, epidural analgesia, oxytocin augmentation and duration of labor?	A Re-Analysis of an RCT	950 participants. 253 nulliparous women using a birth seat and 697 women using other birthing positions.	Adequate description of collection methods.	The birth seat group had improved outcomes over the alternative birthing positions provided in the analysis. It was shown that these women had a shorter labor, less use of oxytocin augmentation and a lower rate of episiotomy. Postpa rtum blood loss was increased when oxytocin augmentation was present.	Methods to reduce the use of oxytocin augmentation including use of the upright position or birth seat would help to reduce excessive blood loss in the postpartum period.	A

Truven Health Analytics. (2013). *The cost of having a baby in the United States: Executive summary.* Retrieved from http://transform.childbirthconnection.org/wp-content/uploads/2013/01/Cost-of-Having-a-Baby-Executive-Summary.pdf	III	Reviewing data from commercial insurance companies and Medicaid to determine the financial cost of having a baby in the United States.	Non-experimental analysis	Commercial insurance and Medicaid claims and payment are assessed for maternity care, delivery type, and newborn care among five different states.	Adequate description of the collection method.	Payments received greatly differed from those billed for procedures, especially for those women undergoing a cesarean delivery.	The financial cost for the woman and newborn is greater among those having a cesarean section delivery.	A
Tussey, C. M. & Botsios, E. (2011). Decrease the length of labor with the use of a labor ball with patients that receive an epidural. Paper presented at the Association of Women's Health, Obstetric, and Neonatal Nurses.	1	With use of the peanut ball after an epidural in labor, patients will have a shorter labor and fewer instrumental deliveries versus those not using the peanut ball.	RCT	200 women with an epidural. 107 in the peanut ball group and 93 in the standard care group.	Little description due to the published paper being a poster presentation.	Women using the peanut ball had labors 90 minutes shorter first stage and shortened second stage by 22 minutes over the standard care group. Use of vacuum and forceps was reduced among the peanut ball users. No adverse neonatal outcomes were present.	Evidence in this study supports use of the peanut ball with patients after epidural to reduce the length of labor. Further studies would be beneficial to evaluate this evidence.	B

Tussey, C. M., Botsios, E., Gerkin, R. D., Kelly, L. A., Gamez, J. & Mesnik, J. (2015). Reducing length of labor and cesarean surgery rate using a peanut ball for women laboring with an epidural. *Journal of Perinatal Education, 24*(1), 16-24.	I	Will the use of the peanut ball in women laboring with an epidural reduce the priamry cesarean rate and length of labor?	2 Group RCT	198 women with an epidural. 107 women used the peanut ball and 94 received standard care.	Adequate description of collection methods.	21% of those in the standard care group had a cesarean delivery whereas 10% of women in the peanut ball underwent the procedure. Labor was reduced in the first stage by 29 minutes for peanut ball users and by 11 minutes in the second stage. No adverse outcomes were present with use of the peanut ball. No difference in Apgar scores was noted between the two groups.	Use of the peanut ball can potentially be a valuable tool to reduce the cesarean rate in primiparous women.	A

Walker, C, Rodriguez, T., Herranz, A., Espinosa, J., Sanchez, E. & Espuna-Pons, M. (2012). Alternative model of birth to reduce the risk of assisted vaginal delivery and perineal trauma. The International Urogynecological Association, 23, 1249-1256.	I	Will an alternative model of birth reduce the rate of assisted vaginal delivery in women with an epidural?	RCT	199 laboring women with an epidural. 103 women with delayed pushing in the lateral position and 96 women pushing after complete dilation and in the lithotomy position.	Adequate description of collection methods.	The alternative model of birth resulted in decreaase in assisted vaginal delivery, a higher rate of intact perineum and resultant lower episiotomy rate. The women in the traditional model group had an increase in assisted vaginal deliveries among nulliparous women with a fetal head unengaged in the pelvis.	The pushing at ten centimeters dilation in women with an epidural in the lithotomy position is disadvantage ous and women would benefit from alternative positioning and pushing with urge rather than in a directed setting.	A

Zhang, J., Bernasko, J., Leybovich, E., Fahs, M. & Hatch, M. (1996). Continuous labor support from labor attendant for primiparous women: A meta-analysis. Obstetrics & Gynecology, 88, 739-744.	I	What are the effects of continuous labor support on primiparous laboring women?	Meta-Analysis; 4 RCTs	4 articles were analyzed: total population size 1349 participants	Adequate description of collection methods.	Labor attendants present in a continuous manner decreased labor by 2.8 hours and doubled spontaneous vaginal birth. There was a decrease in oxytocin use, forceps use and cesarean section by 50%. An increase in maternal satisfaction was also noted.	Continuous labor support provides for a lower rate of maternal anxiety and an associated reduction in catecholamine levels, ineffective contractions and prolonged labor. Good education via support in laboring women is related to better pain control and reduced maternal anxiety.	A

Zhang, L., Hua, F., Du, X., Hu, Y., Luo, Z., Long, X., …Ying, J. (2016). Efficacy of epidural analgesia with Ropivacaine on labor, maternal, and neonatal: A meta-analysis of prospective and retrospective studies. *International Journal of Clinical and Experimental Medicine, 9*(5), 7896-7907. Retrieved from http://www.ijcem.com/files/ijcem0021739.pdf	I	To assess the effectiveness of epidural analgesia with ropivacaine and the risk of potential adverse effects when compared with non-epidural methods of relieving pain in labor or no pain relief.	Meta-analysis of 8 studies (4 prospective and 4 retrospective studies) with a total of 10 trials were include.	18,832 parturients were included in the analyses.	Adequate description of the collection method.	Epidural analgesia in laboring women resulted in a decrease in spontaneous vaginal delivery, an increase in instrumental deliveries, and an increase in the second stage of labor.	With a slowing of the number of spontaneous vaginal delivery and increased length of the second stage of labor when women use an epidural during labor, it would be beneficial to find alternative methods to reduce these sequelae.	A

APPENDIX D

NON-RESEARCH EVIDENCE-BASED MATRIX

Citation	Level of Evidence	Hypothesis	Design	Sample	Data Collection	Statistical Findings/Results	Implications/Conclusions	Quality Rating
Agency for Healthcare Research and Quality. (2015). Perinatal care: Percentage of nulliparous women with a term, singleton baby in vertex position delivered by cesarean birth. National Quality Measures Clearinghouse. Retrieved from https://www.quality measures.ahrq.gov/ summaries/summary/49432	V		AHRQ measure to determine the number of term patient having their first pregnancy with a singleton baby, vertex position resulting in a cesarean delivery.	Twelve random select hospitals were utilized for reliability testing.	Blinding and reabstraction was performed on handwritten notes and electronic health record charts. Structured focus groups were also conducted to obtain feedback on the measures.		Hospital with a cesarean section rate at 50% do not have better neonatal outcomes over the 15-20% cesarean section rate group. The 15-20% rate is optimum.	A

AGREE Next Steps Consortium. (2009). The AGREE II instrument [Electronic Version]. Retrieved from http://www.agreetrust.org	V		Quality Improvement 23-item, 7-point tool within 6 different domain, assessing criteria for inclusion within a guideline.				Useful in determining whether the guideline being developed was a quality item and met the definition of a guideline.	A
American College of Obstetricians and Gynecologists. (2013). Non-medically indicated early-term deliveries. No. 5. Committee Opinion, No. 561. Obstetrics and Gynecology, 121(5), 911-915.	IV		ACOG and Society for Maternal-Fetal Medicine opinion regarding delivery in non-medically indicated early deliveries.				Maternal, fetal and placental issues must be considered with regard to medically indicated delivery. The ACOG and Society for Maternal-Fetal Medicine discourage delivery prior to 39 weeks gestation for non-medically indicated reasons.	A

Association of Women's Health, Obstetric and Neonatal Nurses. (2010). Guidelines for professional registered nurse staffing for perinatal units. *Journal of Obstetrics, Gynecologic & Neonatal Nursing, 40*(1), 131-134. doi:10.1111/j.1552-6909.2010.01214.x	IV		Consensus statement regarding nursing staffing standards with clarification during common patient types and clinical situations.				Nurse-to-patient ratio recommendations should be considered during labor patient care.	A
Brouwer, M. C., Kho, M. E., Browman, G. P., Cluzeau, F., Feder, G., Fervers, B., …Makarski, J. (2010). Development of the AGREE II, part 2: Assessment of validity of items and tools to support application. *Canadian Medical Association Journal, 182*(10), E472-478. doi:10.1503/cmaj.091716	V		AGREE II assessment and evaluation methodology described.				Useful in understanding the need for development of quality healthcare guidelines.	A

Conway, P. (2016). Strong Start for Mothers and Newborns, CMS Innovation Center. Centers for Medicare and Medicaid Services.	V	Will evaluation of enhanced maternal care provided to high-risk for preterm birth women result in improved pregnancy outcomes and reduction in cost?	2 Part: 1-Public-private partnership and awareness campaign to reduce deliveries occurring under 39 weeks gestation. 2-Evaluate enhanced maternal care provided to high-risk for preterm birth women.	High-risk pregnant women using Medicaid and Children's Health Insurance Program.	No specific data collection noted as this is a new program.	No results available, will evaluate over a four-year period.	This initiative provides additional support to the ACOG and other bodies of governance for obstetric care acknowledging the need to reduce the number of elective deliveries under 39 weeks gestation. Evidence shows that deliveries occurring under 39 weeks have an increased risk for maternal, fetal and neonatal complications.	B
Cosan, A. (1960). *The advantages of using a stability ball training*. Retrieved from https://charttatiwong. blogspot.de/2009/07/advantages-of-using-stability-ball.html	V		Literature review of the stability ball and the benefits of use.				Provides a background for the stability ball and evolution of ball use.	A
DONA International. (2017). *About*. Retrieved from https://www.dona.org/what-is-a-doula/	V		Providing information on the description and duties of a doula.				Useful in defining the role of the doula and bedside care.	B

Family Practice Notebook. (2015). *Spontaneous vaginal delivery*. Retrieved from http://www.fpnotebook.com/ mobile/OB/Procedure/ SpntnsVgnlDlvry.htm	V		Online book discussing spontaneous vaginal delivery.				Assisted with delineating the contraindications to vaginal delivery.	A
Grant, C. B. & Clutter, L. B. (2014) The peanut ball: A remarkable labor support tool. *International Doula, 22*(4), 12-15.	V						The peanut ball is a device to be utilized in first and second stage of labor for women with and without an epidural. Evidence supports it can be used as a comfort measure and to reduce the length of labor. More research also needs to be carried out to support the effects of the peanut ball in labor.	B
Hamilton, B. E., Martin, J. A., Osterman, M. J. K., Curtin, S. C. & Mathews, T. J. (2015). Births: Final data for 2014. *National Vital Statistics Reports, 64*(12). Retrieved from http://www.cdc.gov/nchs/ data/nvsr/ nvsr64/nvsr64 _12.pdf	V		Summary of Vital Statistics reports regarding births in 2014.	100% of certified births in all States and the District of Colum-bia.	Birth certificate information collected.	The cesarean delivery rate for 2014 was 32.2 percent. The preterm delivery rate during that same time period was 9.5%.	No recommendations provided.	B

Heffernan, C. (2016). *A brief history of the Swiss ball.* Retrieved from http://www.google.com/amp/s/physicalculturestudy.com/2016/01/04/a-brief-history-of-the-swiss-ball/amp/	V		Origin of the swiss ball is described in this notation.				Provides a background for the development of the pezzi ball, swiss ball, and the peanut ball.	B
Helmer-Hirschberg, O. (1967). *Analysis of the future: The Delphi method*. Rand Corporation. Retrieved from www.rand.org/pubs/papers/P3558.html	Non-Applicable (N/A)							
Johns Hopkins Medicine. (2016). *Johns Hopkins nursing evidence-based practice model*. Center for Evidence Based Practice. Johns Hopkins Medicine. Retrieved from http://www.hopkinsmedicine.org/evidence-based-practice/jhn_ebp.html	N/A							
Klump, J. S. (2016). Personal knowledge of obstetric percentage rates for April 2016 data. Jennifer S. Klump.	N/A							
Linstone H. A. & Turoff, M. (2011). Delphi: A brief look backward and forward. Technological Forecasting and Social Change, 78(9):1712–1719. doi: http://dx.doi.org/10.1016/j.techfore.2010.09.011.	N/A							

Osterman, M. J., & Martin, J. A. (2011). Epidural and spinal anesthesia use during labor: 27-state reporting area, 2008. *National Vital Statistics Reports*, *59*(5). Hyattsville, MD: National Center for Health Statistics.	V		Summary of Vital Statistics data for 2008 in singleton, pregnant women receiving an epidural or spinal during labor.	100% of certified births in 2008 in the 27-State reporting area.	Birth certificate data was collected for this group of women.	Amon singleton pregnant women having a vaginal birth, 61% received an epidural or spinal. Epidural use was associated with larger babies and was also linked to a higher number of pregnancy and delivery complications.	A	
Premier Birth Tools LLC. (2015). *Peanut balls*. Retrieved from http://premierbirthtools.com/product-category/peanut-ball/	V							
RehabMart. (2017). *Cando inflatable saddle rolls.* Retrieved from http://www.rehabmart.com/product/cando-inflatable-saddle-rolls-21911.html	V		Clinical experience. Description of the Cando Saddle Roll.				Provided information on how the Saddle Roll can assist in occupation and physical therapy	B

Simkin, P. & Ancheta, R. (2005). The labor progress handbook (2nd ed.) Malden, MA: Blackwell Science.	V					This a labor progress handbook and is used a reference for clinicians providing services for pregnancy and labor management.	Caregivers have the ability to limit the need for surgical and pharmacological interventions in labor and help to reduce harm while strengthening compliance and bonding with the patient resulting in an increase in maternal satisfaction. Decreased cost and risk could be present with maternal support. A description of appropriate and useful positioning for labor is discussed. Recommendations include a reconsideration of work practices which support a patient-centered model of care.	A

Spong, C., Berghella, V., Wenstrom, K., Mercer, B. & Saade, G. (2012). Preventing the first cesarean delivery. *Obstetrics & Gynecology, 120*(5), 1181-1193. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3548444/	IV		Opinion Statement after workshop between governing bodies related to obstetrics.			Induction of labor should occur for medical indications and non-medical inductions should be limited to those women greater than 39 weeks gestation with a favorable cervix. Indications and guidelines for induction and cesarean delivery were provided. Cesarean section is the most common major U.S. surgery performed. 1 in 3 pregnancies results in a cesarean delivery. Maternal risks are present for cesarean section in the current pregnancy and for future pregnancies.	Recommendations are to institute practices and guidelines to limit the first cesarean delivery. Via improved education to women and their providers, it is hoped a reduction will be present.	A

Stetler, C.B. (2001). Updating the Stetler model of research utilization to facilitate evidence-based practice. *Nursing Outlook, 49*(6), 272-279.	N/A							
Titler, M.G., Kleiber, C., Steelman, V., Rakel, B. A., Budreau, G., Buckwalter, K. C. (2001), The Iowa model of evidenced-based practice to promote quality care. *Critical Care Nursing Clinics of North America, 13*(4), 497-509.	N/A							
U.S. Department of Health and Human Services. (2013). MICH-7.1 Reduce cesarean births among low-risk women with no prior cesareans. Maternal, Infant and Child Health.	IV		Targeted goal for HealthyPeople 2020 to reduce the number of birth delivered by cesarean delivery to 23.9 percent.	Goal based on data collected in 2007 from a 22-State Vital Statistics Report.	Birth certificate information was collected to develop this goal statement. Data is to be collected annually.			B

Waldrop, C., Caruso, D., Fuchs, M. A., & Hypes, K. (2014). EC as PIE: Five criteria for executing a successful DNP final project. *Journal of Professional Nursing, 30*(4), 300-309.	IV		Clinical Practice Guideline recommendation.				An assessment method to determine the Doctorate of Nursing Practice criteria are met during the project development process.	A
Zwelling, E. (2010) Overcoming the challenges: Maternal movement and positioning to facilitate labor progress. *American Journal of Maternal Child Nursing, 35*(2), 72-78.doi: 10.1097/NMC.0b013e3181caeab3	V		Historical review of research related to maternal positioning in laboring women.				Provides evidence to support keeping the laboring woman mobile to promote labor progress.	A

APPENDIX E

PEANUT BALL QUESTIONS FOR GUIDELINE DEVELOPMENT—DELPHI STUDY ROUND ONE

Peanut Ball Questions for Guideline Development
Delphi Study Round 1
Primary Investigator: Jennifer Klump, RN, MSN, CNM, DNPs
University of Northern Colorado
Please return the completed survey to the following email:
klum9872@bears.unco.edu

- What job title and degrees do you carry?

- Are you familiar with the use of the peanut ball in labor? If so, do you use it in your practice site?

- Do you think the nursing staff understand the importance of pelvic positioning in labor?

- Do you think staff have been given appropriate education on the use of the peanut ball for the first and second stage of labor?

- What barriers are there to use of the peanut ball for labor?

- What benefits are present for use of the peanut ball in labor?

- Would it be feasible to change maternal positions every 30 to 45 minutes?

- Would a laminated positioning sheet be useful for the staff to remember the different positions which can be utilized in labor and pushing?

- Would it be feasible to have someone check the pressure and appropriate care of the peanut balls monthly with a checklist?

- What specific information not listed above should be added to a guideline and education protocol?

- What other questions or concerns do you have about the peanut ball use?

APPENDIX F

PEANUT BALL QUESTIONS FOR GUIDELINE DEVELOPMENT--DELPHI STUDY ROUND TWO

Peanut Ball Questions for Guideline Development
Delphi Study Round 2
Primary Investigator: Jennifer Klump, RN, MSN, CNM, DNPs
University of Northern Colorado
Please return the completed survey to the following email:
Klum9872@bears.unco.edu

- What job title and degrees do you carry?

- Do you feel use of the peanut ball could be improved with appropriate scripting from providers and nursing staff?

- Do you currently discuss use of the peanut ball in your practice setting (office, birthing unit tours, childbirth education classes, outpatient/triage visits)?

- Were you aware that there are contraindications to using the peanut ball?

- Do you feel competence of use could be ascertained with a formal education session and a return demonstration?

- Would you like to receive information on the guideline, education material and template policy?

APPENDIX G

EDUCATIONAL GUIDELINE FOR USE OF THE PEANUT BALL IN THE LABORING WOMAN

Educational Guideline for Use of the Peanut Ball in the Laboring Woman

Staff Education

- Staff utilizing the peanut ball for laboring women will be required to complete an educational offering on use of the peanut ball and provide a return demonstration:
    - Knowledge of pelvic positioning in labor
    - Peanut ball positions for laboring women
    - Sizing of peanut ball to the pelvis
    - Safety precautions of peanut ball use and contraindications
    - Proper cleaning, maintenance and storage of peanut ball

Maternal positioning help facilitate labor progress, improves maternal-fetal blood flow and contraction strength, decreases pain and length of labor and allows for the fetal head to descend in the pelvis, ultimately helping to prevent cesarean delivery (Priddes, Dahlen & Schmied, 2012; Zwelling, 2010).

With proper positioning, the fetal head is better aligned with the pelvis. This is not achieved when the patient is confined to the bed or movement is limited. The peanut ball widens the diameters of the pelvis better than the traditional side-lying position or the use of props such as pillows.

There are many positions for the patient to use with the peanut ball in the bed: side-lying, tuck, semi-sitting lunge, fire hydrant, and the forward lean (Grant & Clutter, 2014; Premier Birth Tools, 2015). These positions can be used in the first stage of labor or during the second stage of pushing.

There are different sizes for the peanut ball and sizing must be considered for use with the patient. For women under 5' 3" the 40-centimeter (cm) ball is recommended.

For women 5'3" to 5'6" the 50-cm ball is recommended. For obese women with a BMI greater than 35 and those women 5'7" or taller, the 60-cm ball is recommended (Premier Birth Tools, 2015). Depending upon the position used with the patient, you might need to consider a different size. Injuries to the hip can result if the incorrect peanut ball is used. The ankle must be correctly supported as well to avoid injuries and to keep the pelvic outlet opened appropriately.

You should familiarize yourself with each of the positions. Discuss and offer use of the peanut ball with your patients and their support person(s). It would be helpful to discuss the benefits and positive results. Use the positioning image guide.

Indicated for women in active labor with a vertex fetus and no present contraindications for a vaginal delivery. Contraindications to use: previous or current hip/pelvis injury, pubic symphysis dissection and current ankle or leg injury (Family Practice Notebook, 2015; Premier Birth Tools, 2015).

A standing order set for laboring women could include utilization of the peanut ball. Apply a blue chux pad to the peanut ball prior to patient use. Assist patient with positioning and discuss safety precautions of use. While peanut ball in use, a support person or staff member is to be present at bedside. Repositioning of patient is recommended every 30 to 45 minutes (Premier Birth Tools, 2015).

Nurses need to document use of peanut ball and positioning changes in the electronic health record.

Comply with accompanying manufacturer's instructions (Premier Birth Tools, 2015). The air pressure should be checked regularly and it is recommended to check monthly to ensure appropriate inflation. The peanut ball should be cleaned with

sanitation wipes prior to use, after use, and as needed. Keep a blue chux pad on the ball to protect the skin, limit contact with the ball, and provide a barrier for bodily fluids. Regarding storage, the ball will be preserved if it is kept out of direct sunlight, at less than 80 degrees, and stored off the floor. Keep the peanut balls in a central location to increase availability.

Six videos can be viewed on YouTube regarding appropriate use of the peanut ball and sizing. It is recommended to view these videos to increase your awareness on the subject.

- Duncan, H. (2015). Peanut ball positions for labor & birth. *Expecting New Life Birth Services.* Retrieved from https://m.youtube.com/watch?feature=youtu.be &v=VIXOqs8q62g
- Irby, M. (2017). Shorten labor. *Give Birth with Balls*. Retrieved from https://m.youtube.com/watch?v=B7mFvB9-HsU
- Turner, H.S. (2015). Using the peanut ball by your birth. *Your Birth.* Retrieved from https://www.youtube.com/watch?v=iMjmkjnrUA8
- Turner, H. S. (2015a). Sizing the peanut ball: Part 1. *Premier Birth Tools.* Retrieved from https://www.youtube.com/watch?v=ilBCTYdsetU
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- Turner, H. S. (2015c). Sizing the peanut ball Part 3. *Premier Birth Tools.* Retrieved from https://www.youtube.com/watch?v=0LV_qcdoWik

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Premier Birth Tools. (2015). *Peanut balls*. Retrieved from http://premierbirthtools.com/product-category/peanut-ball/

Priddes, H., Dahlen, H. & Schmied, V. (2012). What are the facilitators, inhibitors, and implications of birth positioning? A review of the literature. *Women and Birth, 25*, 100-106. doi:10.1016/j.wombi.2011.05.001

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APPENDIX H

BULLET POINT GUIDELINE FOR PEANUT BALL USE

Bullet Point Guideline for Peanut Ball Use

- Discuss use of the peanut ball with your patient and support person(s)
- Clean peanut ball with sanitation wipes prior to use
- Position patient and use appropriate placement of peanut ball. Use image guideline to check placement. Size peanut ball to patient's pelvis.
    - The 40-centimeter (cm) ball is recommended for women under 5' 3",
    - The 50-cm ball is recommended for women 5'3" to 5'6".
    - For obese women with a BMI greater than 35 and those women 5'7" or taller, the 60-cm ball is recommended.
    - Depending upon the position used with the patient you may need to consider a different size.
    - Injuries to the hip can result if the incorrect peanut ball is used.
    - The ankle must be correctly supported as well to avoid injuries and to keep the pelvic outlet opened appropriately.
    - Absolute contraindications: conditions not conducive to a vaginal delivery and previous or current hip/pelvis injury, pubic symphysis dissection and current ankle or leg injury.
- Instruct patient and support person(s) on the safe use of the peanut ball.
    - While the peanut ball is in use, the patient should not be left alone. A support person or staff member should be present at bedside.
- Repositioning of patient is recommended every 30 to 45 minutes.

- Nurses need to document use of peanut ball and positioning changes in the electronic health record.
- Clean peanut ball as needed throughout use and after use.

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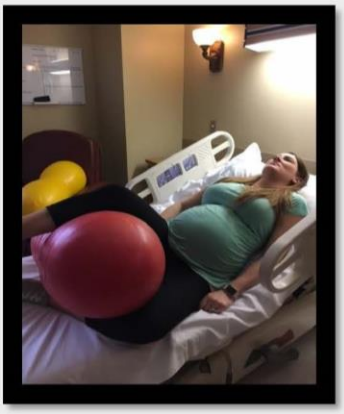
APPENDIX I

PELVIC POSITIONING FOR THE PEANUT BALL

Pelvic Positioning for the Peanut Ball



Taylor sitting-Alternate sides

Promote dilation and descent

Open Mid-pelvis: Knees and feet aligned

Open top of pelvis: Knees wide and feet together

Open lower part of pelvis: Knees and feet wide

Sidelying position-Tuck the ball higher between the thighs for pushing stage

Semi-sitting with knees over ball
Promote Comfort

Fire hydrant (Proper positioning)

May lower the foot of the bed:

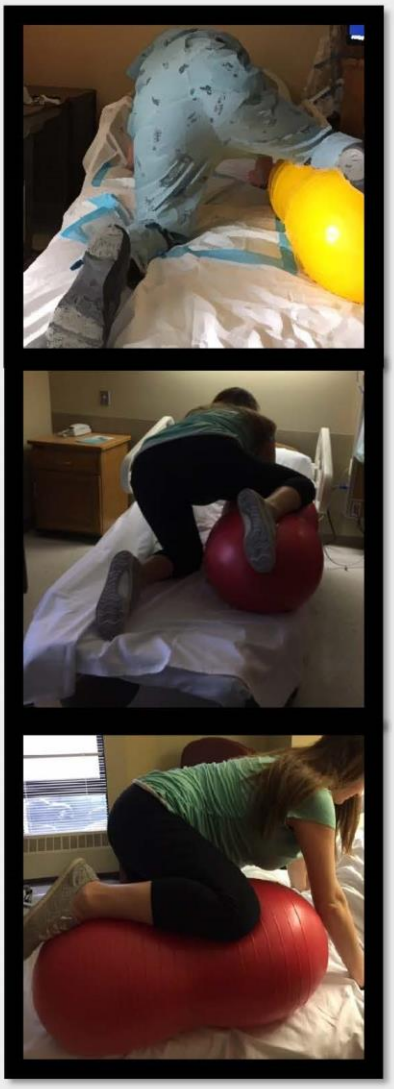
for comfort and to align pelvis with ball

Promotes rotation

Can be used for persistent cervical lip

Sizing Recommendations:

- **For women under 5' 3", the 40-cm ball is recommended.**
- **For women 5' 3" to 5' 6", the 50-cm ball is recommended.**
- **For obese women with a BMI greater than 35 and those women 5' 7" or taller, the 60-cm ball is recommended.**



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APPENDIX J

PEANUT BALL POLICY TEMPLATE

Peanut Ball Policy Template

Subject: Peanut Ball Policy

Policy: A safety guideline for use of the peanut ball for laboring women.

Procedure:

1) Staff Education

- Staff utilizing the peanut ball for laboring women will be required to complete an educational offering on use of the peanut ball and provide a return demonstration:
    - Knowledge of pelvic positioning in labor
    - Peanut ball positions for laboring women
    - Sizing of peanut ball to the pelvis
    - Safety precautions of peanut ball use and contraindications
    - Proper cleaning, maintenance and storage of peanut ball

2) Cleaning, Care and Storage

- Comply with accompanying manufacturer's instructions.
- Check air pressure monthly to ensure appropriate inflation.
- Sanitize peanut ball with sanitation wipes located in each labor and delivery room prior to use, after use and as needed.
- Keep ball out of direct sunlight and at a temperature less than 80 degrees.
- Store ball off the floor.

3) Use of the Peanut Ball

- Indicated for women in active labor with a vertex fetus and no present contraindications.
- Identify patient risk factors prior to use.

    - Contraindication to proceeding with a vaginal delivery.
    - Previous or current hip/pelvis injury, pubic symphysis dissection and current ankle or leg injury.

- Initiate standing order.
- Introduce the peanut ball to the patient and support person(s).
- Educate patient and support person(s) on use of the peanut ball including the positioning image guide. Apply a blue chux pad to the peanut ball prior to patient use.
- Assist patient with positioning and discuss safety precautions of use.
- While peanut ball in use, a support person or staff member is to be present at bedside.
- Repositioning of patient is recommended every 30 to 45 minutes.
- The nurse is to document use of peanut ball and positioning changes in the electronic health record.
- Clean peanut ball as needed during use and after use.

Bibliography

Family Practice Notebook. (2015). *Spontaneous vaginal delivery*. Retrieved from http://www.fpnotebook.com/mobile/OB/Procedure/ SpntnsVgnlDlvry.htm

Grant, C. B., & Clutter, L. B. (2014). The peanut ball: A remarkable labor support tool. *International Doula, 22*(4), 12-15.

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APPENDIX K

PEANUT BALL AGREE II APPRAISAL TOOL

Peanut Ball AGREE II Appraisal Tool

Brouwers et al. (2010), described the Agree II Instrument as a guideline appraisal tool. Utilization assesses the relevance of a guideline to the clinical topic and its ability to address health screening, promotion and health promotion efforts, screening protocols and diagnostic criteria. The Agree II Instrument is comprised of a 23-item questionnaire with a Likert scale divided into six domains. The framework attempts to address the asset and quality of the guideline through a systematic process. The Domains are separated into categories: Domain 1-Scope and Practice Specific Health Population, Domain 2-Stakeholder Involvement, Domain 3-Rigor of the Guideline Development, Domain 4-Clarity of Presentation, Domain 5-Applicability and Domain 6-Editorial Independence. Domain1 is related to the scope and practice specific health population and consists of questions pertaining to the guideline intentions. Stakeholder involvement is the subject of the Domain 2 questions to ensure that pertinent professional groups such as health practitioners, policy makers and educators were involved in the process and the concerns of the target health population were addressed. Domain 3 contains questions surrounding the rigor of the guideline development. Specifically, this domain addresses the methodology of the data collection and synthesis process. Domain 4's questions pertain to terminology use within the guideline, structure of the presentation, form, and stylistics.. Domain 5 seeks to acknowledge the barriers and facilitators to implementing and using the guideline with a concentration on applicability. Methods to increase and strengthen buy-in for the guideline utilization are also addressed. Finally, Domain 6 seeks to ensure that the recommendations are not biased and offered with editorial independence. A score is derived from the rapid appraisal questionnaire to determine the

quality and strength of the information provided by the guideline. Recommendations are established regarding guideline relevance for practice and assist with the development of policies and protocols for that practice setting. Recommendations are also offered for the stakeholders associated with the practice guideline. An appraisal can ease the manner in which practitioners make decisions regarding clinical care for specific health conditions.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

DOMAIN 1. SCOPE AND PURPOSE (100%)

1. The overall objective(s) of the guideline is (are) specifically described.

Rating Score: 7

The objective of the Capstone project: Use of the Peanut Ball to Reduce the Cesarean Rate seeks to provide a standardized education guideline of the peanut ball in care of the laboring woman. A step-by-step guideline was developed including supplemental education material, a graphic display of pelvic positioning and a template policy for institutional integration. The objectives are to reduce the cesarean rate along with the many risks associated with the operative procedure for both laboring women and their babies.

2. The health question(s) covered by the guideline is (are) specifically described.

Rating Score: 7

The target populations were identified as laboring women and the providers of their labor care and management. Appropriate and safe pelvic positioning is sought through the development of a standardized peanut ball guideline to be utilized by care providers. Use

of this guideline promotes increased pelvic mobility and subsequently a lower cesarean section rate and improved maternal satisfaction.

3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.

Rating Score: 7

Pregnant women are the target population to receive the effect of the guideline but providers of labor care including physicians, nursing staff, doulas and other labor attendants would be provided the education within the guideline. The guideline is specifically to be utilized in the first and second stage of labor for those women with a vertex, singleton pregnancy. Education on the peanut ball can be offered to women in childbirth education classes, via providers or in the labor and delivery setting.

DOMAIN 2. STAKEHOLDER INVOLVEMENT (94%)

4. The guideline development group includes individuals from all relevant professional groups.

Rating Score: 7

The guideline seeks to include all labor care personnel. The guideline was developed by this author, a certified nurse midwife and doctorate of nursing practice student, with direction from a community member obstetrician, research advisor and certified nurse midwife and an additional community member registered nurse certified in obstetrics and electronic fetal monitoring.

5. The views and preferences of the target population (patients, public, etc.) have been sought.

Rating Score: 6

A literature review was completed to address the satisfaction of the maternal point of view. Two Delphi surveys were distributed to physicians, midwives, bedside nurses and a doula to develop the guideline. The statistics were analyzed and preferences were reviewed and integrated to create a guideline reflecting the needs of those who will implement the guideline in a safe and efficient manner. The strength of the guideline could further be fortified with input from women who utilized the peanut ball in their labor experience.

6. The target users of the guideline are clearly defined.

Rating Score: 7

The guideline development process clearly addressed those who will be utilizing the education and guideline.

DOMAIN 3. RIGOR OF DEVELOPMENT (93%)

7. Systematic methods were used to search for evidence.

Rating Score: 5

The literature search displays the databases utilized, the timeframe of completion and the search terminology. The search strategy was not fully discussed.

8. The criteria for selecting the evidence are clearly described.

Rating Score: 7

The articles and literature items cited in the references were assessed via the Johns Hopkins Nursing Evidence-Based Practice Evidence Appraisal Tools, which included the level of evidence for each item.

9. The strengths and limitations of the body of evidence are clearly described.

Rating Score: 7

A systematic literature review was performed and provided adequate evidence to support the development of the guideline. An expert panel was also utilized to support the items of inclusion in the guideline.

10. The methods for formulating the recommendations are clearly described.

Rating Score: 7

The two waves of the Delphi surveys were assessed at a consensus rate of 70% to create the guideline recommendations. The results of the surveys were clearly visible in the written project and in table format.

11. The health benefits, side effects, and risks have been considered in formulating the recommendations.

Rating Score: 7

The peanut ball guideline process clearly identified the health benefits of its use in the first and second stage of labor. Risks and contraindications were also included for the integration of the guideline and possible sequelae if the tool is not implemented.

12. There is an explicit link between the recommendations and the supporting evidence.

Rating Score: 7

The evidence to create the guideline recommendations are addressed at length. Within the guideline, itself, references are cited for each recommendation.

13. The guideline has been externally reviewed by experts prior to its publication.

Rating Score: 7

The guideline was externally assessed by one obstetrician and one certified nurse midwife. The Capstone project was also reviewed by the Capstone community member, an obstetrician, and the Capstone research advisor, a certified nurse midwife. Their input was valuable and assisted in validating the guideline components.

14. A procedure for updating the guideline is provided.

Rating Score: 6

The guideline recommends that current literature should be viewed as well as gold standard committee statements pertaining to obstetrics in a one to two-year cycle to determine whether the guideline is congruent with the latest evidence.

DOMAIN 4. CLARITY OF PRESENTATION (100%)

15. The recommendations are specific and unambiguous.

Rating Score: 7

The purpose of the guideline and the intended population is identified in the recommendations along with how to utilize the guideline. Without the use of a

standardized guideline, variation in use will exist and may not meet the needs of the laboring woman.

16. The different options for management of the condition or health issue are clearly presented.

Rating Score: 7

Alternative options are discussed for when the peanut ball is not available including increased ambulation and mobility; shower, rocking chair, dancing, round physiotherapy ball, bed stirrup and support from personnel.

17. Recommendations are easily identifiable.

Rating Score: 7

This article clearly articulates the peanut ball guideline recommendations and is summarized.

DOMAIN 5. APPLICABILITY (100%)

18. The guideline describes facilitators and barriers to its application.

Rating Score: 7

The facilitators and barriers to implementation of the peanut ball were assessed via the Delphi surveys from the expert panel and through expert interviews. Education was cited as the weakest link in this process and would be enhanced by the guideline.

19. The guideline provides advice and/or tools on how the recommendations can be put into practice.

Rating Score: 7

The peanut ball guideline includes a laminated pelvic positioning sheet to help bedside labor attendants with care of the laboring woman. Instructions are included to always read through the peanut ball manufacturer's guidelines for compliance in safety, care and compliance of intended use. The discussion and implications sections address new learning from the capstone project.

20. The potential resource implications of applying the recommendations have been considered.

Rating Score: 7

The expected costs of utilizing the peanut ball for laboring women and employment of the guideline are addressed as time is a necessity to educate care providers appropriately. The purchase of peanut balls is considered a low-cost investment with greater financial benefits from it use via a reduction in health sequelae of a higher cesarean section rate.

21. The guideline presents monitoring and/or auditing criteria.

Rating Score: 7

The guideline recommends a return demonstration check off for those utilizing the peanut ball at the bedside for laboring women. The use is to be documented in the medical record as it is a nursing intervention. This information could then be translated into data to help assess the cesarean section and vaginal delivery rates for before and after implementation. Length of labor stages, operative delivery rates and improvement in maternal satisfaction could also be evaluated. This data may be collected in a monthly or

annual fashion to determine whether the HealthyPeople 2020 goal of cesarean rate at or below 23% is being achieved

(United States Department of Health & Human Services, 2013).

DOMAIN 6. EDITORIAL INDEPENDENCE (100%)

22. The views of the funding body have not influenced the content of the guideline.

Rating Score: 7

The guideline specifically states that no funding body or source was involved in the development or implementation of the capstone project and guideline formation.

23. Competing interests of guideline development group members have been recorded and addressed.

Rating Score: 7

The guideline development articulates that no competing interests were identified by members of the guideline development team.

OVERALL GUIDELINE ASSESSMENT:

Lowest possible quality 1/Highest possible quality 7

1. Rate the overall quality of this guideline.

   Overall Rating Score: 7 (97.8%)

2. The peanut ball guideline secured a 97.8% score via the AGREE II Appraisal tool and does serve to create an education guideline that seems to be employable in a clear and concise format.