



Reducing Primary Cesareans

An Innovative Multipronged Approach to Supporting Physiologic Labor and Vaginal Birth

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ABSTRACT

Primary cesarean birth increases a woman's risk for hemorrhage, infection, pain, and cesarean births with subsequent pregnancies. A woman may experience difficulties with breastfeeding, bonding, and incorporating the newborn into the family structure. One urban, academic hospital in the Midwest participated in the American College of Nurse-Midwives Healthy Birth Initiative: Reducing Primary Cesarean Births Project. The project purpose was to reduce the rate of cesarean births in nulliparous, term, singleton, and vertex pregnancies. Strategies employed included use of intermittent auscultation, upright labor positioning, early labor lounge, one-to-one labor support, and team huddles. The baseline nulliparous, term, singleton, vertex cesarean rate in 2015 was 29.3%. In 2016, after 1 year of implementation of the project, the hospital decreased nulliparous,

term, singleton, vertex cesarean rate to 26.1%—a reduction of 10%. In 2017, the rate was decreased to 25.3%—a reduction by 3.7%.

Key Words: nulliparous, physiologic birth, primary cesarean, quality improvement

The increase in cesarean birth rate in the United States (US) has been well documented by the US Centers for Disease Control and Prevention. Preliminary data from 2017 demonstrate an overall rate of 32.0%.¹ In 2013, researchers found a 10-fold variation in cesarean rates among hospitals—from 7.1% to 69.9%.² The variation is thought to be related to clinician practice and hospital culture rather than differences attributed to the patient population. Comparisons with worldwide rates show a general overuse of primary and repeat cesarean births concentrated in the United States and South American countries without an improvement in outcomes. The maternal mortality rate has increased 27% between 2000 and 2014 from 18.8 to 23.8 per 100 000 live births.³ Women undergoing a cesarean birth are at higher risk for delayed skin-to-skin breastfeeding initiation and formula supplementation.⁴ Compared with women who experience vaginal births, women who experience cesarean births use more pain medications and experience a longer length of hospital stay. Cesarean birth is also associated with the adverse outcomes of abdominal adhesion formation and chronic pelvic pain.^{5–7} In addition, there is a higher risk of placental implantation abnormalities, adhesions, hysterectomy, surgical injury,⁸ placental abruption, and uterine rupture in future pregnancies.^{9–11} A woman who experienced a cesarean birth is 90% likely to experience a cesarean birth with subsequent births whereas a woman who experienced a vaginal birth is 90% likely to

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experience a vaginal birth with subsequent births.¹² Serious maternal morbidity such as placental and bleeding disorders¹³ increases progressively as the number of cesareans increases.^{10,11} Fetal and neonatal consequences include small size for gestational age, low birth weight, preterm birth, stillbirth, and neonatal intensive care unit admission.^{9,14,15}

Several professional maternity care organizations in the United States are supporting the reduction of primary cesarean birth through practice recommendations including the American College of Obstetricians and Gynecologists,¹⁶ the Society for Maternal-Fetal Medicine (SMFM),¹⁶ the American College of Nurse-Midwives (ACNM),¹⁷ and the Association of Women's Health (AWHONN), Obstetric and Neonatal Nurses.¹⁸ In addition, the California Maternity Quality Care Collaborative Toolkit to Support Vaginal Birth and Reduce Primary Cesareans¹⁹ and the Council of Patient Safety in Women's Health Care Safe Reduction of Primary Cesarean Birth bundle²⁰ are other examples of national organizations with specific strategies and recommendations aimed to promote the safe reduction in primary cesarean births.

The American College of Nurse-Midwives launched the Healthy Birth Initiative: Reducing Primary Cesareans (RPC) Project in 2015. This national multisite quality improvement collaborative recruited 18 hospitals in the first year. A key focus of the project included the use of 3 bundles aimed to reduce cesareans in the nulliparous, term, singleton, vertex (NTSV) population. The 3 bundles included the Promoting Labor Progress bundle, Promoting Comfort in Labor bundle, and Intermittent Auscultation bundle. The focus is on the NTSV population as substantial variation exists in cesarean rates that are unjustifiable for medical reasons. The use of these bundles standardizes evidence-based system and practice changes shown to promote physiologic labor and birth. Bundle science has been shown to improve reliability and processes by structuring care which, when used collectively and reliably, have been shown to improve outcomes in patient care.²¹

The risks associated with what is considered a "safe" surgical procedure in addition to the call to action by national professional organizations offer compelling reasons for all maternity care providers and stakeholders in maternity care to seek to reduce the incidence of the primary cesarean.¹³ The purpose of this project was to reduce the rate of cesarean births among the NTSV population. This article describes a Midwestern urban, academic medical center's experience participating in a cohort of hospitals enrolled in the ACNM Reducing Primary Cesarean Births initiative, and outcomes of the project are presented.

SETTING

Hospital and unit description

The University of Minnesota Medical Center (UMMC) was an 874-bed hospital, with a 14-bed labor and delivery unit with approximately 2500 births annually. The hospital provided care for a diverse population who self-identify as African American (10%), African (14%), Asian (9%), Native American/Alaskan Native (3%), white (53%), Hispanic or Latina (4%), and chose not to answer (6%). Maternity care providers included certified nurse-midwives, obstetric physicians, maternal-fetal medicine physicians, and family medicine physicians. In addition, the UMMC was an academic teaching hospital with obstetric, family medicine, and anesthesia residents along with maternal-fetal medicine fellows. The labor and delivery unit employed 85 registered nurses (RNs) led by a perinatal services director, nurse manager, advanced practice nurse leader (APNL), and clinical development specialist. The full leadership team included a medical director and a midwifery director prior to the start of the RPC project; the baseline NTSV cesarean rate at UMMC in 2015 was 29.3% (229/781).

Quality improvement and unit culture

Quality improvement methodology served as a framework for change management strategies with the use of the Plan, Study, Do and Act cycles and a working charter to outline the project's scope. Strategic use of process improvement tools has been a part of the labor and delivery unit culture for a decade. The staff nurses are often involved with quality and process improvement projects. Many members of the project team have previous experience with quality improvement.

INITIATION

The UMMC team joined the first cohort of the ACNM RPC initiative in 2016 as 1 of 18 hospitals. All teams were invited to an introductory meeting. During this meeting, the teams were introduced to the expectations of participation and the aims of the initiative and were asked to choose an evidence-based bundle as a focus for quality improvement activities. The coleaders of the project from UMMC reviewed the requirements for each bundle and considered the culture and readiness of the maternity nursing and medical teams at the UMMC. Each bundle has a specific focus such as the use of intermittent auscultation (IA) or the use of comfort measures and birth tools. Based on these considerations, the Promoting Spontaneous Labor Progress bundle was chosen

as the leaders determined that the use of birth tools was an established practice while more emphasis could be placed on nursing support of one-on-one labor support and upright positioning.

The teams were asked to determine a goal for the reduction of the NTSV cesarean rate at various hospitals in the first year; a 3% reduction was determined for the UMMC. During the rest of the meeting, the teams were provided strategies for change management and quality improvement, and time was allowed for an exchange of ideas about specific strategies that could be utilized at their sites. Buoyed by the energy of the introductory meeting, the project leaders set out to build the interprofessional team and infrastructure to implement the RPC quality improvement changes.

BUILDING INFRASTRUCTURE

Building the team

The initial action plan centered on building the infrastructure to support implementation of the RPC initiative. The project leaders focused on strategic team member recruitment from several disciplines within the hospital. One of the leaders was a PhD prepared, practicing midwife providing full-scope midwifery care. The other leader was an APNL whose primary responsibilities centered on maternal and newborn nursing practice and facilitating collaborative processes of developing evidence-based practice for the interprofessional team. Some of the APNL responsibilities and skill sets that benefited the initiative included policy and guideline development, patient order set development, and electronic medical record template revisions. The obstetric medical department chair, obstetric anesthesia lead, and perinatal nursing director were recruited while applying to the project. The next phases included recruiting members from medical and nursing leadership. E-mail and individual conversations were used to recruit staff nurses, midwives, and obstetricians. Obstetric residents and medical students were recruited by the obstetric medical director who also serves as the residency director. Quality and Patient Safety staff joined at the end of the first year. Five Doctor of Nursing Practice–Certified Nurse Midwife (DNP-CNM) students from the University of Minnesota School of Nursing implemented their doctoral quality improvement projects at UMMC, which were specifically chosen to collaborate with the RPC project. In addition, there was rolling recruitment by medical students and residents. Overall, membership on the RPC project has evolved and grown to include a number of disciplines. The collaboration with the School of Nursing and Medical School serves a dual purpose: to meet RPC project objectives while serv-

ing as an opportunity for students to meet curriculum requirements in a real-world setting to improve patient care outcomes.

The interprofessional and leadership team has remained consistent throughout the duration of the initiative. The RPC project leaders met regularly to submit data to ACNM's RPC data center for analysis, evaluate progress toward deliverables, and strategize ongoing quality improvement interventions. The synergy created by this partnership established a strong collaborative relationship and brought together the perspectives of the disciplines to make impactful and shared changes in the culture of the unit and clinical nursing and provider practice.

Using established meetings and communication patterns

A second infrastructure-building strategy included using established meetings and communication avenues rather than creating new ones. This strategy resulted in effective involvement and dissemination of information. Standing bimonthly obstetric interdisciplinary team meetings, unit provider meetings, and nursing staff meetings served as the platform for regular updates including new practice changes, progress on bundle deliverables and data collection, medical record documentation revisions, and a review of the cesarean rates and other metrics tracked by the RPC data center. The obstetric interdisciplinary team membership includes representatives from medical and nursing teams as well as laboratory services, social work services, spiritual health services, neonatal intensive care unit leadership, quality and patient safety, anesthesia, and other invited guests. The purpose of the meeting with all of these established groups is to elicit the perspectives from all disciplines caring for women and infants to build a shared mental model in a culture of collaboration to improve patient care.

Collaboration with information technology team

The third infrastructure-building strategy involved the information technology team. At the outset, data collection occurred through worksheets that were provided to the registered nurse (RN) staff. The staff were asked to complete worksheets after each birth where women met NTSV criteria. Simultaneously, the RPC project leaders collaborated with the information technology department to revise the electronic medical record to include required data collection elements and create a report to pull the required data. Examples of added data points included one-to-one labor support, predominant type of fetal surveillance during first stage, and midwife management of the labor and birth (see Table 1).

Table 1. Data collection points for promoting progress in spontaneous labor bundle

Date and time of birth
Type of labor
Spontaneous
Induction
Scheduled cesarean
Type of birth
Vaginal
Operative vaginal birth
Cesarean birth
If cesarean
1st stage
2nd stage
Episiotomy performed
Pain management
Epidural
Nitrous
IV opioid
Apgar score
0-3
4-7
8-10
Predominant method of monitoring 1st stage
Intermittent auscultation
Continuous fetal heart rate monitoring
Midwife care
1:1 Labor support provided
Provider
Nurse
Doula

Once this was completed, the paper worksheets were discontinued. This change decreased the audit time for each chart significantly. A staff nurse from the labor and delivery unit and the member of RPC would then review the reports and fill in any missing data to ensure accuracy and complete records. All data were stored on a password-protected computer and de-identified data were uploaded to the RPC data center.

INDIVIDUALIZED PROJECTS WITHIN RPC

To address the components of the Promoting Progress in Spontaneous Labor bundle, the RPC project leaders, in collaboration with a designated RPC mentor, the labor and delivery nurse manager, and the leadership at University of Minnesota School of Nursing graduate nurse-midwifery program, identified some key projects that would enhance the nurse's role in supporting physiologic birth. The 3 projects in the first year included the use of IA for fetal assessment during labor, use of upright labor positioning and introduction of labor slings, and development of an early labor lounge to reduce admissions of women in early labor. In the second year, the Partners in Birth student Doula Project was introduced. Each project was led by a nurse-midwife Doc-

tor of Nursing Practice (DNP) student supported by a faculty advisor or a community liaison in close collaboration with the APNL project leader.

Use of IA

The scope of the IA project included a literature review, inventory of available Doptone devices and documentation needs, data collection, revision of the electronic fetal monitoring guideline, nursing education and competence assessment, provider education, and setting roles and expectations for the project leaders, student, and faculty.

During the planning stage, the workgroup identified several barriers to the use of IA that needed to be addressed. First, the team was unable to locate any instructional videos from reputable organizations on the use of IA. Second, the electronic medical record supported only documentation of continuous electronic fetal monitoring. Third, the existing fetal monitoring guideline provided very limited guidance on appropriate patient selection criteria or auscultation frequency. Finally, the unit had a limited supply of Doptone devices and was inconsistent with a specific Doptone storage location.

To work through the barriers, the team divided up the tasks as appropriate for the roles. The APNL project leader and the clinical development specialist reviewed the literature for the appropriate patient selection, definitions of terms, frequency of auscultation, recommendations for interventions, and documentation for the use of IA. This information was incorporated into the hospital's electronic fetal monitoring guideline. The APNL ensured that the medical record was modified to comply with the recommendations in the literature and hospital guideline. The role of the student and the faculty included the production of an instructional video for nurses and providers demonstrating the correct technique, participation in nurse competency education, collection of pre- and postintervention data, and development of bedside instructional references for the nursing staff. The student produced written resources for nursing staff and presented at the patient care rounds attended by members of the healthcare team. The video and guidelines are posted as examples on the RPC collaborative Web site (see Table 2).

Use of upright labor positioning

Another strategy to support physiologic labor progress included use of upright labor positioning. The unit culture already supported the use of birth balls and peanut balls; however, emphasizing upright positioning as the primary labor position required a new guideline the team titled Upright Labor Support and Positioning. The RPC project leaders, several midwives, and the

Table 2. UMMC tools and videos available on the American College of Nurse-Midwives Reducing Primary Cesareans Project Web site

UMMC Intermittent Auscultation Training Video
UMMC Guideline for Early Labor
UMMC Guideline for Ambulation and Upright Positioning
UMMC Electronic Fetal Monitoring and Doptone Intermittent Auscultation Guideline
UMMC Checklist for Eligibility for Intermittent Auscultation
UMMC Dystocia Checklist (team huddle)
UMMC Birth Sling Checklist
Early Labor Lounge Guide

Abbreviation: UMMC, University of Minnesota Medical Center.

student collaborated on writing the guideline that included strategies supported in the literature aimed to reduce the length of labor, increase the use of nonpharmacologic pain relief measures, and enhance maternal satisfaction and control. An Upright Labor Positions pictograph sheet for women and their support persons was created. In addition to the online learning module that was created for all labor nurses, the evidence to support various upright positions, reinforcement of out-of-bed laboring as women desire, and opportunities to practice hands-on use of the labor sling, rebozo, birth balls, and floor mats was presented at a daylong local maternity nursing conference. Eighty-five labor and delivery nurses from the hospital system attended and the group was energized to practice the new skills. Finally, pre- and postintervention data were collected and reviewed by the members of the team.

While not part of the scope of the student project, labor slings were simultaneously introduced and incorporated into the Upright Labor Support and Positioning guideline. The slings offer another option for women who prefer to remain upright and supported while out of the bed during labor. The Upright Labor Support and Positioning Guideline includes criteria for women who are eligible to use the labor sling. Fortunately, the labor and delivery unit was under renovation, allowing for the installation of weight-bearing structures and rings in the ceiling necessary to safely bear the weight of the laboring woman. The nurse manager of the labor and delivery unit worked closely with the construction team and the hospital's facilities management leadership to ensure safe installation. Collaboration with the hospital's laundry service and infection prevention department resulted in best practice for laundering and storing the labor slings. At the time of the project, no videos demonstrating the use of the birth slings from a

reputable source were located. A staff nurse, midwife, and student midwife produced a video featuring the midwife demonstrating proper inspection, setup, and options for patient positioning. A competency checklist developed by the clinical development specialist and APNL was completed by each nurse and overseen by nursing unit champions. The proper inspection, preparation, and use of slings are reviewed at regularly scheduled nursing competencies. The student presented at the early morning rounds attended by providers, residents, and students. The Upright Labor Support and Positioning Guideline and the video are posted on the ACNM RPC Collaborative Web site.

Use of labor lounge

The third student project in the first year of the RPC initiative focused on early labor management. Development of an early labor lounge was proposed by the student and the faculty advisor to maternity care providers during a monthly meeting. The concept of the early labor lounge is to allow a space for women in early labor to safely labor while delaying admission until active labor or when appropriate based on maternal or fetal condition. The student designed patient education depicting the use of various birth tools including birth balls and slings and various upright labor positions. Maintaining hydration and nutritional intake and the use of aromatherapy were included. The team worked closely with the nurse manager of the labor and delivery unit to explore various space options and consulted with risk management regarding outpatient status requirements. The student presented information about the labor lounge at the daylong local conference and at nursing competencies as a learning station. A Guideline for the Management of Early Labor written in collaboration with the RPC project leaders and several midwives included definitions of labor and patient criteria for use of the Early Labor guideline and patient disposition options. The guideline is posted on the ACNM Birthtools Web site. The educational components related to the student projects were incorporated into the entire curriculum for new labor and delivery nurses. The student collected pre- and postdata around the use of the labor lounge.

Partners in birth student Doula Project

The final student project was implemented near the end of the second year of the RPC project, during the academic fall semester of 2017. The overall aim of this project was to increase the rates of one-to-one labor support, noted in the literature as critical for reducing cesarean rates.^{22,23} The project started after a survey to determine the level of interest of current junior and senior nursing students in the baccalaureate program and

in the postbaccalaureate master's degree in nursing program regarding a desire for Doula training. The results showed an overwhelming interest with approximately 100 students responding. Supported by the high-interest level, the students, faculty, and a Doula trainer developed a 4-day, 2-hour didactic curriculum and 16-hour Doula training workshop. Known as Partners in Birth, this project included the development of an elective nursing 2-course credit Doula training course offered by the University of Minnesota School of Nursing. The Doula training course content consisted of didactic and hands-on practice of labor support comfort strategies, basic breastfeeding techniques, a panel of local leaders who described the community resources available to childbearing families, and a tour of the labor and delivery unit where the Doulas would provide labor and birth support. Students involved in the pilot project then provided four 8-hour shifts of labor support at no cost to women in labor at the hospital. The students set up the student nurse Doula calendar and designed a T-shirt designating the student as part of the Partners in Birth program. The RPC project leaders provided a tour to the students, ensured that students' calendars were available to the unit charge nurses, collaborated on the data collection items, and developed and covered the cost of a brochure to promote the Partners in Birth program in the associated prenatal clinics. To keep the course sustainable for the fall 2018 and spring 2019 semesters, a hospital staff nurse participated as a faculty member. The course allowed 20 students to enroll and the number of Doula support hours increased from 32 per student to 40 per student. The same nurse who was responsible for assisting with data collection fulfilled the faculty for the student Doula program.

SUPPORTING PROVIDER PRACTICE CHANGE IN REDUCING PRIMARY CESAREANS

The interprofessional RPC leadership team also concentrated efforts to standardize provider practice to reduce NTSV cesarean birth. Attention was placed on the use of a labor management algorithm²⁴ for the diagnosis and management of labor dystocia. The algorithm was reviewed at the obstetric interdisciplinary team meetings and placed in the resource folders in each of the patient rooms, along with other reference materials developed to support the project. A labor dystocia huddle task force utilizing champion obstetricians, midwives, and the APNL created a team huddle process for the indication of labor dystocia. At the time the possibility of a cesarean arose, the obstetrician, family medicine physician or midwife, primary nurse for the patient, and charge nurse met to review the patient's labor course, the algorithm, and verified that the patient met crite-

ria for diagnosis of labor dystocia. A note template for the electronic medical record was designed to facilitate standardized documentation for the providers and for future case review. In addition, every 3 months an obstetric resident and medical student reviewed all cesareans with diagnosis of labor dystocia and determined whether the algorithm was followed. Cases where the algorithm was not followed but a cesarean occurred are reviewed by a multidisciplinary group and results are shared for learning purposes. In addition, an online presentation reviewing management of category II fetal heart rate tracings was made available to all maternity care providers as part of the credentialing process. An algorithm for the management of category II fetal heart rate tracings²⁵ was made readily available on the unit.

Finally, an interprofessional team of a midwife, maternal fetal medicine specialist, RN, and a resident, developed a methodology to closely examine balance measures related to the RPC project to ensure that no harm to the mother or the newborn occurred as a result of these practice changes. Balance measures are a way at looking at the system change to ensure that improvements in one part of the system are not causing issues or harm in another part of the system.²⁶ Data tracked include Apgar score, rates of postpartum hemorrhage, and triple I, otherwise known as intra-amniotic inflammation and infection. This team also reviewed cases involving deep transverse arrest and maneuvers employed to manage difficult fetal cesarean extraction (see Figure 1).

ETHICAL CONSIDERATIONS

Because of the quality improvement nature of this project and no protected health information obtained, the project was deemed exempt by Institutional Review Board at the UMMC. In addition, each student project was deemed exempt by the Institutional Review Board of the University of Minnesota.

RESULTS

The baseline NTSV primary cesarean rate in 2015 was 29.3%. In 2016, after 1 year of implementation of the project, the hospital realized a 10% decrease in NTSV cesareans to a rate of 26.1%. In 2017, there was a more modest decrease of 3.7% to 25.3% as noted in Table 3.

Self-reported by labor and delivery RNs, continuous labor support during active labor rates increased from 47.5% in 2016 to 66.3% in 2017, an increase of 40%. The highest percentage of one-to-one labor support reported during the RPC project was 80% during high saturation with the Partners in Birth student Doula program.

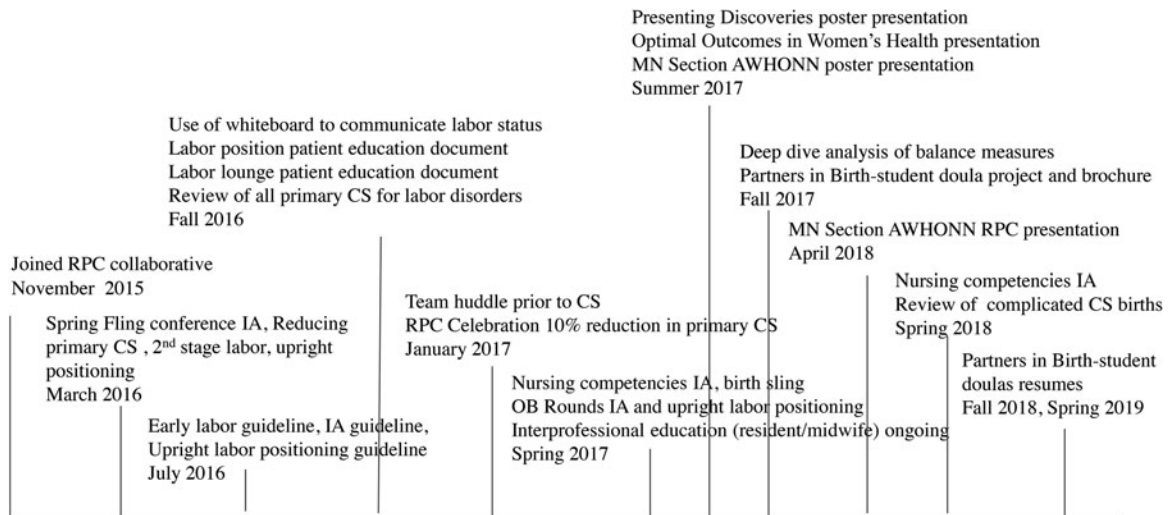


Figure 1. Timeline for Reducing Primary Cesareans Project. CS indicates cesarean birth; IA, intermittent auscultation; RPC, Reducing Primary Cesareans.

Overall, IA use increased from 8.1% in 2016 to 9.1% in 2017, an increase of 12%. During the intervention and data collection period, 89 women were identified as eligible for IA. For the women who qualified for IA, the use of IA increased from a baseline of 20% to 53%.²⁷

During the data collection time frame for the labor lounge project, 56 women met inclusion criteria. Eight women used the space and 6 completed the survey. The low use of the labor lounge may be attributed to a lack of nurse buy-in, women electing not to use the lounge, and lack of documentation of lounge use. All women who used the lounge reported that they would recommend use of the space to a friend and would use it again themselves.²⁸

The results from the third project focused on the use of upright labor positioning for NTSV women. During this data collection time frame, the women who spent the majority of labor time in upright positions

increased from 13.8% to 29.7% and the augmentation rates decreased from 38% to 30%. The average length of first-stage labor for a woman who remained in bed for the majority of her labor was 2 hours longer than that for a woman who was upright greater than 50% of labor. The rate of labor augmentation for women who were upright greater than 50% of labor was significantly less than that for women who were upright less than 50% (26.3% vs 54.4%, $P = .011$). Being upright greater than 50% of labor was significantly associated with not having an epidural (7.3% vs 78.3%, $P < .001$). Spending more than 50% of labor time upright was significantly associated with a lower chance of having a cesarean birth (4.9% vs 18.6%, $P = .037$). There was no statistically significant change in neonatal intensive care unit admissions.²⁹ The hospital has not seen an increase in the rate of low Apgar score, suspected triple I, or postpartum hemorrhage over the project's time period.

Table 3. Annual cesarean rate of nulliparous term singleton vertex pregnancies

Time frame	NTSV C/S rate	Percent change
2015 (preintervention)	29.3%	
2016	26.1%	10% decrease from 2015
2017	25.3%	3.7% decrease from 2016
		Overall, 13.7% decrease from 2015

Abbreviation: NTSV, nulliparous, term, singleton, vertex.

DISCUSSION

Strengths

There are several strengths of this project, most notably the collaboration and engagement of several disciplines to implement interventions aimed at a common goal: reducing primary cesarean in the NTSV population. Working with the DNP students on various projects has several benefits for the students, faculty, hospital, and the patients receiving care. Sustaining the work, however, remains with the project leaders and interdisciplinary team. The staff have enthusiastically welcomed the student Doulas and invited the Doulas to participate in shift change report. The Doula

nursing course has been sustainable through the addition of a staff nurse assuming an adjunct faculty role. The students provided a great service to the hospital and have achieved more than completion of an assignment. Similar to a student program at Johns Hopkins, many of the student Doula's plan to become Doula-certified, labor and delivery nurses, or complete a midwifery program.³⁰ This course offers them firsthand experience with laboring women and families. Included is the satisfaction of having an impact on nursing and patient care, gaining confidence, hands-on experience in supporting a woman's choice in labor and patient advocacy,³⁰ and changing the culture of the unit. Nursing staff and providers have benefited by receiving clinically relevant, evidence-based information from DNP students immersed in researching a clinically relevant topic and practicing quality improvement and change management processes.

Nurses and providers at other hospitals in the system benefit from the dissemination of the new guidelines and the education incorporated in the labor and delivery curriculum. There has been an increase in the correct patient selection and use of IA as a result of nursing education, enhanced electronic documentation, and culture change. The data elements added to the electronic medical record and ability to pull reports related to birth outcomes have supported other projects for the department. Overall, the RPC project has increased awareness and informed the multidisciplinary team about the NTSV cesarean rates at UMMC and has motivated the team to continue to reduce NTSV cesareans.

Limitations

There are several limitations to the RPC project implementation at this site. The project has limited generalizability as the project took place at 1 metro area hospital in a Midwestern academic medical center. The student projects included very small sample sizes and were time limited due to the constraints of the academic program. The ongoing use of the labor lounge has been minimal without nursing or provider champions to support or track use. Sustaining the culture around the use of IA has continued to be an area of needed focus. Use of labor dystocia huddle and documentation has been variable and provider dependent.

Suggested next steps and recommendations

Overall, the incremental reductions in NTSV cesareans have been rewarding for the leaders, interdisciplinary team members, nurses, and providers. The student projects facilitated the implementation of clinical practice changes that otherwise would have taken 3 or more years to accomplish. The work of the projects

was divided per the scope of practice of the team members. Recommendations for future student projects would include a sustainment plan to incorporate hand-off of projects to specific nurse champions on the unit as well as sustainable data collection and review processes. In addition, the site plans to continue to improve the utilization of IA and the labor lounge.

CONCLUSION

In the United States, one-third of women will experience a cesarean and cesarean births are not without risk.¹ Participation in the ACNM's RPC collaborative initiative provided UMMC the tools and support to reduce the NTSV cesarean rate from 29.3% to 25.3% over a 2-year period. By utilizing the evidence-based bundle, incorporating proven quality improvement strategies, and engaging numerous champions and stakeholders including DNP midwifery students, this example provides a model for similar sites. Collaborating with students offers an opportunity to increase the capacity to take clinical practice and culture change to the next level. Quality improvement is an ongoing process and the project members will continue to strive for the Healthy People 2020 goal of 23.9% over the next year.

References

1. Hamilton BE, Martin JA, Osterman MJK, Driscoll AK, Rossen LM. *Births: Provisional Data for 2017*. National Vital Statistics Reports; 4. Hyattsville, MD: National Center for Health Statistics; 2018. <https://www.cdc.gov/nchs/data/vsrr/report004.pdf>. Accessed September 28, 2018.
2. Kozhimannil KB, Law MR, Virnig BA. Cesarean delivery rates vary 10-fold among US hospitals; reducing variation may address quality, cost issues. *Health Aff (Millwood)*. 2013;32(3):527-535. doi:10.1377/hlthaff.2012.1030.
3. MacDorman MF, Declercq E, Cabral H, Morton C. Recent increases in the US maternal mortality rate: disentangling trends from measurement issues. *Obstet Gynecol*. 2016;128(3):447-455.
4. Berg O, Hung KJ. Early skin-to-skin to improve breastfeeding after cesarean birth. *J Obstetric Gynecol Neonatal Nurs*. 2011;40. doi:10.1111/j.1552-6909.2011.01242_24.x.
5. Almeida EC, Nogueira AA, Candido dos Reis FJ, Rosa e Silva JC Cesarean section as a cause of chronic pelvic pain. *Int J Gynaecol Obstet*. 2002;79(2):101-104. doi:10.1016/s0020-7292(02)00227-8.
6. Lyell DJ, Caughey AB, Hu E, Daniels K. Peritoneal closure at primary Cesarean delivery and adhesions. *Obstet Gynecol Survey*. 2006;61(1):12-13. doi:10.1097/01.ogx.0000193847.91540.14.
7. Morales KJ, Gordon MC, Bates GW Jr. Postcesarean delivery adhesions associated with delayed delivery of infant. *Am J Obstet Gynecol*. 2007;196(5):461.e1-e6. doi:10.1016/j.ajog.2006.12.017.
8. Marshall NE, Fu R, Guise JM. Impact of multiple cesarean deliveries on maternal morbidity: a systematic review. *Am J Obstet Gynecol*. 2011;205(3):262.e1-e8. doi:10.1016/j.ajog.2011.06.035.
9. Getahun D, Oyelese Y, Salihu HM, Ananth CV. Previous cesarean delivery and risks of placenta previa and placental

- abruption. *Obstet Gynecol.* 2006;107(4):771–778. doi:10.1097/01.aog.0000206182.63788.80.
10. Nisenblat V, Barak S, Ohel G, Gonen R. Maternal morbidity associated with multiple cesarean deliveries. *Am J Obstet Gynecol.* 2005;193(6):S127. doi:10.1016/j.ajog.2005.10.456.
 11. Silver RM, Landon MB, Rouse DJ, et al. Maternal morbidity associated with multiple repeat cesarean deliveries. *Obstet Gynecol.* 2006;107(6):1226–1232. doi:10.1097/01.aog.0000219750.79480.84.
 12. Main E. Safely reducing primary cesarean birth. Webinar presented at: Reducing primary Cesareans Collaborative; January 8, 2016.
 13. Avery MD, Bell AD, Bingham D, et al. *Blueprint for Advancing High-Value Maternity Care Through Physiologic Childbearing.* Washington, DC: National Partnership for Women & Families; 2018. <http://www.nationalpartnership.org/research-library/maternal-health/blueprint-for-advancing-high-value-maternity-care.pdf>. Accessed July 18, 2018.
 14. Kennare R, Tucker G, Heard A, Chan A. Risks of adverse outcomes in the next birth after a first Cesarean delivery. *Obstet Gynecol.* 2007;109(2, pt 1):270–276. doi:10.1097/01.aog.0000250469.23047.73.
 15. Taylor LK, Simpson JM, Roberts CL, Olive EC, Henderson-Smart DJ. Risk of complications in a second pregnancy following Caesarean section in the first pregnancy: a population-based study. *Med J Aust.* 2005;183(10):515–519.
 16. American College of Obstetricians and Gynecologists (College); Society for Maternal-Fetal Medicine; Caughey AB, Cahill AG, Guise J-M, Rouse DJ. Safe prevention of the primary cesarean delivery. *Am J Obstet Gynecol.* 2014;210(3):179–193. doi:10.1016/j.ajog.2014.01.026.
 17. Reducing Primary Cesareans. The American College of Nurse-Midwives Healthy Birth Initiative. <http://birthtools.org/HBI-Reducing-Primary-Cesareans>. Accessed July 18, 2018.
 18. Association for Women's Health, Obstetric and Neonatal Nurses. Continuous labor support for every woman. [https://www.jognn.org/article/S0884-2175\(17\)30482-3/fulltext](https://www.jognn.org/article/S0884-2175(17)30482-3/fulltext). Published January 2018. Accessed October 4, 2018.
 19. California Maternity Quality Care Collaborative. Toolkit to support Vaginal Birth and Reduce Primary Cesareans. Published 2017. <https://www.cmqqc.org/VBirthToolkit>. Accessed October 4, 2018.
 20. Council of Patient Safety in Women's Health Care. safe reduction of primary cesarean birth bundle. <https://safehealthcareforeverywoman.org/patient-safety-bundles/safe-reduction-of-primary-cesarean-birth>. Accessed October 4, 2018.
 21. Institute for Healthcare Improvement. What is a bundle? <http://www.ihl.org/resources/Pages/ImprovementStories/WhatIsaBundle.aspx>. Published 2013. Accessed October 4, 2018.
 22. Bohren MA, Hofmeyr G, Sakala C, Fukuzawa RK, Cuthbert A. Continuous support for women during childbirth. *Cochrane Database Syst Rev.* 2017;(7):CD003766. doi:10.1002/14651858.CD003766.pub6.
 23. Kozhimannil KB, Hardeman RR, Alarid-Escudero F, Vogel-sang CA, Blauer-Peterson C, Howell EA. Modeling the cost-effectiveness of doula care associated with reductions in preterm birth and Cesarean delivery. *Birth.* 2016;43(1):20–27. doi:10.1111/birt.12218.
 24. Spong CY, Berghella V, Wenstrom KD, Mercer BM, Saade GR. Preventing the first cesarean delivery: summary of a joint Eunice Kennedy Shriver National Institute of Child Health and Human Development, Society for Maternal-Fetal Medicine, and American College of Obstetricians and Gynecologists Workshop. *Obstet Gynecol.* 2012;120(5):1181–1193.
 25. Clark SL, Nageotte MP, Garite TJ, et al. Intrapartum management of category II fetal heart rate tracings: towards standardization of care. *Am J Obstet Gynecol.* 2013;209(2):89–97.
 26. Institute for Healthcare Improvement. Sciences of improving measures. <http://www.ihl.org/resources/Pages/HowtoImprove/ScienceofImprovementEstablishingMeasures.aspx>. Accessed October 4, 2018.
 27. Liljegren A. Promoting normal physiologic birth by the implementation of an evidence-based intermittent auscultation (IA) protocol. Paper presented on Reducing Primary Cesarean Project Celebration; May 2017; University of Minnesota Medical Center, Minneapolis, MN.
 28. Barth B. Implementing a labor lounge for women in early labor. Paper Presented on Reducing Primary Cesarean Project Celebration; May 2017; University of Minnesota Medical Center, Minneapolis, MN.
 29. Kennedy S. Improving birth outcomes through maternal upright positioning and mobility during labor. Paper Presented on Reducing Primary Cesarean Project Celebration; May 2017; University of Minnesota Medical Center, Minneapolis, MN.
 30. Jordan ET, Van Zandt SE, Wright E. Doula care: Nursing students gain additional skills to define their professional practice. *J Prof Nurs.* 2008;24(2):118–121.