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First Births: A Review of the United States Primary Cesarean Section Rate And Recommendations for Further Study

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Abstract

The cesarean section (CS) rate has increased exponentially worldwide over the past twenty years, and today it is the "most common major surgical procedure in the United States" (Boyle et al., 2013). CS is associated with increased morbidity and mortality for both mothers and newborns, and lowering the national CS rate has become a national health concern (American College of Obstetricians and Gynecologists, 2014). Once a woman has her first CS (the primary CS), it is very likely that all of her subsequent deliveries will also be by CS. Thus, preventing primary CS is critical for reducing the overall CS rate (ACOG, 2014). This paper explores factors contributing to the elevated CS rate, and specifically examines the diagnosis of labor dystocia. The nurse's role in promoting normal birth and preventing CS is also outlined. Lastly, emerging programs intended to address the elevated CS rate are discussed.

Keywords: cesarean section, primary cesarean section, labor dystocia, labor and delivery nursing, normal birth, evidence-based practice

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Background

Childbirth is a major life event experienced by women around the world (Jordan, 1980). It can be affirming and empowering or traumatic and exhausting. Women may remember giving birth with pride or with disappointment (Callister, 1995). As a complex yet nearly universal part of women's lives, childbirth has been the subject of anthropological study for decades and has been conceptualized in a variety of ways.

Birth may be seen as a threshold, a time of transition from the role of a woman without children to that of mother. In anthropological terms first put forth by Arnold van Gennep (1906) and later refined by Victor Turner (1969), birth is viewed as a liminal time, an in-between state defined by uncertainty, vulnerability, and change. Other liminal times include puberty and death. Turner wrote that during liminal periods, a sense of community or *communitas* arises, connecting participants regardless of social constructs, such as class, that traditionally divide populations (1969). According to this framework, childbirth unites women through the bond of shared experience.

Brigitte Jordan (1980) defined childbirth as a biosocial event, acknowledging "the universal biological function and the culture-specific matrix within which human biology is embedded" (p. 1). While the physical process of birth is much the same for most women, the customs surrounding it vary widely. Across cultures, birth is associated with various specific beliefs and rituals, which define the elaborate systems of practices that each culture uses to manage the birth process (Jordan, 1980). Thus, Jordan asserted, birth appears different in each culture to the degree that, "in the most extreme case it would be impossible to interpret a woman's behavior during labor if one didn't know the culture's rules for appropriate displays during birth" (1980, p. ii).

Robbie Davis-Floyd (2003) developed the anthropological framework of childbirth further in her book, *Birth as an American Rite of Passage*. In this work, she explored the medical model of birth embraced in the United States (US). Davis-Floyd argued that, contrary to common belief, the medicalization of birth was not characterized by a deritualization of the process. Instead, the increase in technology and active management of the birth process seen in the past century "has resulted in a proliferation of rituals", i.e., routine use of medical interventions, such as continuous fetal monitoring and intravenous fluids (p. 1).

Although birth may be seen as an intersection between biology and society, at its core it is a normal physiological process. Lamaze International (2015) defines normal birth as "one that unfolds naturally, free of unnecessary interventions" (p. 1), while a consensus statement put forth jointly in 2012 by the American College of Nurse-Midwives (ACNM), Midwives Alliance North America (MANA), and National Association of Certified Professional Midwives (NACPM) states, "A normal physiologic labor and birth is one that is powered by the innate human capacity of the woman and fetus" (p. 2). Simply put, women are innately capable of giving birth.

Romano and Lothian (2008) maintain that childbirth is a delicate, multifaceted event. Labor begins with an intricate sequence of hormonal signaling between mother and fetus that indicates what Romano and Lothian termed "[fetal] readiness" and "[maternal] receptiveness" (p. 94). As labor progresses, oxytocin and prostaglandins in conjunction with changes in the woman's emotional state play a role in contraction strength and frequency. Maternal catecholamines regulate pain perception and stimulate the fetal respiratory system. After the spontaneous vaginal birth of the newborn and placenta, there is an increased secretion of maternal oxytocin, stimulating uterine involution and reducing postpartum hemorrhage while supporting successful breastfeeding and bonding between mother and infant (Romano & Lothian, 2008).

While this brief overview of normal birth may appear straightforward, birth in modern America is perceived as an unpredictable process that must be controlled (Davis-Floyd, 2003). Many of the routine interventions of modern day obstetrics act to mitigate labor's variable nature and bring order to the supposed chaos of childbirth. However, this has not always been the case.

In the 19th century, childbirth was managed with few interventions. Women in labor were treated with watchful expectancy and most gave birth at home. Birth was seen as a normal physiological process that many physicians and midwives chose not to interfere with. However, the turn of the century heralded changing attitudes towards childbirth. As the world began placing its trust in science over nature, expectant management of birth fell out of vogue. Joseph DeLee, known as the father of modern of obstetrics, described labor in 1920 as a "decidedly pathological process" (p. 39). As the field of medicine evolved and expanded in the twentieth century, birth became an illness state to be managed by a team of doctors, nurses, anesthesiologists, and pharmacists, and women in labor flooded hospitals in seek of medical and institutional care (Wertz & Wertz, 1977).

Childbirth has undergone a sea change, from normal physiologic process to a medicalized condition. According to Zwelling (2008), birth has become a "high tech" event (p. 85), and has been pathologized to the degree that medical intervention is the norm rather than the exception. The process of giving birth in a hospital now involves a host of routine interventions including intravenous fluids, episiotomy, labor induction, electronic fetal monitoring, amniotomy, forceps, vacuum extraction, regional anesthesia, and cesarean section (Romano & Lothian, 2008; Zwelling, 2008). These interventions are performed consistently, although evidence shows that they may not improve health outcomes and may even lead to adverse outcomes (Jansen, Gibson, Bowles, & Leach, 2013, Sakala & Corry, 2008).

Davis-Floyd (2003) named this phenomenon the *technocratic model of birth*. In this model, the medical system and, to an extent, society at large value technology over nature. The body is seen as a machine, and female bodies as fragile machines with inherent design flaws that must be managed by physicians. The woman's ability to give birth independently is dismissed from the outset and, in fact, her participation in the birth is not required. The goal of birth under this framework is the "perfect baby" (Banner, 2014). The woman's experience is an afterthought.

Davis-Floyd paints a grim picture; however, research over the past thirteen years supports her dire warnings. In the nearly 25 years since she published, rates of medical intervention have skyrocketed (Romano & Goer, 2012; Declercq, Sakala, Corry, Applebaum, & Herrlich, 2013). One manifestation of the medicalization of birth is the rapid rise in the numbers of cesarean sections, what Davis-Floyd termed "the ultimate technological intervention" (2003, p. 4).

Cesarean section (CS) is the "most common major surgical procedure in the United States" (Boyle et al., 2013). In the 1960s, CS was rarely performed, and accounted for less than 5% of births in the US (Menacker & Hamilton, 2010). However, in the last 50 years CS has become increasingly routine, and in the past 20 years has increased exponentially. In 13 years, the rate increased by 60%, from 20.7% in 1996 to 32.9% in 2009 (Osterman & Martin, 2014). With a CS rate of 32.2% in 2014 (Martin, Hamilton, & Osterman, 2015), approximately one in three births in the US are by CS.

There is no argument that CS is recommended in certain situations. In the case of pelvic abnormalities that preclude vaginal delivery, CS is necessary. Fetal intolerance of labor due to placental insufficiency, maternal HIV infection, and maternal active herpes simplex lesions are some of the conditions that require CS to reduce risk of harm to the fetus (ACOG, 2014). CS may also be done to protect the safety of both mother and fetus; placental complications, such as placenta accreta and placenta previa, require CS delivery (ACOG, 2014).

Although birth by CS saves lives when critically indicated, there are significant risks that accompany the procedure. It is major surgery. As such, CS is accompanied by all of the associated morbidity and mortality of abdominal surgery, in addition to short and long-term consequences specific to reproduction (Campbell, 2011).

Women who have CS experience a higher morbidity, with an increased incidence of blood clots, increased risk of pneumonia, and increased psychological sequelae (Campbell, 2011). When compared with vaginal birth, CS is associated with increased rates of hemorrhage requiring blood transfusion (Curtin, Gregory, Korst, & Uddin, 2015). Uterine rupture and unplanned hysterectomy are also increased with CS (Curtin, Gregory, Korst, & Uddin, 2015). There is also an increased risk of surgical injury, incision site infections with associated costly treatment (Brown, 2012), and pelvic adhesions with CS (Marshall, Fu, & Guise, 2011). CS is associated with longer hospital stays and longer recovery periods (Campbell, 2011), more ICU admissions (Curtin, Gregory, Korst, & Uddin, 2015), and more readmissions (Brown, 2012).

In addition to these serious complications, women who have a CS may also find their options for future births limited, especially if they have a history of more than one CS (repeat CS). Each time the uterus is incised, scar tissue grows and replaces healthy, functional tissue. This process weakens the uterine walls, leading to increased risk of uterine rupture and unplanned hysterectomy during subsequent pregnancies (ACOG, 2014). It also puts the woman at increased risk for placental problems such as previa and accreta (Marshall, Fu, & Guise, 2011). Lastly, women with a history of CS have a lower likelihood of subsequent childbearing, in part due to increased risk of spontaneous abortion and ectopic pregnancy (Clark & Silver, 2011; Kjerulff, Zhu, Wiesman, & Ananth, 2013; Masinter, Feinglass, Grobman, & Simon, 2014; and the 2014 Obstetric Care Consensus).

Infants born by CS are also at heightened risk for specific complications. CS can negatively impact breastfeeding in newborns (Hauck, Fenwick, Dhaliwal, & Butt, 2011).

Transient tachypnea, respiratory distress syndrome, and pulmonary hypertension are newborn complications seen more frequently with repeat CS (Patel & Jain, 2010). Repeat CS is also associated with more NICU admissions, increased length of hospital stay, and increased costs (2010).

Higher rates of maternal and infant mortality are also associated with CS. Maternal mortality is significantly increased in CS delivery (Deneux-Tharaux, Carmona, Bouvier-Colle, &Breart, 2006; Liu et al., 2007). The rate of maternal death with CS is 2.2 per 100,000, while the rate of maternal death with vaginal birth is 0.2 per 100,000 (Clark et al., 2008). For infants born via nonemergent CS, the rate of mortality is 2.3 times higher than that of vaginal birth (MacDorman & Mathews, 2009).

It is critical to ensure that CS is performed for evidence-based medical indications. Utilizing CS for healthy, low-risk births does not improve outcomes and has a host of negative consequences (ACOG, 2014; Goer & Romano, 2012; Romano & Lothian, 2008). The World Health Organization (WHO) statement on CS rates asserts that CS should be done only when medically necessary (2015). In 1985, the WHO declared that a CS rate of 10-15% is optimal, and rates higher than 15% are not medically necessary. Ye, Betran, Guerrero, Souza, and Zhang (2014) found that rates exceeding 10% were not accompanied by decreased infant mortality rates, and after 15% did not impact maternal mortality rates.

The current US rate of CS is more than double that of the WHO recommended rate, indicating that CS is a vastly overused procedure in this country, as well as many other developed countries. According to the 2014 Obstetric Care Consensus, entitled *Safe Prevention of the Primary Cesarean Delivery*, released jointly by the American College of Obstetricians and Gynecologists (ACOG) and the Society for Maternal-Fetal Medicine (SMFM), lowering the national CS rate in low-risk women has become a national health concern. *Healthy People 2020*, the national public health objectives put forth by the US

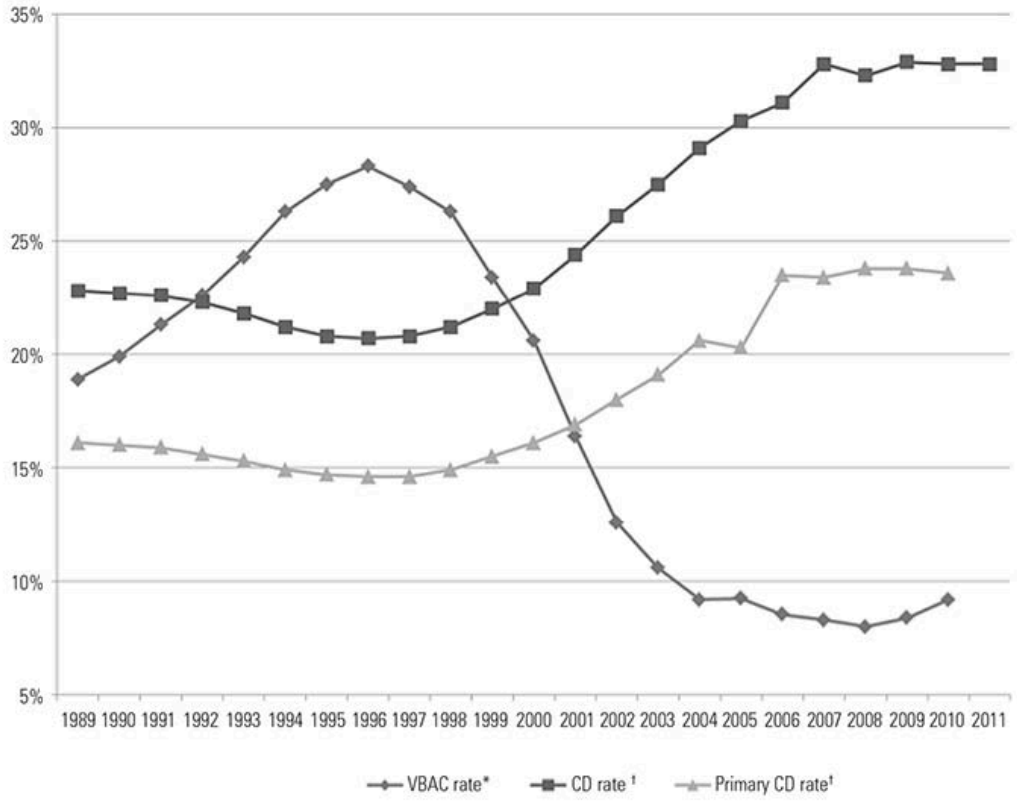
Department of Health and Human Services (HHS), outlines goals for decreasing both the primary CS rate and the repeat CS rate in low-risk populations (2010).

Literature Review

This paper focuses on prevention of primary CS in low risk women, promotion of normal physiologic birth, and the nurse's role in these initiatives. A low risk birth is defined as a term pregnancy (greater than 37 weeks gestation), with a singleton fetus in cephalic presentation, without medical complications and history of CS (Liu et al., 2007; Osterman & Martin, 2014).

The first CS a woman has is termed a *primary* CS. In 1996, 14.5% of all births were primary CS (MacDorman, Declercq, & Menacker, 2011). By 2014, the rate of primary CS had increased to 22.3% (Martin, Hamilton, & Osterman, 2015). These women may be giving birth for the first time (primiparous) or may have already given birth (multiparous). Research examining the primary CS rate found that from 2002-2008, 30.8% of primiparous women had a primary CS and 11.5% of multiparous women had a primary CS (Boyle et al., 2013). Of all women having a primary CS during this period, 45.6% were low-risk primiparous women (Boyle et al., 2013). The primary CS rate is critical because once a woman has had a CS, it is very likely that all of her subsequent deliveries will also be CS births, i.e., repeat CS. In fact, in 2005, 89.4% of women who had a primary CS went on to have a repeat CS rather than a vaginal birth (Menacker, 2005). As discussed previously, each repeat CS is associated with an increase in significant health risks including uterine rupture and placental abnormalities.

The alternative to a repeat CS is vaginal birth after cesarean, or VBAC. To attempt a VBAC, women must meet specific criteria. According to ACOG, "most women with one previous cesarean delivery with a low transverse incision" should be offered a VBAC (ACOG, 2010). Though there is a growing movement supporting this birth method, in 2014 the national VBAC rate was only 11.3% (Martin, Hamilton, & Osterman, 2015) compared to 28.3% in 1996 (Menacker, 2005).



The change in the practice of VBAC may be related in part to research published in the New England Journal of Medicine in 2001. Lydon-Rochelle, Holt, Easterling, & Martin (2001) maintained that VBAC was associated with a significant, increased risk of uterine rupture. The overall rate of uterine rupture was 0.45%, but risk was exponentially heightened when labor was induced with prostaglandins (2.45%). Recent research has overturned this evidence, finding that uterine rupture is a rare, but serious, complication, with rates as low as 0.30% and elevated rates are seen particularly with the use of prostaglandins for labor induction (Guise et al., 2010; Holmgren, Scott, Porter, Esplin, & Bardley, 2012). According to the consensus statement from the National Institute of Health, and practice guidelines from ACOG and SMFM, VBAC is a safe, appropriate choice for women who meet the aforementioned criteria (ACOG & SMFM, 2010; Cunningham et al., 2010). Another barrier to VBAC is the need for anesthesia. Because VBACs occasionally end in a CS, hospitals offering VBAC are required to have

anesthesia and surgical services immediately available. Many community hospitals cannot afford to meet this requirement, and so do not offer the option of VBAC.

Notably, this reflects an inverse trend with the overall CS rate; since 1996, as the CS rate increased, the VBAC rate plummeted. Thus, the majority of nulliparous women who have a primary CS may never give birth vaginally. Due to reliance on repeat CS rather than VBAC, even in healthy, low-risk women who meet the ACOG criteria, the total CS rate is dependent on the primary CS rate. Thus, according to Osterman & Martin (2014) "efforts to reduce the overall cesarean delivery rate often focus on primary cesareans" (p. 2).

The primary CS rate varies widely between states. A report examining the state-specific primary cesarean section rate over time gathered information by utilizing the revised U.S. birth certificate, which was released in 2003 and included changes to data collection around primary CS rates. States adopted it gradually. In 2006, 19 states used the revised birth certificate. By 2012, 38 states, New York City, and Washington D.C. implemented it. As states began to use the revised certificate, the authors gathered more specific birth information, particularly in regards to the primary CS rate. In 2006, the overall primary CS rate in the 19 states was 21.9%, ranging from a low of 14.5% (Idaho) to the high of 26.2% (Florida). By 2012, the average primary CS rate remained 21.9%, with a range of 12.5% (Utah) to 26.9% (Florida and Louisiana) (Osterman & Martin, 2014). This data shows a great degree of variability among individual states' primary CS rates.

According to ACOG and SMFM's 2014 Obstetric Care Consensus, the significant regional variability seen in primary CS rates "indicates that clinical practice patterns affect the number of cesarean births performed" (p. 3). A complex host of issues are at play that must be carefully examined to identify instances in which medically unindicated primary CS in low-risk women can be safely and appropriately prevented.

It is key to review the indications most often cited for primary CS in the US. Currently, primary CS is done for several high-risk indications, including the previously discussed pelvic abnormalities, fetal intolerance of labor, maternal infection, and placental problems (Campbell, 2011). However, there are other frequently referenced indications that are less conclusive.

The overall most common indication cited for primary CS in the US is labor dystocia (ACOG & SMFM, 2014; Boyle, et al., 2013). The diagnosis of dystocia is based on labor progression patterns outlined by the *Friedman Labor Curve*, published in 1955. The Friedman curve designated labor as a time-bound process based on average lengths of labor. It delineated phases and stages of labor and the typical duration of each. Friedman's work went on to define abnormal progression of labor during the active phase of labor as cervical dilation less than 1.2 centimeters per hour in nulliparous women and less than 1.5 centimeters per hour in multiparous women. Labor arrest is defined as no change in cervical dilation over the course of two hours in the presence of adequate contractions (Friedman, 1955). As the medicalization of birth has become increasingly complex, it has become standard practice to intervene if labor exceeds the allotted time (Zhang et al., 2010). Friedman never intended for his curve to become a guide; rather, he defined the ideal course of labor (Zhang, Troendle, & Yancey, 2002). Nonetheless, it has been widely adopted by clinicians as a useful tool for determining acceptable labor duration.

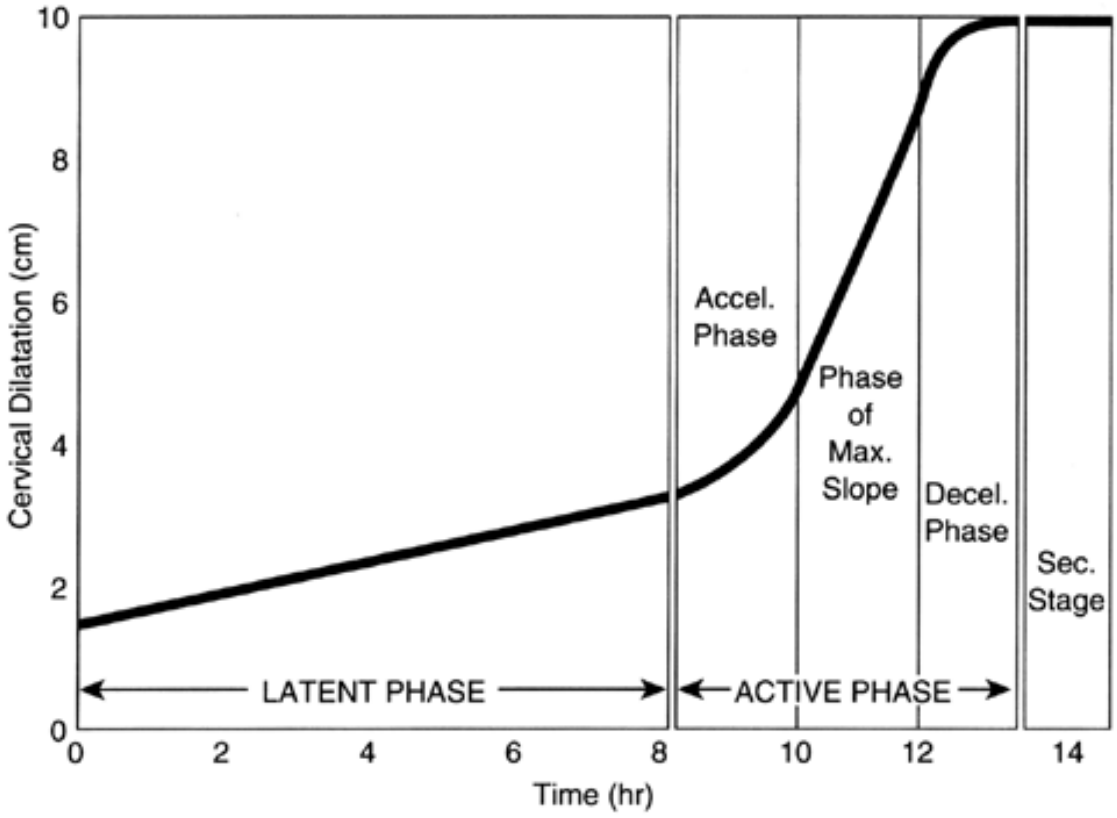


Fig. 1. Composite of the average dilatation curve for nulliparous labor. (Friedman, 1978)

In the sixty years since Friedman's work, the curve has been contested (Albers, 1999; Zhang, Troendle, & Yancey, 2002; Zhang et al., 2010) and yet it is still used to determine women's labor progression. Albers conducted an observational study examining patterns of the active phase of labor in 2511 low-risk women cared for by certified nurse midwives (CNMs). The length of the active phase of labor varies significantly among women, and during the active phase of labor, cervical dilation occurs rapidly (ACOG & SMFM, 2014).

Albers' results showed that labor left to "progress at [its] own pace" (1999, p. 116), i.e., labor without interventions such as oxytocin or epidural anesthesia, lasted significantly longer than expected based on Friedman's work. Indeed, Albers' data indicated that active phase, first stage labor for low risk nulliparous women and

multiparous women lasted double the amount of time that these groups would have been allotted by the Friedman curve (17.5 hours versus 8.5 hours and 13.8 hours versus 7.0 hours respectively) (1999). Furthermore, longer labor times "were not associated with increased morbidity for mother or infant" (p. 117). Albers also hypothesized that the expected complications associated with prolonged labors may be related to common obstetric interventions (epidurals, oxytocin) and not the length of labor itself.

Zhang, Troendle, and Yancey (2002) evaluated the Friedman curve in 1,329 low-risk nulliparous women. The authors found that for this population, cervical dilation during the active phase of labor happened significantly more slowly than stipulated by the Friedman curve. Similar to Albers' findings, the time required for this phase of labor was more than twice the amount of time apportioned by the Friedman curve (5.5 hours versus 2.5 hours) (Zhang, Troendle, & Yancey).

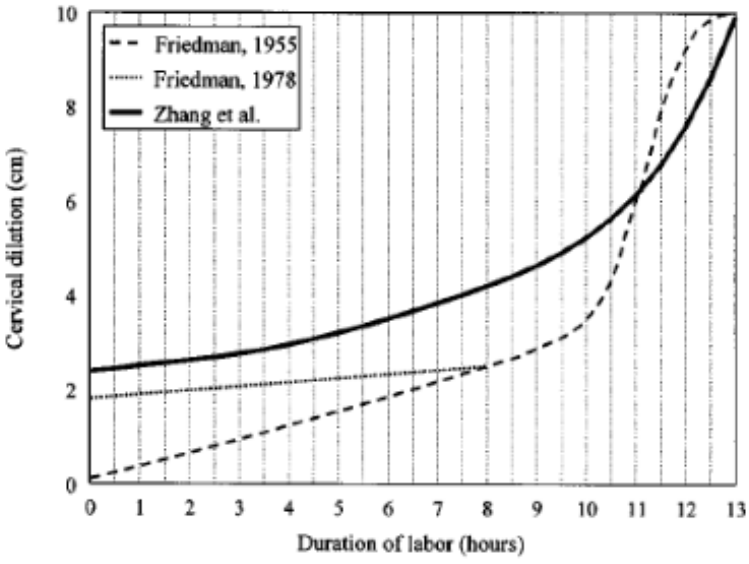


Fig. 2. (Zhang, Troendle, & Yancey, 2002)

In 2010, Zhang and colleagues revisited the Friedman curve. In this multicentered retrospective study, the authors examined the labor patterns of over 62000 low-risk

women, showing that labor duration was longer than calculated when using the parameters of the Friedman curve. These results supported Zhang's previous research.

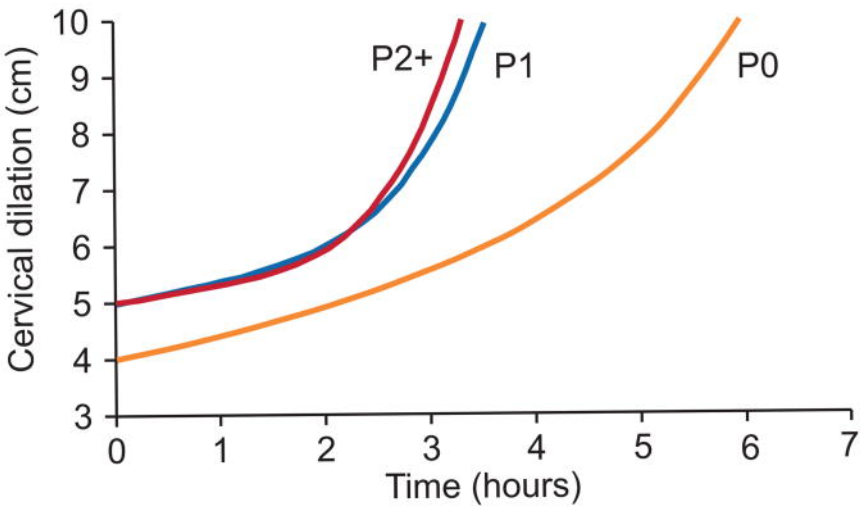


Fig. 3. Average labor curves by parity in singleton, term pregnancies with spontaneous onset of labor, vaginal delivery and normal neonatal outcomes. P0: nulliparas; P1: women of parity 1; P2+: women of parity 2 or higher. (Zhang et al., 2010)

Additionally, a significant number of women, particularly nulliparous women, experienced inconsistent patterns of labor during the active phase but were still able to achieve a successful vaginal delivery. The authors concluded that there is widespread variation up to 6 centimeters dilation. Zhang et al. (2010) also found that the active phase, the period of labor during which cervical dilation occurs rapidly, did not begin until after 6 centimeters dilation whereas Friedman's work defines the active phase as beginning at 4 centimeters dilation. Furthermore, the authors also found that until 6 centimeters dilation, a lack of cervical change for up to four hours did not negatively impact labor. Consequently, the authors proposed that 6 centimeters is a more accurate starting point for the active phase of labor. These findings are supported by the 2014 Obstetric Care Consensus statement (ACOG & SMFM, 2014). Lastly, Zhang et al. suggested that operative delivery prior to 6 centimeters dilation utilizing dystocia as a single indication may be premature (Zhang et al., 2010).

This body of evidence calls the Friedman curve into question in a profound way, particularly in the case of low-risk women giving birth for the first time. According to Boyle et al. (2013), from 2002-2008, 45.6% of women undergoing a primary CS were low risk primiparous women. Dystocia was cited as the cause for more than half (52.3%) of these CS deliveries (Boyle et al., 2013). Of the total number of women in the study having a primary CS, 42.6% of primiparous women and 33.5% of multiparous women did not progress beyond 5 centimeters dilation before having a CS. Using the newer guidelines from the 2010 Zhang et al. research, these women were still too early in their labor to be diagnosed with dystocia. Waiting until women dilate to at least 6 centimeters may have a measurable effect on the CS rate (Boyle, et al., 2013). As the research illustrates, there is a degree of subjectivity that leaves room for factors such as provider preference to play a role in whether a laboring woman receives a CS (Boyle et al., 2013; Declercq et al., 2013; Goer, Leslie, & Romano, 2007).

A reevaluation of the Friedman curve and its application for modern low-risk populations is critical to decreasing the primary CS rate in the US. Zhang et al. (2010) put forth a new partogram to be used in place of the Friedman curve. While the Friedman curve is based on the average labor, the 2010 partogram reflected the 95th percentile, accounting for the individualized route labors may follow (2010). As Zhang et al. (2010) advised:

> These findings point to the importance of separating an average starting point of active phase labor from a clinical diagnosis of labor arrest. Judging whether a woman is having labor protraction and arrest should not be based on a research definition of an average starting point or average duration of labor. Instead, an upper limit of what is considered "normal labor" should be used in patient management. As long as the labor is within a normal range and other maternal and fetal conditions are reassuring, a woman should be allowed to continue the labor process. (p. 4)

Revision of practice guidelines from average length of labor to maximum safe duration of labor has been supported by subsequent research (Neal, Lowe, Ahijevych, Patrick, Cabbage, & Corwin, 2011). The 2014 Obstetric Care Consensus released by ACOG and SMFM strongly recommended the retirement of the stringent Friedman curve in favor of accepting prolonged latent phase labor (greater than 20 hours in nulliparous women and greater than 14 hours in multiparous women); considering 6 cm dilation, rather than 4 cm dilation as the start of active phase labor, and allowing increased time for the active phase of labor before resorting to CS.

The Nursing Role in Primary CS Prevention

While the medical community addresses the limitations posed by the use of stringent labor curves and the subsequently elevated CS rate, nurses must come to a consensus on how best to address the excessive interventions that characterize obstetric care in the US. The vast majority of births take place in the hospital setting, and as the largest group of healthcare professionals, nurses are at the bedside for these births (Edmonds, Hacker, Golen, & Shah, 2016; Lyndon & Kennedy, 2010). Because every woman who gives birth in a hospital is cared for by a nurse, nurses have an excellent opportunity to effect positive change. However, the role of the nurse in the prevention of primary CS in low-risk women may not be immediately apparent.

A qualitative study by Edmonds and Jones (2012) examined labor and delivery nurses' perceptions of their ability to influence mode of delivery. The authors found experienced nurses were more confident in their ability to influence delivery mode, and utilized negotiation for more time as the primary strategy to improve chances for a vaginal birth. Prince and Armstrong (2015) evaluated a program put in place to empower nurses to decrease the primary CS rate on a labor and delivery unit in Virginia. Through nursing education, the adoption of hard-stop guidelines to prevent early induction, wireless fetal monitors to encourage freedom of movement through labor, the unit

reduced its primary CS rate by 12% in its first year of implementation. By August 2014, the unit's primary CS rate was 9%.

Nursing encompasses a variety of roles and responsibilities, one of which is, according to the American Nurses Association (ANA) is "[providing] health promotion, counseling and education" (ANA, 2016, para. 1). Because normal physiological birth is beneficial to mothers and infants (Cragin & Kennedy, 2006; Low, Seng, & Miller, 2008; Murphy & Fullerton, 2006; Romano & Lothian, 2008), supporting normal birth is a way for nurses to promote health.

The World Health Organization (WHO) has identified four practices that support normal birth (Chalmers & Porter, 2001; WHO, 1996), and Lamaze International identified two additional practices in 2004. Romano and Lothian adapted the care practices to nursing care in 2008. Utilizing these care practices as a road map, nurses can encourage normal physiologic birth in their professional and private lives.

Care Practice #1: Labor Begins on Its Own

Induction of labor is a procedure that stimulates uterine contractions prior to the natural beginning of labor, and often involves administration of intravenous oxytocin (Romano & Lothian, 2008). It has become a common intervention encountered in maternity care in the US today (Zwelling, 2008). There are evidence-based medical indications for induction, including post-term pregnancy (greater than 42 weeks gestation), preeclampsia, gestational diabetes, and premature rupture of membranes (ACOG, 2005). However, like CS, induction is also done for controversial reasons, such as patient and provider convenience (Zwelling, 2008). Induction can be the first step in the intervention cascade leading to CS, especially in nulliparous women or women whose Bishop score, indicating cervical readiness for birth, is low (Romano & Lothian, 2008; Zwelling, 2008).

Nurses are can support the care practice of labor beginning on its own by ensuring that women understand the potential consequences of induction. Though it is the

provider's responsibility to apprise the patient of the risks of a procedure, educating and providing information is a critical part of the nurse's role. Induction of labor may require formal informed consent, but policies are dependent on facility. Regardless of the facility policy, nurses are patient advocates and should prioritize patient understanding, including the risks as well as the benefits of intervention.

Care Practice #2: Freedom of Movement Throughout Labor

Most women in the US give birth in bed, either because of provider preference or because of routine medical interventions such as intravenous fluids or continuous fetal monitoring (Romano & Lothian, 2008). In *Listening to Mothers III* (*LTM III*), 67% of women reported receiving epidural anesthesia (Declercq et al., 2013). If a woman has an epidural, she is usually confined to the supine position even though it is not necessarily required (Goer & Romano, 2012; Romano & Lothian, 2008; Zwelling, 2008). However, study of cultures around the world demonstrates that most women, if left to move on their own, will change their position at will. Many give birth in less conventional positions such as squatting, kneeling, or on hands and knees, all of which assist with opening the pelvis. This freedom of movement helps labor progress and allows for greater comfort (Goer & Romano, 2012; Romano & Lothian, 2008; Zwelling, 2008).

Nurses can address freedom of movement throughout labor by getting involved in childbirth education. *LTM III* (Declercq et al., 2013), found that fewer women are attending childbirth classes, and according to Ross (2014) nurses perceive women as less prepared for birth. *LTM III* also linked decreased childbirth education rates to increased epidural rates It may be that if more women had an educated expectation of the rigors of labor, they would be more amenable towards non-pharmacological methods of pain management. Without an epidural for pain, women would be freer to move around, encouraging labor to progress naturally (Romano & Lothian, 2008; Zwelling, 2008). Nurses have a wealth of information to utilize for teaching classes and would make an excellent resource for expectant mothers.

Care Practice #3: Continuous Labor Support

Historically and elsewhere in the world, women are escorted through the birth process by other women (Hodnett, Gates, Hofmeyr, Sakala, & Weston, 2011; Jordan, 1980; Zwelling, 2008). Usually mothers and midwives filled this role (Jordan, 1980). In modern day America, formal labor support is rare. Nurses caring for more than one laboring patient cannot provide continuous 1:1 support. However, according to a systematic review analyzing data from over 15,000 women, 1:1 labor support is associated with a wide array of maternal benefits, including spontaneous vaginal birth, shorter labors, and decreased pain (Hodnett et al., 2011). Women with continuous support were less likely to report dissatisfaction, were less likely to have an instrumental vaginal birth, and were less likely to have a baby with a low 5-minute Apgar score. Additionally, women who had continuous support are less likely to have an unplanned CS (Hodnett et al., 2011). The study also showed that continuous support was most effective when provided by a doula, family member or friend, not a nurse (Hodnett et al., 2011). Hodnett et al. conclude that all women should have access to this type of support.

Nurses are not necessarily the most preferred or practical choice for labor support. According to Hodnett et al. (2011), nurses were preoccupied with equipment, especially fetal monitor strips, and nurses with more than one patient to care for cannot provide the targeted support that has been shown to be most beneficial. However, there are ways that nurses can support women during labor. In 2002, Miltner asked nurses to define the actions most critical for labor support. Nurses identified 55 discrete actions that supported labor, and distinguished between psychosocial care and clinical skills. Thus, nurses have the knowledge and experience to provide nuanced care for women during childbirth, but may not have the time to allocate to 1:1 care. Nurses can advocate for lower nurse-to-patient ratios so that they can be dedicated to individual patients. Furthermore, more research should be done regarding nursing responsibilities in labor

and delivery, and the division of time between providing direct patient care and monitoring technology.

Nurses can also promote continuous labor support by advising women to explore the possibility of utilizing a doula during birth. Doulas, birth companions trained to assist women during labor, are an option available to women who seek individualized support. However, although research has shown many benefits of doula care, including that women cared for by doulas are up to 80% less likely to have a non-indicated CS (Kozhimannil, Attanasio, Jou, Joarnt, Johnson, & Gjerdingen, 2014), most insurance companies do not completely cover their services. Research continues to examine ways to increase access to doulas, especially for low-income women (Kozhimannil et al., 2014; Kozhimannil, Vogelsang, & Hardeman, 2015). Increased access to doulas is a public health issue; every woman who wants doula support during birth should be able to have it (Lamaze Institute for Safe and Healthy Birth, 2009). Advocating for increased access to doulas and embracing the role of the doula for support in labor and birth is another way nurses can increase women's support during childbirth.

Care Practice #4: No Routine Interventions

This care practice may be the most salient for the purposes of this paper. CS is associated with specific interventions common in the cascade that occur once a woman arrives at the hospital in labor (Dahlen, Tracy, Tracy, Bisits, Brown, & Thornton, 2012; Rossignol, Chaillet, Boughrassa, & Moutquin, 2014). Preventing or slowing the intervention cascade is critical to lowering the CS rate. Romano and Lothian (2008) look at several routine interventions, including eating and drinking restrictions, intravenous fluids, continuous electronic fetal monitoring (CFM), augmentation of labor, and epidural anesthesia. Evidence shows that use of CFM correlates with increased CS (Alfirevic, Devane, & Gyte, 2013; Goer, Leslie, & Romano, 2007; Rossignol, Chaillet, Boughrassa, & Moutquin, 2014) and epidural anesthesia has also been associated with CS, especially

when administered prior to the active phase of labor (Bannister-Tyrrell, Ford, Morris, & Roberts, 2014; Rossignol, Chaillet, Boughrassa, & Moutquin, 2014).

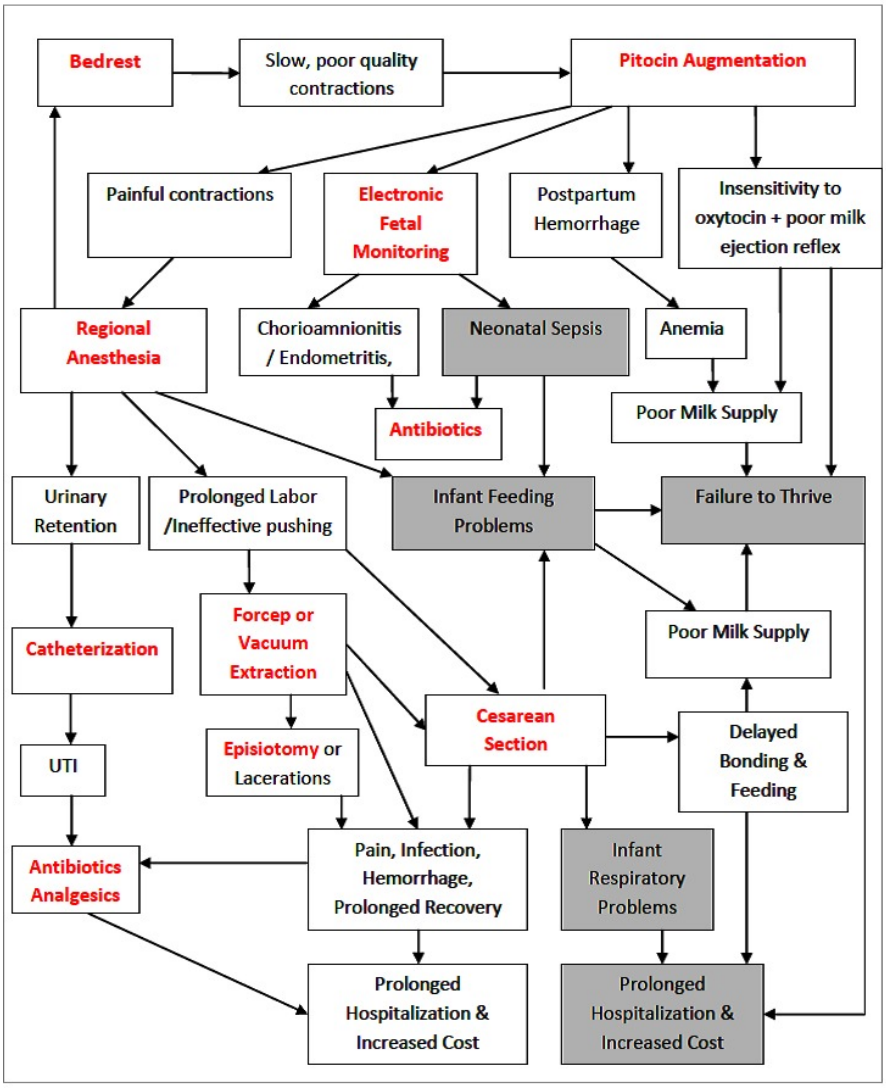


Fig. 4. An illustration of cascading events using bed rest as an intervention (Jansen, Gibson, Bowles, & Leach, 2013)

The nurse's role can be quite significant in determining the course of the birth process, including the intervention cascade. Because nurses monitor patients' progress and report to providers, they can have a great degree of autonomy in how they relay information. Edmonds and Jones (2012) interviewed labor and delivery nurses regarding communication with physicians. One nurse described the delicate process as follows:

> You learn over time sort of how you can . . . influence, sort of tailor your communication towards the particular physician because you know if you say one thing to a particular physician they're going to come in and say, "We're going to do a C-section right away," or had you just sort of let go or communicate a little bit different, you might buy the patient a little more time for sure. (p. 8)

In January 2016, Kim Mikes, Executive Director of Operations at the Women's Health Institute at Hoag Hospital in Newport Beach, California, was quoted in the New York Times as saying, "When the nurse is on phone to the doctor, it's important how they present it… It can be: 'She's not moving that fast,' or 'She's not moving as fast as I had hoped but I'm trying this and this.'" (Rosenburg, 2016).

Jansen, Gibson, Bowles, and Leach (2013) reviewed components in the intervention cascade, including bed rest, EFM, limited oral intake, frequent vaginal examinations, the use of Pitocin to induce or augment labor, amniotomy, regional anesthesia, catheterization, episiotomy, and CS. They recommended that nurses promote natural physiologic processes of birth and ensure that women understand the possible consequences of medical interventions. The authors also urge nurses to back policies that support normal birth and comprehensive informed consent.

Care Practice #5: Nonsupine Positions for Birth

As reviewed in Care Practice #2, most women who give birth in the hospital setting are confined to bed. In *LTM III*, 57% of women reported giving birth in a supine position, and an additional 35% reported giving birth in a semi-sitting position (Declercq et al., 2013). These statistics may be related to epidural rates; however, while traditional epidurals may require women to deliver in bed, "walking epidurals," a low-dose option available at many facilities, allow women more freedom of movement. Women who give birth without anesthesia have no medical reason to be bed-bound. Evidence shows that giving birth in upright positions is beneficial; this position allows gravity to help labor progress, opens the pelvis to ease fetal descent, increases the contractility of the uterus,

shortens labor, decreases incidence of severe pain, and decreases the likelihood of additional intervention (Priddis, Dahlen, & Schmied, 2012; Romano & Lothian, 2008; Zwelling, 2008).

Some evidence shows nurse resistance to upright positioning as one barrier to this care practice (Gilder, Mayberry, Gennaro, & Clemmens, 2002; Priddis, Dahlen, & Schmied, 2012). In interviews conducted by Gilder and colleagues, nurses cited fears regarding maternal hypotension and fetal intolerance of labor as reasons for discouraging women from giving birth in alternative positions. Research has shown that upright positioning is safe for women who have not received anesthesia (Priddis, Dahlen, & Schmied, 2012). Thus, one way for nurses to address this care practice is to examine their own preconceptions and educate themselves on the best evidence-based practice regarding birth.

Care Practice #6: No Separation of Mother and Baby After Birth

With the movement of birth from home to hospital over the last century, separation of mothers and newborns became the norm. Nurses often took infants after birth for washing and assessment. However, the Cochrane systematic review of early "skin-to-skin" contact between mothers and neonates demonstrated that this time is critical for bonding and initiation of breastfeeding (Moore, Anderson, Bergman, & Dowsell, 2012). This substantial evidence has given birth to new programs like the Baby-Friendly Hospital Initiative (BFHI), created by WHO and UNICEF. BFHI recognizes hospitals that support early contact between mothers and infants and breastfeeding practices through facility policies and overall "culture" (Baby Friendly USA, 2016). As of March 2016, 340 hospitals and birth centers in the US have adopted Baby Friendly measures, and 17.16% of all US births occur in Baby Friendly facilities (Baby Friendly USA, 2016).

Nurses have an important role to play in this care practice. Instead of assessing infants immediately after birth, and in doing so interrupting the critical period of

attachment and breastfeeding, nurses can encourage the skin-to-skin contact that is so beneficial for mothers and babies. Infants can be thoroughly assessed while being held by mothers, and nurses should feel comfortable gathering data during this time while supporting this contact. Nurses can also encourage their hospital or birth facility to pursue Baby Friendly accreditation.

Though the above care practices are most relevant to labor and delivery nurses, all nurses, regardless of specialty, have opportunities to promote normal birth. Nurses can encourage peers, colleagues, family, and friends to advocate for themselves during the birth process, make educated decisions, and seek providers whose philosophy aligns with their own. Nurse educators can get involved in childbirth education and provide patients with evidence-based information to empower them to make informed choices regarding their birth. Nurses who teach in higher education can inculcate nursing students with a respect for the process of physiologic birth, and impart the skills and attitudes support physiologic birth in clinical practice.

Nurses are the largest group of care providers in the US, and are on the front line, especially in maternity care. Nurses can make a difference both in their own practice and by changing the culture of their unit, facility, and community. However, while personal accountability is vital, widespread change depends on policy and programming at a facility, community, or government level.

Looking Forward

The Department of Health and Human Services (HHS) made the CS rate a public health priority in 2010 with the release of the *Healthy People 2020* objectives. At the time of the publication's release, the *primary* CS rate was 26.5% among low risk women and the repeat CS rate was 90.8% among low risk women. *Healthy People 2020* set a goal of 23.9% and 81.7% respectively (HHS, 2010).

The Joint Commission addressed the CS rate as well, and zeroed in on the primary CS as a critical factor. The Perinatal Care Measure 02 states:

> This measure seeks to focus attention on the most variable portion of the CS epidemic, the term labor CS in nulliparous women. This population segment accounts for the large majority of the variable portion of the CS rate, and is the area most affected by subjectivity. As compared to other CS measures, what is different about NTSV CS rate (Low-risk Primary CS in first births) is that there are clear cut quality improvement activities that can be done to address the differences. (The Joint Commission Specifications Manual)

The measure outlines strategies for CS reduction, such as improving the accuracy of practice guidelines for dystocia and fetal heart rate abnormalities.

The elevated CS rate is a complex issue with a host of interconnected causes. Because of this, reducing the CS rate will require a multipronged approach. Groups from the public and private sectors at facility and community levels must to come together to work toward this common goal. Targeting the primary CS rate specifically will consequently lower the overall CS rate, and so prevention of primary CS is especially critical (ACOG, 2014).

Some progress has been made toward reducing the CS rate. There are a variety of programs in development. Some address the elevated cost of CS, while others have been put in place to promote safe outcomes for mothers and newborns. Some offer specific incentives for decreasing CS rates, and one program even enlisted peer pressure as a strategy. Meaningful lessons can be learned from the following initiatives. However, all of these programs are in early implementation, so long term evaluation data is not yet available.

In Maryland, *HealthChoice*, a mandatory statewide managed care organization (MCO) through Medicaid, was evaluated as a strategy for reducing CS in 2008 (Misra). Because MCOs incentivize cost containment, they depend on providers discouraging the use of unnecessary and expensive services. In the case of low risk women, CS can be understood to be an overused, costly procedure. Results of this retrospective study

showed that while overall CS rates in Maryland increased during the program (1995-2000), rates of CS among HealthChoice enrollees increased at a significantly lower rate. Thus, while the CS rate increased in both groups, women enrolled in the MCO were significantly less likely to undergo CS (Misra, 2008).

California Maternal Quality Care Collaborative (CMQCC) in collaboration with Pacific Business Group on Health worked with insurance companies in 2014 to reform reimbursement so that hospitals receive the same payment for CS and vaginal birth. This program also added additional forms for physicians to fill out if recommending CS at less than 39 weeks gestation (Pacific Business Group on Health, 2015). The program enhanced patient education regarding risks of CS. Nurses received additional education regarding nonpharmacological management of labor and were rewarded with monetary bonuses for reducing CS birth (Pacific Business Group on Health, 2015). Laborists, physicians whose "sole focus of practice is managing the patient in labor" (Weinstein, 2003, p.310), were integrated to support VBAC births. The three participating facilities decreased their low-risk CS rate by an average of greater than 20% within four months, and all hospitals sustained that reduction for 12 months. Each hospital had a low-risk CS rate lower than 25% in 2015. These changes resulted in a savings of close to two million dollars (Pacific Business Group on Health, 2015).

One of the hospitals involved in the CMQCC program described above instituted a controversial policy in an attempt to further reduce CS rates. In 2012, Hoag Memorial Hospital Presbyterian had a total CS rate of 38%, significantly higher than the state and national rates. To encourage providers to think critically about recommending CS, the hospital tracked each physician's CS rate and shared the data publicly. Physicians cited peer pressure as a factor in reducing the CS rate. They also said that this policy made them more likely to allow women to labor for longer before declaring a CS was indicated. This change in attitudes is critical for CS rate reduction. As Dr. Allyson Brooks,

Executive Medical Director of the Hoag Women's Health Institute commented, "Hospitals don't do C-sections, doctors do." (Gorman, 2015).

The American College of Nurse-Midwives (ACNM) has recently introduced the Reducing Primary Cesareans (RPC) project. The RPC project is part of the ACNM Healthy Birth Initiative (HBI), which encourages evidence-based promotion of normal physiologic birth. Twenty one hospitals will be working with ACNM to implement practice "bundles," standardized, research-based action steps to prevent primary CS. There are currently three bundles: Improving Care and Comfort in Labor, Promoting Spontaneous Progress in Labor, and Implementing Use of Intermittent Auscultation as the Standard for Fetal Assessment. Participating hospitals will work with ACNM staff to collect data and evaluate implementation. This program is funded by the Transforming Birth Fund, a subset of the New Hampshire Charitable Fund (ACNM, 2016).

Conclusion

The time has come for a reevaluation of childbirth care in the US. As more and more research demonstrates the benefit of allowing labor to run its course, changes in practice must follow. Already, new guidelines promoting physiologic birth have been released by ACOG, SMFM, and ACNM, and these research-based recommendations further support existing data.

With the implementation of programs such as HealthChoice, the CMQCC initiative, and ACNM's RPC program, new strategies are being utilized to address this issue. Both the total CS rate and the primary CS rate have leveled off since their precipitous rise throughout the last two decades, and with increased public and private focus on CS rates, it is possible that these rates will fall further in the next several years.

However, as stated previously, it will take consistent, deliberate, dedicated partnership among agencies, non-profit organizations, facilities, and staff, including nurses, to ensure that these changes are effective and lasting. Provider attitudes will have to adapt to new evidence, and facility culture and policy must also evolve to support

normal birth. As the CMQCC program shows, insurance reform may be an important factor in decreasing the CS rate. Lastly, the ACOG consensus statement also recommends tort reform to address relationships between malpractice litigation and CS (2014). Nurses, as the largest group of healthcare workers in the US and front line care providers, are well-placed to role model evidence-based childbirth care. With collaboration on these fronts, the future is bright for healthy birth in the US.

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