

# Improving Maternal & Neonatal Outcomes



Fall 2013

This toolkit represents a collaborative effort among the Washington State Health Care Authority, the Optimizing Birth Outcomes Workgroup, and the Center for Evidence-based Policy at Oregon Health & Science University. The toolkit was developed and reviewed by these stakeholders and other content area experts.

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Nearly one third of all U.S. women are giving birth by Cesarean, and an ever increasing number are undergoing induction of labor and Cesarean deliveries. Our challenge, as health practitioners, has been to understand the variations in clinical practices that are affecting the decision to perform a Cesarean delivery.

We simultaneously seek to improve the quality of care and reduce unnecessary care, including Cesarean deliveries. According to a 2009 report on Maternal and Neonatal Outcomes of Elective Induction of Labor from the Agency for Healthcare Research and Quality (AHRQ), labor inductions increased from 9.5% in 1990 to 22.1% in 2004. This increase occurred without a clear understanding of the medical need or rationale and without any associated improvement in outcomes. Medicaid covers over 40% of all births nationally. State and federal insurance programs work closely with community clinicians and facilities to provide maternity services. It is clear that ensuring access, improving quality, and promoting cost efficiency are best achieved when we use the best available evidence to guide care. Using data to highlight variations in care can help identify opportunities for improvement. There are multiple reports documenting associations between labor and delivery practices (i.e. elective delivery without a medical indication) and maternal and neonatal morbidity. We must both monitor and find “best practices,” and actively engage in discussions of why there are unnecessary variations in care.

A clear, user-friendly guide to current evidence of practices that can improve the quality of care and outcomes is required. Evaluating data for benchmarking outcomes and examples of best practices will allow us to continuously improve. This toolkit brings together a set of resources sponsored by the Washington State Health Care Authority and the Center for Evidence-based Policy at Oregon Health & Science University. This toolkit will help to make maternal and infant care more evidence-based, transparent, consistent, and measured to reduce variation in care across Washington State. Additionally, we hope this toolkit will help to forge stronger partnerships between obstetricians, family medicine physicians, midwives, and hospitals in order to:

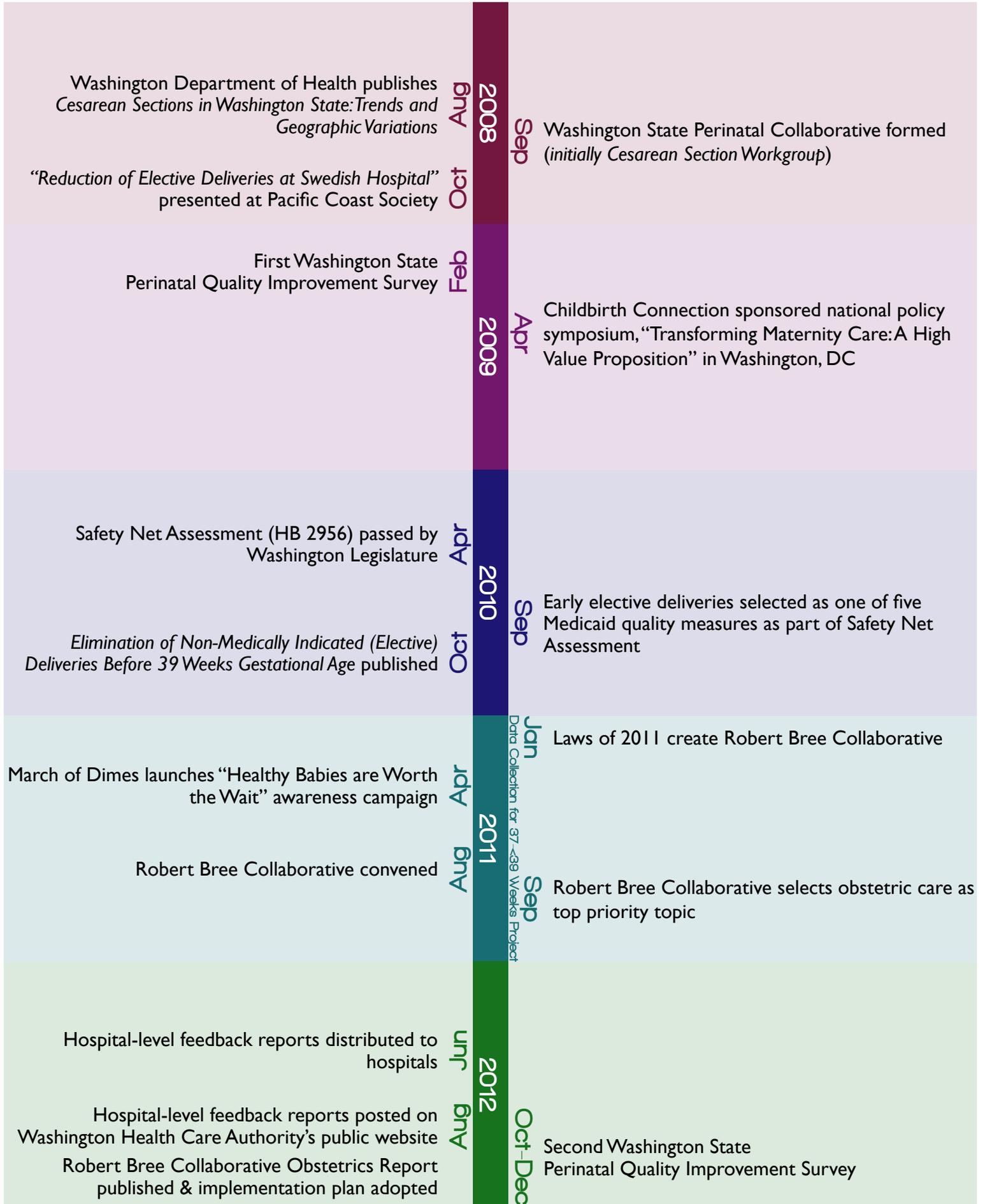
- Bring the best, most current evidence to providers and care systems for the women and infants of Washington State
- Challenge providers, hospitals, and systems to measure, compare, and improve to the greatest extent possible
- Embrace measurement to make our healthcare system sustainable
- Share learning and experience with others so we are all able to improve

We hope that this document assists you in your work to improve the health of mothers and infants in your community.

**Daniel Lessler, MD, MHA**  
Chief Medical Officer

*Washington State Health Care Authority*

**Figure I.1. Washington State Timeline of Change Activities, 2008-2012**



This toolkit contains data, evidence-based strategies and change management techniques to aid nurses, midwives, doctors, hospitals, and health systems to reduce Cesarean deliveries and improve the quality and cost-effectiveness of maternity care. The increase in Cesarean deliveries in the U.S. represents a major public health concern, due to both the high cost and poor health outcomes associated with non-medically indicated Cesarean births (Moczygamba et al., 2010; De Luca, Boulvain, Irion, Berner & Pfister, 2009; Kuklina et al., 2009; Russo et al., 2009; Liu et al., 2007).

The **Epidemiology of Cesarean Birth** section frames the problem for both Washington State and the nation as a whole. Although the Cesarean delivery rate in the state of Washington is roughly three percentage points lower than the national average, it increased by 73% between 1996 and 2009, one of the highest rates of change nationally (Menacker & Hamilton, 2010). Major contributors to this increasing rate of Cesarean deliveries include “elective” induction of labor, primary Cesareans for low-risk births, and failure to attempt a trial of labor after a previous Cesarean birth. Other potential drivers of the increase in Cesarean deliveries include changing thresholds for various indications, changing maternal demographics, provider and maternal preferences, the medico-legal environment and payment incentives. Multiple factors drive the rates of Cesarean deliveries, and each institution will have areas more amenable to change. Relating your institution’s experience to the data provided in this section of the toolkit can help target efforts to make the greatest impact.

The evidence in the **Evidence-based Strategies** section is intended to help clinicians and institutions select prenatal and intrapartum strategies that have been demonstrated to be effective in reducing unnecessary Cesarean deliveries. These include: turning breech fetuses, delay of admission until active labor has started, encouraging labor after Cesarean, avoiding non-indicated induction of labor, providing continuous support in labor, using intermittent fetal monitoring techniques, promoting and providing pain management alternatives during labor, and giving labor more time. Also provided in this section is a summary of evidence-based system-level strategies,

such as audit and feedback, quality improvement methodologies, and multifaceted approaches that can be employed to implement selected clinical interventions.

Following the evidence sections, the toolkit reviews case studies and models for effecting change. The **Innovative Models** section includes examples of several organizations that have undertaken efforts to improve maternal and neonatal outcomes. Their goals, tactics, challenges and successes are described in this section via case studies. In **Managing Change**, a conceptual model is provided for managing change. This section describes the optimal change-oriented environment adapted from Six Sigma—a quality improvement methodology already widely in use in many health systems. This environment is conducive to lasting change due to support from senior executives, involvement of individuals serving as change facilitators, uniform measurement, communication and training, and reward and recognition. Finally, the Model for Improvement and associated Plan-Do-Study-Act (PDSA) cycles are explained both in narrative and via a case study on turning breech babies, one of the evidence-based strategies described in the toolkit.

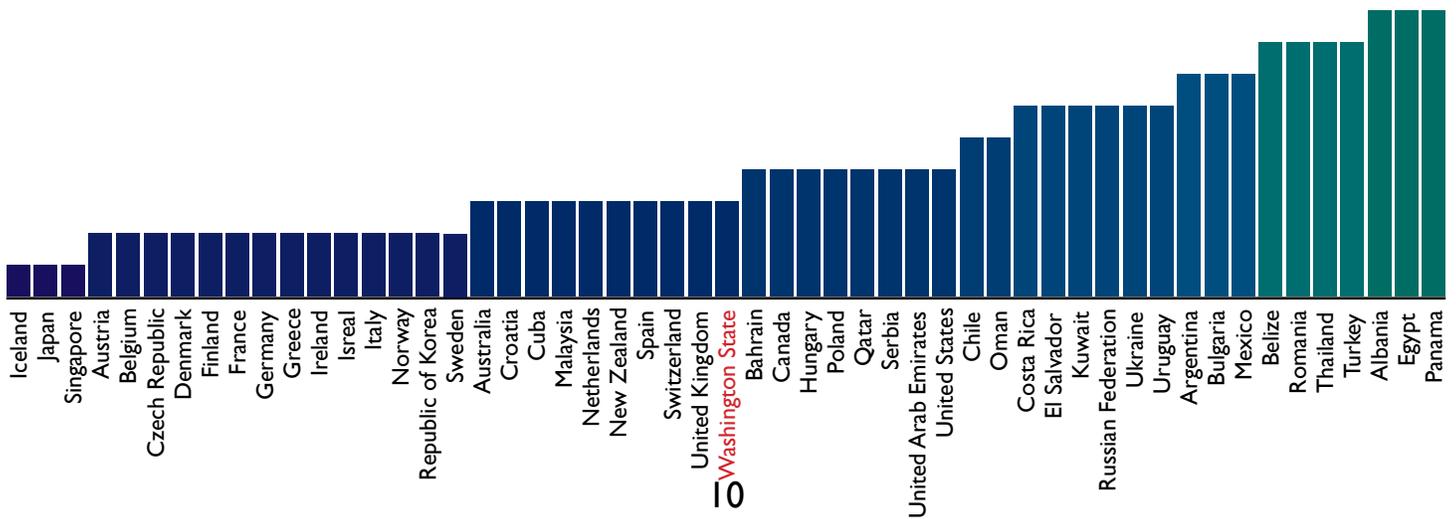
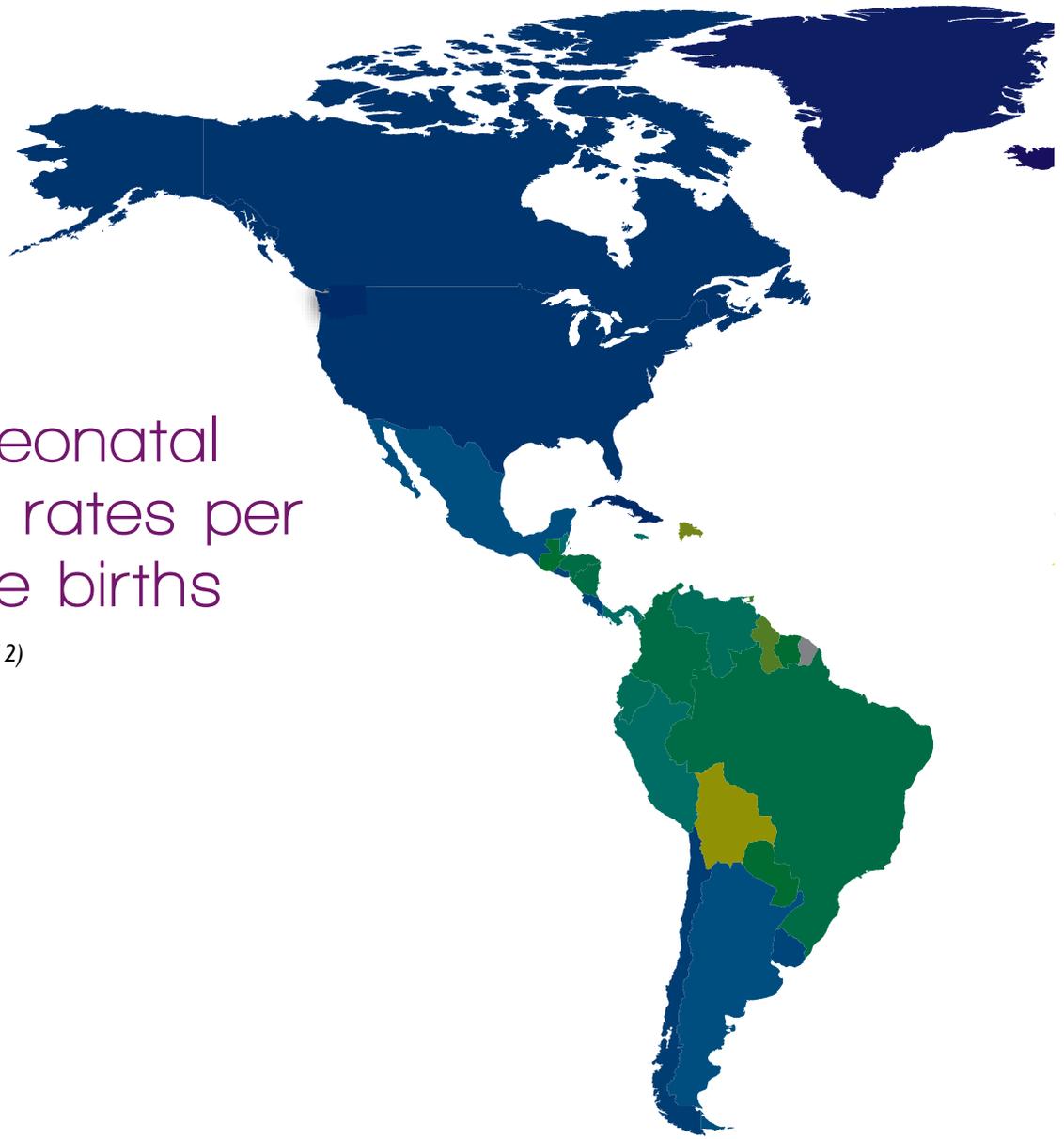
The final portion of this toolkit includes additional resources and tools, including links to both clinician and women and family focused products in the **Resources** section, as well as example forms for adaptation and use in your setting in the **Templates & Tools** section. The **Appendices** include data and performance measure definitions, lists of useful websites and sample forms for quality improvement initiatives.

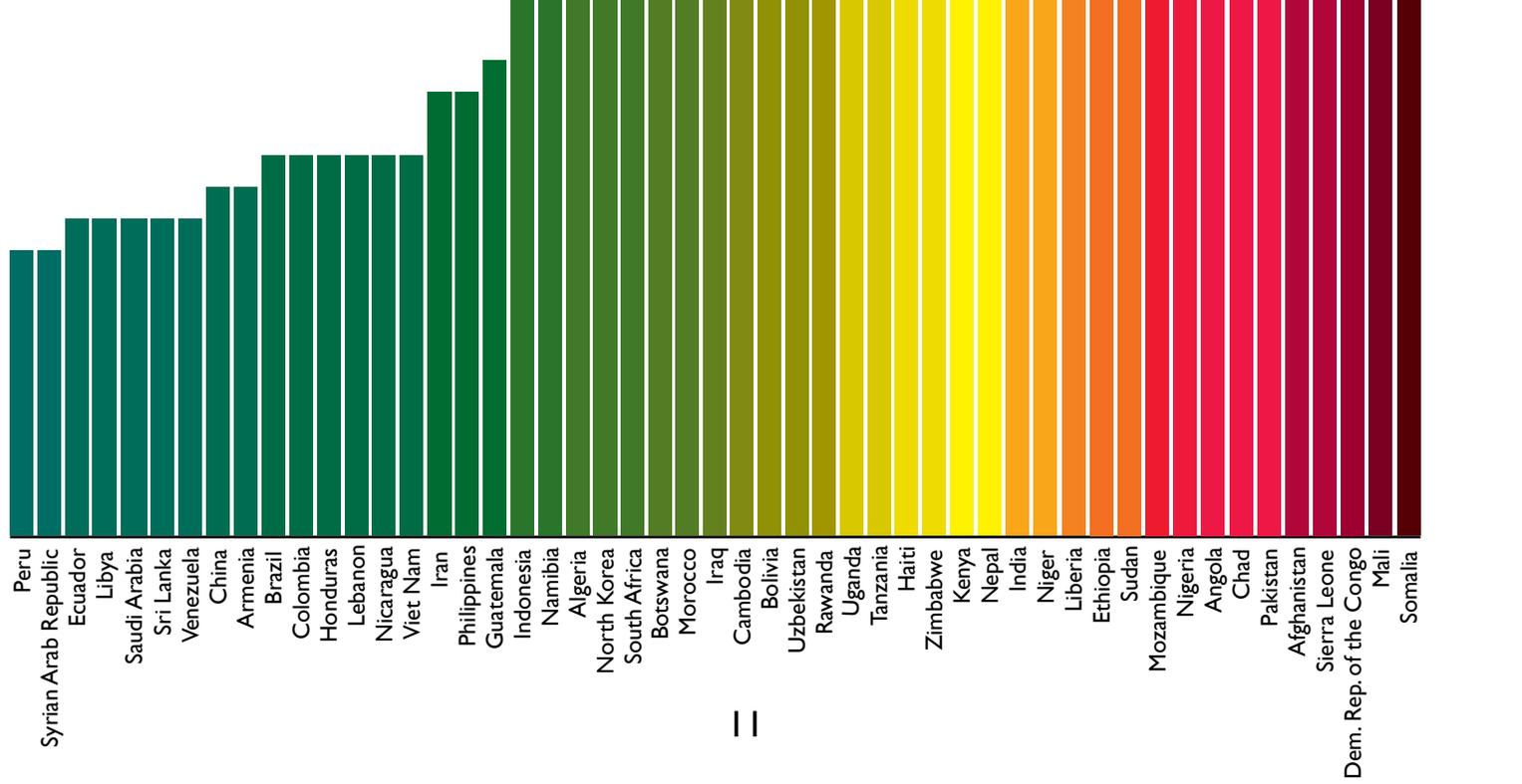
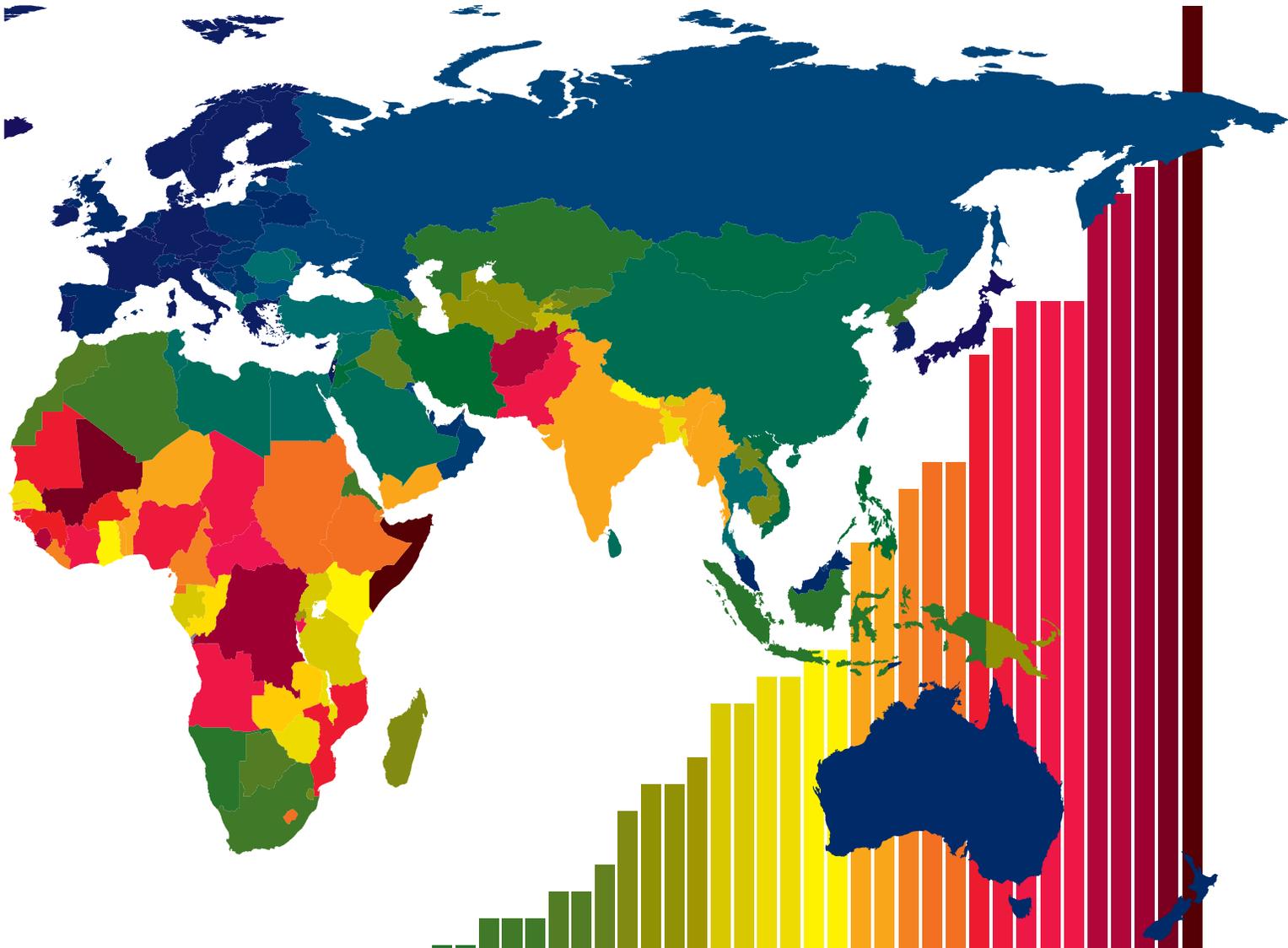
# Section 1. Introduction



# Global neonatal mortality rates per 1,000 live births

(WHO, 2012; Cawthon, 2012)





# 1. Introduction

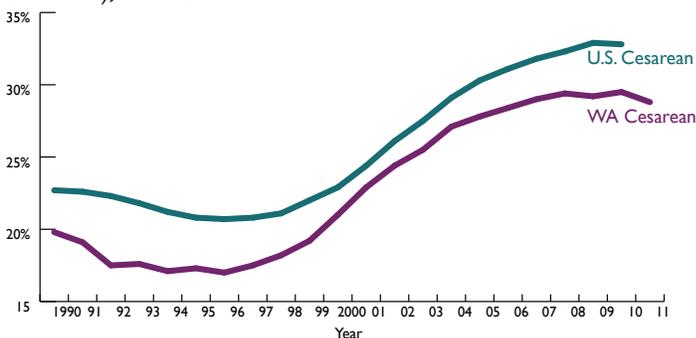
## *Epidemiology of Cesarean Birth*

*Since 2005 Cesarean births have accounted for at least 30% of all U.S. births (Menacker & Hamilton, 2010)*

The Agency for Healthcare Research and Quality (AHRQ) reported that Cesarean deliveries increased more than 50% between 1997 and 2006, and had become the most commonly performed operating room procedure in the U.S. (Russo, Wier & Steiner, 2009). While there is large variation both geographically and among different types of providers, the potential for adverse maternal and neonatal health outcomes and high costs associated with Cesarean delivery have been growing public health concerns (Moczygemba et al., 2010; De Luca et al., 2009; Kuklina et al., 2009; Russo et al., 2009; Liu et al., 2007). Despite increased risks of infection, hemorrhage, bladder injury, and downstream sequelae (Clark, Belfort, Byrum, Meyers & Perlin, 2008), until recently, Cesarean birth rates had been steadily increasing in the U.S. In 2010 the Centers for Disease Control and Prevention (CDC) reported a slight decline in the Cesarean delivery rate from 32.9% in 2009 to 32.8% (Martin, 2012). Whether this dip represents a trend is yet to be seen, and the figure remains well above the Healthy People 2020 goal of 23.9% for Cesarean delivery among low-risk women with term singleton fetuses in vertex presentation with no prior Cesarean births (DHHS, 2012).

Cesarean delivery rates in Washington State have been consistently lower than in the U.S. as a whole (Menacker & Hamilton, 2010). However, both rates began increasing in 1996, and increases were largely consistent across subgroups by age, race, and ethnicity (Menacker & Hamilton, 2010). In 34 states, Cesarean delivery rates increased 50% or more between 1996 and 2009. Washington's Cesarean delivery rate increased 73% between 1996 and 2009, the second highest rates of change nationally (Menacker & Hamilton, 2010).

Figure 1.3. U.S. & Washington Cesarean Delivery Rates (percent of live births), 1990-2011



Source: DSHS RDA First Steps Database analysis of national birth records from NCHS and Washington State birth records from DOH Center for Health Statistics (CDC, 2012; WA DOH, 2012)

A complex interplay of factors is responsible for increases in Cesarean delivery. Contextual factors including liability concerns, hospital economics, and payment strategies may be less amenable to intervention than are clinical practices (Main et al., 2011; Guise et al., 2010). Identifying measurable modifiable factors and utilizing evidence-based approaches to incite change are critical to reducing Cesarean delivery rates and mitigating the associated risks. The next sections will focus on some of the key modifiable factors contributing to increased Cesarean rates, namely, increased non-medically indicated inductions of labor (eIOL), decreased trial of labor (TOL), and vaginal birth after Cesarean (VBAC).

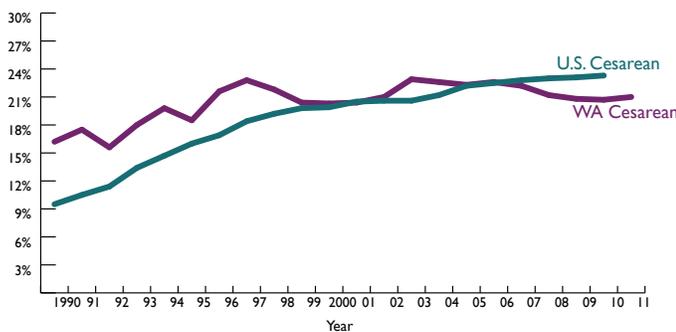
### Elective vs. Medically Indicated Induction of Labor

Much of the increase in Cesarean deliveries over the past two decades has been attributed to rising rates of not medically indicated, or “elective,” inductions (eIOL) (Martin & Foley, 2006). Induction rates across the U.S. have increased substantially at all gestational ages, including preterm (less than 37 weeks of gestation) and late preterm (34 through 36 weeks of gestation) (Martin et al., 2009). Between 1990 and 2009 the proportion of U.S. births from induced labor more than doubled (9.5% to 23.1%)

with substantial variation across states (King, Pilliod & Little, 2010; Sakala & Corry, 2008). It is not known what proportion of induced labors are elective. However, the overall rate of induced labor has risen faster than the rate of medically indicated IOL and it is therefore plausible that increasing eIOL rates account for the remainder (King et al., 2010; MacDorman, Mathews, Martin & Malloy, 2002; Zhang, Yancey & Henderson, 2002). A growing body of evidence has demonstrated attainable decreases in eIOL rates without corresponding increases in maternal or neonatal morbidity and mortality (Clark et al., 2010; Oshiro, Henry, Wilson, Branch & Varner, 2009; Reisner, Wallin, Zingheim & Luthy, 2009).

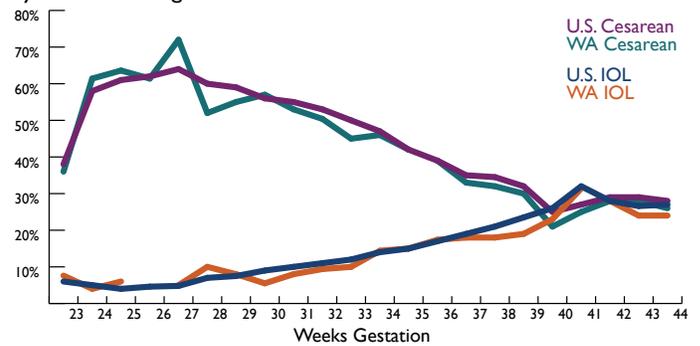
In 1990, the rate of induced labor in Washington State (16.2%) was higher than that for the U.S. as a whole (9.5%). However, the rate in Washington State began to decline in 2007 and was lower than the U.S. national average. Since 2009, Washington State's IOL rate has remained below 21% (Figure 1.4) and total IOL and Cesarean delivery rates trend closely with those of the rest of the nation (Figures 1.4 and 1.5).

Figure 1.4. U.S. & Washington Total Induction Rates (percent of live births with induced labor), 1990-2011



Source: DSHS RDA First Steps Database analysis of national birth records from NCHS and Washington State birth records from DOH Center for Health Statistics (CDC, 2012; WA DOH, 2012)

Figure 1.5. U.S. & Washington Induction of Labor & Cesarean Rates by Gestational Age



Source: DSHS RDA First Steps Database analysis of national birth records from NCHS and Washington State birth records from DOH Center for Health Statistics (CDC, 2012; WA DOH, 2012)

Between 1990 & 2009 the proportion of U.S. births from induced labor more than doubled

The willingness of providers to induce at earlier gestational ages appears to have shifted for both medically indicated inductions and those without a firm medical indication (Engle & Kominiarek, 2008). Small changes in thresholds for IOL can dramatically increase the number of women who undergo IOL because both the procedure itself and its "soft" indications are common. Therefore, increases in inductions without a compelling medical indication may also be a driver for increased rates of Cesarean delivery (Engle & Kominiarek, 2008; Moore & Rayburn, 2006).

Use of induction, particularly among nulliparous women and those without a favorable (ready for labor) cervix, is associated with increased use of health care resources, longer labors and increased use of Cesarean delivery (Grobman, 2007). Neonatal mortality has been shown to be significantly higher for infants of women induced, whether at term or prior to 37 weeks, even after controlling for both sociodemographic and medical risk factors (MacDorman et al., 2002). In contrast, perinatal mortality after IOL for post-term inductions in this same analysis demonstrated a statistically significant decrease (MacDorman et al., 2002).

Elective or non-medically indicated IOL presents a targetable measure well-suited to intervention and has been demonstrated in numerous studies to safely reduce the unnecessary Cesarean delivery rate. Additionally, maternity care change leaders throughout the U.S., in a variety of care settings, have documented sustainable improvements in Cesarean delivery rates employing targeted interventions through continuous quality improvement strategies (Clark et al., 2010; Reiser et al., 2009; Oshiro et al., 2009).

## Primary Cesarean

There is some agreement that the increasing primary Cesarean rate and decreasing vaginal birth after Cesarean (VBAC) rate are key drivers in the rise of the overall Cesarean delivery rate.

*The Healthy People 2020 goal is a 23.9% Cesarean delivery rate for low-risk women with term, singleton fetuses in vertex presentation with no prior Cesarean births (U.S. DHHS, 2012)*

Main and colleagues (2011) noted that the greatest contributor among all Cesarean indications is a prior Cesarean delivery, and over 90% of women with a previous Cesarean are likely to have a repeat Cesarean (Main et al., 2011). Another study of documented indications for primary and repeat Cesareans found that 50% of the Cesarean rate increase was attributable to increasing primary Cesarean deliveries (Barber et al., 2011). Decreasing the primary Cesarean rate would have the largest impact on the overall Cesarean delivery rate.

## Vaginal Birth After Cesarean

In the mid-1990s, the American Congress of

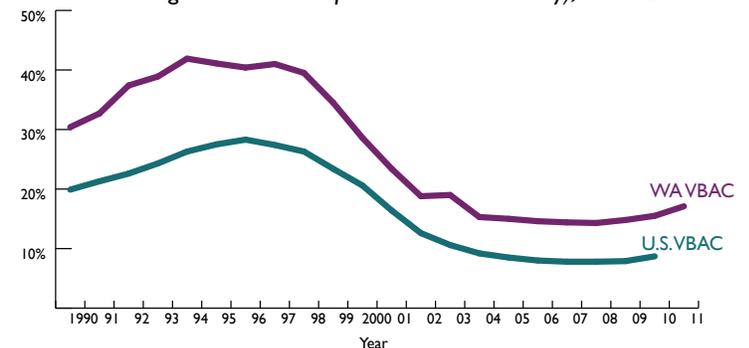
*The Healthy People 2020 goal is an 18.3% VBAC rate for low-risk women with term, singleton fetuses in vertex presentation with a prior Cesarean birth (U.S. DHHS, 2012)*

Obstetricians and Gynecologists (ACOG) recommendation for trial of labor after previous Cesarean birth added requirements for hospital resources to

respond to acute intrapartum obstetric emergencies and increase the availability of personnel capable of performing Cesarean delivery (ACOG, 1995). Concerns over liability and logistics of providing “immediately available” resources, including anesthesia services, for emergency Cesareans reduced the number of hospitals offering planned VBAC services and limited women’s access, particularly in smaller or more remote hospitals (Roberts, Deutchman, King, Fryer & Miyoshi, 2007). Updated VBAC recommendations issued by ACOG in 2010 specified that rural hospitals could offer trial of labor after Cesarean (TOLAC) without surgical staff immediately present if patients were adequately informed and willing to accept an increased level of risk (Leeman & King, 2011; ACOG, 2010).

Washington State’s VBAC rates parallel national rates, but have been higher than the national average (see Figure 1.6). After peaking at 41.9% in 1994, VBAC rates in Washington State declined until 2009, and have demonstrated a slight increase since that time. National rates have remained at approximately half of Washington State’s.

Figure 1.6. U.S. & Washington VBAC Rates (percent of vaginal deliveries among women with a prior Cesarean delivery), 1990-2011



Source: DSHS RDA First Steps Database analysis of national birth records from NCHS and Washington State birth records from DOH Center for Health Statistics (CDC, 2012; WA DOH, 2012)

## Subjective vs. Objective Indications

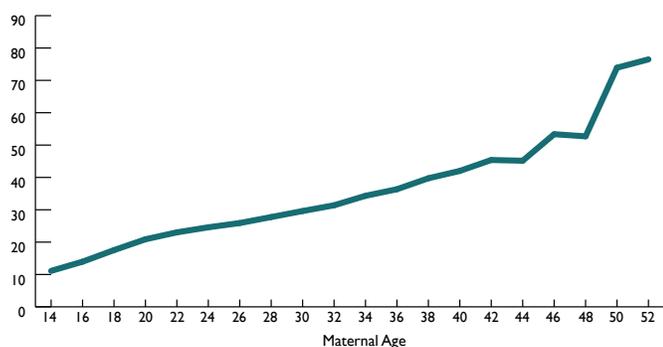
Barber and colleagues (2011) examined documented indications for primary and repeat Cesarean deliveries in their 2011 study, and found that 50% of the Cesarean delivery rate increase was attributable to an increase in primary Cesarean deliveries. The authors examined indications for Cesarean delivery, and found that the most common were non-reassuring fetal heart status (32%) and labor arrest (18%). The study concluded that more subjective

indications (non-reassuring fetal heart status, arrest of dilation) contributed to a greater proportion of Cesarean deliveries than did more objective indications, such as malpresentation.

## Changing Demographics

Changing maternal demographics such as increased age and obesity (commonly measured by the Body Mass Index, or BMI) affect Cesarean delivery rates. There is a strong association between high pre-pregnancy BMI and unfavorable pregnancy outcomes. One study noted that obese women were more likely to experience Cesarean deliveries than their normal weight counterparts. Women with a BMI between 30 and 40 (meeting the definition of obesity) were twice as likely, and women with BMI greater than 40 were three times as likely to experience a Cesarean birth (Chung et al., 2012). Increasing age is also recognized as a risk factor for Cesarean (Figure 1.7), but the reasons behind this are not fully understood (Bayrampour & Heaman, 2010).

Figure 1.7. Cesarean Delivery Rates in Relation to Maternal Age



Source: DSHS RDA First Steps Database analysis of national birth records from NCHS and Washington State birth records from DOH Center for Health Statistics (WA DOH, 2012)

## Maternal Preference

There is not widespread agreement about the role of maternal preference in driving current rates of Cesarean delivery. Researchers have suggested that women's perceptions of the safety of elective IOL may not be accurate and may contribute to increased patient demand for the procedure (Goldenberg, McClure, Bhattacharya, Groat & Stahl, 2009). Wax, Cartin, Pinette, and Blackstone (2004) noted that primary elective Cesarean delivery comprised between 4-18% of all Cesarean deliveries and

between 14-22% of elective Cesareans, largely due to patient fear of childbirth. Childbirth Connection's "Listening to Mothers" Survey found little evidence that women were requesting elective Cesareans in large numbers and cited that one quarter of women undergoing Cesarean delivery reported being pressured by a health professional to do so (Declercq, Sakala, Corry & Applebaum, 2006). However, Barber and colleagues (2011) reported that while maternal request did not contribute a large percentage of the increase in the overall Cesarean rate, it was the most rapidly increasing contributor to indications for Cesarean delivery.

## Medico-Legal Environment & Payment Incentives

Murthy, Grobman, Lee and Holl (2009) have reported that rising provider insurance premiums were correlated with increases in inductions for late preterm women, and that for every additional \$10,000 paid in malpractice insurance inductions increased significantly.

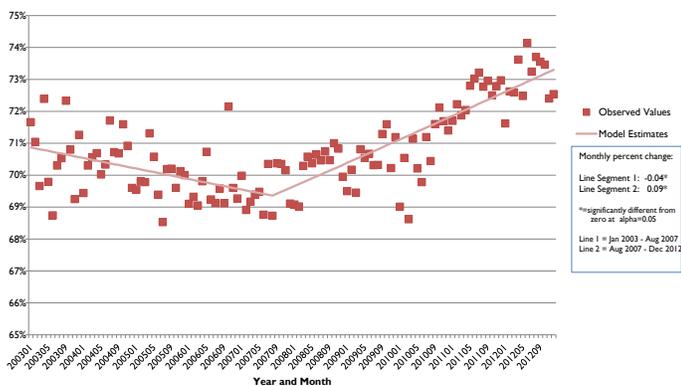
Payment models may also contribute to rising Cesarean delivery rates. Healthcare providers are motivated to deliver their own patients, as global fee reimbursement for maternity care is based on attendance at delivery. Providers are financially incentivized to deliver on their shift in order to be compensated for their time-intensive investment. As providers are paid based on the actual delivery, they may be less likely to tolerate longer labors and may move a patient towards Cesarean or toward interventions that carry a higher risk of Cesarean birth (Main et al., 2011).

## Efforts in Washington State

Washington State's 2011 efforts to eliminate non-medically indicated deliveries from 37 to less than 39 weeks gestation relied on data, a community dialogue to better understand variation and trends, and financial incentives to hospitals. Encouraging reductions in early term deliveries is emerging as a priority throughout Washington State and the U.S., with initiatives like CMS' *Strong Start* and March of Dimes' *Healthy Babies Are Worth the Wait*®. As shown in Figure 1.8, the increase in the proportion

of births at 39-41 weeks gestational age among all term births reached a low point in Washington State in mid-2009, prior to the start of organized statewide improvement efforts. Since 2009, the proportion of late term births has steadily increased, with corresponding reduction in the proportion of early term births. The statistically significant upward trend continues after the commencement of the Washington State Medicaid Quality Incentive initiative, which was part of the 2010 Safety Net Assessment legislation (RCW 74.60).

Figure 1.8. 39+ Weeks Gestation as a Portion of All Births 37-41 Weeks in Washington (non-military hospitals), 2003-2012



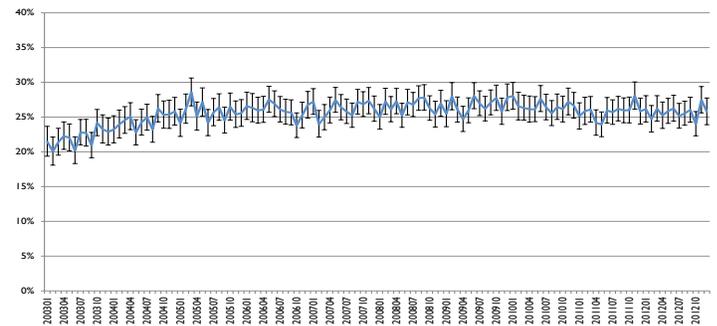
Birth Certificate Data for 2012 are preliminary. Limited to live births 37 through 41 weeks gestation. '39+ Weeks Gestation' means at least 39 completed weeks gestation. Model statistics were determined using the Joinpoint Regression Program, Version 3.5.4, August 2012; Statistical Research and Applications Branch, National Cancer Institute.

Source: DSHS RDA First Steps Database analysis of national birth records from NCHS and Washington State birth records from DOH Center for Health Statistics (WA DOH, 2012)

Figure 1.9 illustrates that the Cesarean birth rate remains relatively unchanged, based on birth certificate data. Washington State has conducted a pilot validation study of nulliparous, term, singleton, vertex (NTSV) rates from birth certificate data compared to hospital administrative data, or medical records, at five Washington hospitals. This study showed that NTSV Cesarean delivery rates based on birth certificate data are comparable to those based on medical records/administrative data, and that neither in aggregate, nor for any individual hospital, did the differences between birth certificate and chart abstraction/administrative data approach statistical significance (Cawthon, 2011). Figures 1.8 and 1.9 illustrate positive changes which appear to be maintained thus far. It remains to be seen how much further improvement can be achieved in shifting early term deliveries to late term deliveries and to what

extent focused interventions to reduce Cesarean deliveries planned to begin in 2014 will reduce the NTSV Cesarean delivery rate. This toolkit is a first step in supporting targeted improvement initiatives in this area.

Figure 1.9. Washington State NTSV Cesarean Birth Rates (non-military hospitals), 2003-2012



Birth Certificate Data for 2012 are preliminary. NTSV data exclude records with unknown characteristics of labor and delivery and cases where mother was transferred to higher level care for maternal medical or fetal indicators for delivery, or where intended place of birth was other than hospital.

Source: DSHS RDA First Steps Database analysis of national birth records from NCHS and Washington State birth records from DOH Center for Health Statistics (WA DOH, 2012)

## Moving Forward

Many factors contribute to the current use of Cesarean delivery, some of which are more amenable to change than others. In the **Evidence-based Strategies** section, antepartum and intrapartum interventions are examined in detail to help determine where efforts may most prudently be directed in your community of institution to reduce Cesarean deliveries.

Nationally, multiple institutions of varying size and organizational structure have demonstrated that Cesarean delivery rates can safely and successfully be lowered by reducing non-medically indicated IOL. Washington State has already shown progress in reducing elective inductions between 37 and less than 39 weeks gestation. The following sections address this and other evidence-based strategies for reducing Cesarean deliveries, and introduce innovative models nationwide that have sustained change, primarily through reduction of non-medically indicated early delivery. The methods utilized by the highlighted institutions to achieve change are applicable to other change initiatives to reduce Cesarean delivery.

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## Section 2. Evidence-based Strategies



## 2. Evidence-based Strategies

### *Evidence-based Medicine*

*"It ain't what people don't know that hurts them, it's what they know that ain't so."*

— Mark Twain

As the field of health care continues to evolve and expand with innovations and new technologies, providing excellent patient care requires a balance of clinical expertise and utilization of the best available evidence. The Institute of Medicine (IOM) (McClellan, McGinnis, Nabel & Olsen, 2008) considers evidence-based health care an appropriate combination of clinical knowledge and experience, best available evidence, and consideration of unique patient needs and preferences which results in improved decision making. This section aims to bolster the clinical experience you already have with evidence about the effect of various interventions and strategies on the risk of Cesarean birth. While Cesarean operations can improve the health of both mothers and infants when required, they are often performed for subjective indications (Sakala & Corry, 2008). The large increases in the use of Cesarean delivery over the past decades have not been accompanied by corresponding improvements in the health of mothers and infants (Clark, Gelfort, Hankins, Meyers & Houser, 2007; Althabe et al., 2006). In these circumstances the risks of Cesarean birth exceed those of vaginal delivery and also carry future health consequences such as abnormal placental position and growth, and the risks of future surgery (Guise et al., 2010; NIH, 2010).

It is important to remember that when there is no defined benefit to an elective intervention, any harm arising from it is completely preventable. When an intervention is applied electively, it needs to be held to a higher standard since it is not being applied to correct or treat a condition. For example, elective delivery prior to the onset of spontaneous labor may carry risks of Cesarean delivery for the mother as well as shorter and longer term risks for the infant. There are numerous data indicating that late preterm infants are more likely to suffer long term medical, behavioral and educational problems (Raju, 2006). However, mounting data also indicate that infants born at term also suffer consequences from earlier

delivery. Kirkegaard and colleagues (2006) studied the school performance of children age 9 to 11 and found that reading and spelling difficulties were lowest when children were born after 39 weeks of gestation. Similarly, Nobel and colleagues (2012) found that there was a steady increase in reading and math scores in the third grade for infants born at gestational ages between 37 and 41 weeks.

In their 2008 landmark White Paper, *Evidence-based Maternity Care: What it is and What It Can Achieve*, written for The Milbank Memorial Fund, The Reforming States Group and Childbirth Connection examined the evidence for and against maternity care interventions as it relates to achieving high quality care and outcomes (Sakala & Corry, 2008). While acknowledging that there are multiple structural barriers to the implementation of evidence-based strategies, such as adverse effects of the malpractice system, perverse financial incentives of the payment system, limited attention to harms and iatrogenesis, limited reliance on best evidence to determine guideline recommendations and the challenges of translating evidence into practice, the authors also identified many interventions which are commonly overused and many evidence-based ones which are underused. For example, they cite induction of labor without a medical indication, use of regional anesthesia, continuous electronic fetal monitoring, artificial rupture of membranes during labor and episiotomy as interventions that have their place, but are commonly overused and used for women for whom they are not indicated. Similarly, they list a variety of interventions, which if applied with more fidelity and regularity, could improve overall care and outcomes. Examples include smoking cessation interventions, turning breech fetuses to a head down position before labor, continuous labor support, allowing time for labor to progress, using a variety of comfort measures and pain management alternatives, and providing access for planned vaginal birth after prior Cesarean.



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This section of the toolkit relies primarily on high quality systematic reviews in order to give you the best evidence on what might work to safely reduce Cesarean deliveries. Systematic reviews (SRs) gather together all the available studies about an intervention in order to help determine the likely impact of that intervention, both its benefits and potential harms. The majority of these SRs are from the Cochrane Collaboration via the Cochrane Library's Database of Systematic Reviews ([www.thecochranelibrary.com](http://www.thecochranelibrary.com)). Cochrane Reviews are methodologically robust SRs, usually of randomized controlled trials (RCTs). Most Cochrane Reviews and some other SRs provide a meta-analysis, or a combined quantitative estimate of the impact of an intervention. When SRs were not available for particular interventions of interest, a MEDLINE search for recent individual studies was conducted and these additional articles are summarized in the overview of that intervention.

The overall strength of evidence for each strategy is rated as high, moderate, or low, based on the quality, quantity, and consistency of the evidence available about that intervention. The evidence about some of the interventions in this section is emerging because they have not been extensively studied or are difficult to examine in a rigorous manner using RCTs. Although the strength of evidence about these types of interventions may currently be low, most of them also have a low risk of potential harm. Hospitals and clinicians may be encouraged to try them in the context of a quality improvement effort to see if they make a difference in their own settings. At the end of this section there is a "Number Needed to Treat" (NNT) table (Table 2.2). The NNT is the number of women who would need to receive the intervention (compared to no intervention, usual care or an alternate intervention in order for one of them to avoid having a Cesarean birth. This is an easy way to compare the relative effectiveness of various strategies. The lower the NNT, the more efficient the intervention is at helping a woman avoid a Cesarean delivery.

## 2. Evidence-based Strategies

### *Evidence-based Strategies to Safely Reduce Cesarean Birth Rates*

This section summarizes the evidence about interventions (with high, moderate, and low strength of evidence) that can be used before and during labor, as well as health systems changes that can be undertaken at the hospital and clinician level to help reduce unnecessary Cesarean deliveries.

#### Before Labor

- Social support for at-risk women HIGH
- Turning breech fetuses HIGH
- Planned out of hospital birth HIGH
- Delay of admission until active labor has started LOW
- Facilitate vaginal birth after Cesarean (VBAC) HIGH
- Planned induction of labor after 41 weeks HIGH
- Restricting early elective induction of labor between 37-41 weeks HIGH

#### During Labor

- Continuous support in labor HIGH
- Fetal monitoring using intermittent auscultation HIGH
- Pain management alternatives during labor MODERATE
- Amnioinfusion for suspected cord compression HIGH
- Giving labor more time MODERATE
- Higher dose oxytocin for labor augmentation HIGH
- Second opinion prior to non-emergent Cesarean MODERATE

#### Systems Level Interventions

- Audit & feedback MODERATE
- Quality improvement programs MODERATE
- Multifaceted strategies MODERATE
- Guidelines implementation MODERATE



## Before Labor

### Social Support for At-Risk Women

Hodnett, Fredericks, and Weston (2010) conducted a good quality Cochrane systematic review (SR) on additional support during pregnancy for women at increased risk of having low birth weight infants. The SR included 17 randomized control trials (RCTs) with over 12,000 women. Additional support during the antenatal period varied among trials and included support provided by professionals (social workers, midwives, and nurses) or trained lay persons. Although these types of interventions did not statistically reduce the risk of having a low birth weight infant, the authors found other benefits, including a decreased risk of Cesarean delivery with a number needed to treat (NNT) of 33. Women in the intervention groups also had about a 20% reduced risk of hospital admission during pregnancy. **The overall strength of evidence for this intervention is high.**

### Turning Breech Fetuses

#### *External Cephalic Version for Breech Presentation at or Near Term*

About 4% of fetuses are in the breech (bottom first rather than head first) position at term. Most women in the U.S. with a breech presentation undergo Cesarean section for delivery. External cephalic version (ECV) involves manipulation of the fetus into a head down position using pressure on the maternal abdomen. This is generally done at or near term 36 to 37 weeks of gestation, as it is more successful when the fetus is smaller and there is more amniotic fluid in the uterus compared to later in gestation. Hofmeyr and Kulier (1996) published a Cochrane Review of ECV with seven RCTs including 1,245 women. Cesarean delivery was reduced by about half by offering ECV to these women. With an NNT of 6, this is one of the individually most effective strategies for reducing Cesarean delivery. There were no differences between the ECV and usual care groups in regard to poor perinatal outcomes. There is also some suggestion that performing ECV even earlier may be useful and there is an ongoing large RCT to test this concept (Hutton & Hofmeyr, 2006). **The**

**overall strength of evidence for this intervention is high.**

#### *Interventions to Help External Cephalic Version for Breech Presentation at Term*

Another Cochrane Review looked at interventions to help with ECV (Cluver, Hofmeyr, Gyte & Sinclair, 2012). The review included 25 RCTs, providing data on 2,548 women. Two co-interventions, the use of an injection of a tocolytic betastimulant drug (all three included trials used terbutaline) and regional anesthesia (epidural or spinal anesthesia) reduced the risk of Cesarean birth. The use of terbutaline to relax the uterus increased the success of ECV by 20% and prevented Cesarean delivery with an NNT of 6. Epidural or spinal anesthesia, with or without use of terbutaline also reduced the risk of Cesarean birth, with an NNT of 7. **The overall strength of evidence for this intervention is high.**

#### *Moxibustion for Cephalic Version*

Moxibustion is a traditional Chinese medicine (TCM) technique which involves burning a compressed bundle of an herb close to the skin at the acupuncture point Bladder 67 (BL67) at the lateral tip of the fifth (little) toe. Moxibustion is usually begun in the late preterm period (34 to 36 weeks of gestation) and typically consists of treatments done twice weekly up to once per day. A Cochrane Review of eight RCTs with a total of 1346 women did not find a significant effect of moxibustion alone on the risk of Cesarean delivery (Coyle, Smith & Peat, 2012). However, one RCT including 226 women did find that moxibustion plus acupuncture reduced Cesarean delivery by 21% compared with no specific treatment. The NNT is 7. The review did not identify any serious maternal or fetal harms. Because moxibustion and acupuncture are started earlier than ECV is generally attempted, to identify women with breech presentations early and inform them about TCM treatment makes sense. If the fetus remains in a breech presentation, the woman can also be offered ECV at 36 to 37 weeks of gestation. **The overall strength of evidence for the TCM technique of moxibustion plus acupuncture is moderate.**

## Planned Out of Hospital Birth

Hodnett, Downe, and Walsh (2012) published a Cochrane Review of alternative birth settings compared to institutional settings that included 10 RCTs or quasi-randomized trials and nearly 12,000 women. “Alternative settings” in this SR included “home like” birth rooms in hospitals, and birthing units adjacent to regular labor units. There were no studies of freestanding birth centers in this review. They found that women allocated to alternative settings were more likely to have a spontaneous vaginal birth and less likely to have an operative vaginal birth, but that the risk of Cesarean birth was not statistically different (RR 0.88 [95% CI 0.78-1.00]). Women were also less likely to use analgesia or anesthesia (including epidurals) and had lower rates of oxytocin augmentation and episiotomy. They were more likely to maintain breastfeeding at six to eight weeks postpartum, and to have a more positive view of their care. There was a 17% increase in serious perinatal morbidity (a composite of birth asphyxia, neonatal encephalopathy, severe respiratory distress syndrome and other conditions threatening life or predictive of long-term disability) or mortality. There were very few events overall; the difference was not statistically significant. Similarly, the authors found a 9% increase in neonatal intensive care unit admission, but this was also not statistically significant. In most of the studies it was impossible to separate the confounded effects of the setting and the staffing of these units.

A good quality SR of home birth by Fullerton, Navarro, and Young (2007) included 28 observational studies from developed countries and found the rate of primary Cesarean delivery ranged from 1.4% to 17.7% among women who had planned a home birth, compared to 13.8% to 28.2% in the control populations. About two-thirds of the studies did not report comparative perinatal mortality rates. There was essentially no consistency about finding higher rates of perinatal mortality in either the home birth or control group.

*For select, low-risk women, planned out of hospital birth can lower the risk of Cesarean delivery. Selecting appropriate patients, providing education, excellent clinicians & easy transfer options are key to making this a safe option.*

A controversial SR by Wax and colleagues (2010) included 12 studies published in English from developed countries comparing planned home birth to planned hospital birth. Aside from a pilot RCT which included 11 women, the remaining 11 studies were observational in nature, with data primarily derived from birth registries and birth certificates. Their meta-analysis found lower rates of interventions, including risk of Cesarean delivery (OR 0.42 [95% CI 0.39-0.45]; NNT 23), operative vaginal delivery, episiotomy, and use of epidural and electronic fetal heart rate monitoring. Women in the planned home birth group also had lower risk of all types of perineal lacerations, infection, postpartum hemorrhage, and retained placenta. Their analysis also reported an equivalent risk of perinatal death (fetal and newborn deaths together), but a higher risk of neonatal mortality (all types OR 1.98 [95% CI 1.19-3.28] and mortality among nonanomalous (without a birth defect) infant (OR 2.87 [95% CI 1.32-6.25]). The study was criticized for exclusion of relevant studies, inclusion of studies that did not meet their own inclusion criteria, inclusion of unplanned home births, births at home which were not attended by a professional, imprecise attribution of outcomes by setting, heterogeneous definitions of neonatal death, imprecise definition of nonanomalous neonatal deaths, low number of contemporary studies applicable to the U.S. setting, inadequate control of confounding, and lack of detail on how the meta-analysis was conducted.

A “best” evidence review of home birth for the Medicaid Evidence-based Decisions Project included one SR with 16 studies, (four additional studies were published after the SR), and found that Cesarean delivery rates were reduced by 60-75% with planned home birth compared to planned hospital birth (King, 2009). The NNT for home birth compared to hospital birth for women at low risk of complications ranged from 20 to 34 in order to prevent one additional Cesarean birth. This review found that older studies often demonstrated slightly higher rates of perinatal mortality among the home birth groups. Larger, higher quality and more recent studies

showed equivalent or decreased risks of perinatal mortality among women giving birth at home. There were increased risks of complications (including perinatal death) in situations in which women with complications (primarily breech presentation, multiple gestation, and postmaturity) had planned home birth. These studies were generally from countries which have integrated systems of care and formal risk criteria for home birth.

A recent prospective study in England looked at over 64,000 singleton, term births which were “booked” (had received any prenatal care) for birth in out-of-hospital or non-obstetric settings (home, freestanding and alongside midwifery units, and hospital based midwifery units) and a stratified random sample of births in obstetric units across England between April 2008 and April 2010 (Birthplace in England Collaborative Group [BECG], 2011). Planned Cesarean births were excluded. The primary outcome was a composite measure of perinatal mortality (including intrapartum stillbirth and early neonatal death) and neonatal morbidities (including neonatal encephalopathy, meconium aspiration syndrome, brachial plexus injury, and humeral or clavicular fracture). Overall, there was no difference in the risk of the composite primary outcome based on birth setting. However, for nulliparous women, the risk of the primary outcome was higher for planned home birth (adj OR 1.75 [95% CI 1.07-2.86]; weighted incidence 9.3 per 1,000 births, 95% CI 6.5-13.1), but not for birth in a midwifery unit. There were no significant differences in the occurrence of the primary outcome for multiparous women by planned site of birth. Across all settings, there were 153 primary outcome events among low risk nulliparous women, and 97 events among low risk multiparous women (BECG, 2011). The full report of study outcomes includes a complete listing of incidence of each of the components of the composite primary outcome, by planned place of birth (BECG, 2011). Interventions during labor were much higher in the obstetric unit setting than in all other settings. The odds of Cesarean birth was 69% lower for planned home birth, 68% lower in freestanding midwifery units and 61% lower in alongside midwifery units. The NNT for alternative settings compared with obstetric units in terms of Cesarean birth was 14. For home birth compared with obstetric units the NNT was 12 and for midwifery units compared to obstetric units the

NNT was 15. The NNT comparing Cesarean birth with planned home birth to birth in midwifery units was 76.

High quality data on planned out of hospital births in U.S. settings are few. We have concentrated on describing the results of SRs and large comparative studies in this toolkit. However, there are two additional non-comparative studies that bear mentioning because they describe out of hospital birth in the North American setting. Johnson and Daviss (2005) reported on a prospective cohort study of planned home births with professional midwives in Canada and the U.S. during 2000. There was no concurrent control or usual care group. The study was supported by the North American Registry of Midwives (NARM) and made study participation a requirement for recertification. The study compiled data on 5,418 women planning home birth. Just over 12% were transferred to a hospital either during, or after labor. About half of those transferred prior to birth had failure to progress, maternal exhaustion, or pain relief as the primary reason. Postpartum transfer occurred for 1.3% of women and 0.7% of infants. Transfers were considered urgent in 3.4% of cases. Cesarean birth occurred in 3.7% of women and 1.6% had an operative vaginal delivery. After excluding four cases of fetal demise prior to labor and three infants with fatal birth defects there were 11 perinatal deaths for an overall perinatal mortality rate of 2 per 1,000 live births. The rate was 1.7 per 1,000 when 80 planned home births of breech presentations and 13 twin births were excluded, as they were not low risk women. Immediate post-birth complications were reported for 4.2% of infants and 2.4% were placed in NICU care. Slightly over 1% of infants had Apgar scores of less than 7 at five minutes. Health problems in the first six weeks after birth were reported for 7% of newborns. Over 95% of women were breastfeeding at six weeks postpartum.

More recently, Stapleton and colleagues (2013) reported the results of the second National Birth Center Study (NBCS). This was a prospective cohort study of women cared for by 79 midwifery-led birth centers in 33 U.S. states. These birth centers adhere to a national set of standards and were accredited by the Commission for the Accreditation of Birth Centers, which is an independent accrediting body in the U.S. Data were collected between 2007 and

2010 using a uniform data set developed by the American Association of Birth Centers. Of 15,574 women who had planned and were eligible for birth center care at the beginning of labor, 84% delivered at the birth center. Four percent were transferred to hospital prior to birth center admission and 12% were transferred at some point during labor. Overall, 93% of women had a spontaneous vaginal birth, regardless of place of delivery, while 1% had an operative vaginal birth and 6% delivered by Cesarean. For women giving birth in a birth center, 2.4% required postpartum transfer and 2.6% of infants were transferred to hospital after birth. No maternal deaths were reported. The intrapartum fetal mortality rate for women admitted in labor to a birth center was 0.47/1000 births and the total neonatal mortality rate (excluding anomalies) was 0.40/1000 live births. For comparison, the U.S. neonatal mortality rate for infants weighing 2500 grams or more in 2007 was 0.75/1000 (Mathews & MacDorman, 2011). The Johnson and Daviss study (2005), for comparison, reported a neonatal mortality rate of 2/1000.

The concerns about home birth, in particular, primarily rest with possible increased risk to the neonate. The American Academy of Pediatrics issued a policy statement on home birth in April 2013. The statement concurs with the position of ACOG that hospitals and birthing centers are the safest settings for newborns, but supports the right of women to make an informed choice about the site of birth (AAP, 2013). The statement notes the importance of appropriate patient selection, well-functioning systems of care, and offers guidance on care for the neonate after a home birth (AAP, 2013).

We note that, while using alternative birth settings may not be a current option for many hospitals, clinicians, or women, there are lessons to be learned from out of hospital labor management practices that may be applicable to the inpatient setting (e.g. intermittent auscultation, continuous labor support, alternatives to pharmacologic pain management) which can help reduce Cesarean delivery. The specific details of these components are discussed in this section. Some hospitals may also wish to investigate starting separate birth units that are housed in the hospital or free standing birth centers that are on or

close by the hospital campus. Finally, some hospitals may wish to explore increasing communication with out of hospital birth providers so that referral and transfer can occur more easily. The results of the NBCS suggest that adherence to strict protocols and accreditation may be influential in promoting safety. ***The overall strength of evidence for out of hospital birth reducing Cesarean delivery is high.***

## Delay Admission Until Active Labor Has Started

Admission to hospital before the onset of active labor is associated with higher risk of Cesarean birth (Bailit, Dierker, Blanchard & Mercer, 2005). In a study of over 8,000 low risk women, Bailit and colleagues (2005) found that the rate of Cesarean birth was 14.2% for nulliparas (women having their first birth) admitted in the latent phase versus 6.7% ( $p < 0.0001$ ) for those admitted in the active phase of labor. Although the absolute rate of Cesarean delivery was much lower for multiparas (women having a subsequent birth) overall, the differential persisted with a rates of 3.1% versus 1.4% ( $p < 0.0001$ ) for multiparas. Similarly, Holmes, Oppenheimer and Wen (2001) reported on the mode of delivery outcomes among over 3000 women. There was a statistically significant, inverse linear relationship between cervical dilation at presentation and Cesarean delivery, for both multiparous and nulliparous women. They did not find a significant relationship between deferred admission and immediate admission at any cervical dilation.

Effectively supporting women to stay home in early labor can help them to ***arrive at the hospital in active labor***, and require fewer interventions

A Cochrane Review by Lauzon and Hodnett (2001) examined the use of labor assessment units to delay hospital admission until active labor has started. The review included one RCT with 209 women (McNiven, Williams, Hodnett, Kaufman & Hannah, 1998). Women who were allocated to the assessment unit had significantly less need for oxytocin or analgesia once admitted to the hospital, and had improved ratings of self-control during

labor. However, although there were fewer Cesarean deliveries in the control group, the difference was not statistically significant. With only one RCT, there are not sufficient data to assess the full impact of this type of program on the risk of Cesarean birth.

Preventing admission until active labor was established was one of seven key strategies promoted in the Institute for Healthcare Improvement's (IHI) "Breakthrough Series Guide" on reducing Cesarean delivery rates (Flamm, Berwick & Kabcenell, 1998; Flamm, Kabcenell, Berwick & Roessner, 1997). It is also one of the key quality improvement strategies promoted by the California Maternal Quality Care Collaborative (CMQCC) for reducing Cesarean delivery rates (Main et al., 2011). Main and colleagues from the Sutter Health System in California (2006) have reported that there is a significant linear relationship between admission in early labor (cervical dilation less than 3 cm for nulliparous women) and higher NTSV (nulliparous, term, singleton, vertex) Cesarean rates. They found that early admission accounted for about 40% of the variation in the rate of NTSV Cesarean among hospitals. Additional data from Sutter hospitals presented by Elliott Main at a 2010 Washington State Hospital Association meeting on over 4,000 nulliparous women in term, spontaneous labor, found that the relative risk of NTSV nearly doubled when women were admitted early (25.3% vs. 13.4%,  $p < 0.00001$ ) (Main, 2010).

This relative risk is nearly identical to the risk reported by Balit and colleagues (2005) in Ohio among over 3,000 low-risk nulliparous women in spontaneous labor (RR 2.1,  $p < 0.0001$ ). Although the question has always been whether early admission is a cause or effect of labor abnormalities, the RCT by McNiven and colleagues (1998) found that admission to delivery time, length of second stage, oxytocin and anesthesia or analgesia use, and woman's own feeling of being "in control" were all improved with assessment and support rather than early admission. Although the study was underpowered to detect a difference in Cesarean delivery rates, it did find a difference of 7.6% vs. 10.5%, ( $p = ns$ ). The NNT based on the studies by Balit (2005) and Main (2006) range from 8 to 13 and for McNiven is 34, although the calculation for McNiven would not reach statistical

significance. While there is insufficient evidence from RCTs to support the strategy of delayed admission for Cesarean delivery reduction, it is reasonable to suggest that hospitals have protocols and supports in place to assure that women are not admitted to Labor and Delivery units until they are in active labor. For nulliparous women, the new ACOG ReVITALize definitions indicate that active labor generally begins at 6 cm of cervical dilation for nulliparous women and 5 cm for multiparous women (ACOG, 2012a). Adoption of this definition may assist hospitals in delaying admission when women are not in active labor. **The overall strength of evidence for these interventions is low.**

## Planned Vaginal Birth After Cesarean (VBAC)

Guise and colleagues (2010) conducted a good quality, comprehensive SR on labor after Cesarean (LAC) for AHRQ and in support of an NIH consensus conference on vaginal birth after Cesarean (VBAC) held in March 2010. The SR included 67 U.S. and non-U.S. based prospective and retrospective cohort studies. They found that among the 43 U.S.-based studies, 74% (95% CI 49-87%) of women who have LAC deliver vaginally (i.e. have a "successful" VBAC). Among all studies (U.S. and non-U.S.) the rate of vaginal delivery was also 74% (95% CI 72-75%). Among U.S. studies of women at term (rather than all women, term and preterm) the VBAC rate was similar at 73% (95% CI 70-77%). Analyses stratified by study design, estimated gestational age, country, and years of data collection did not find statistically significant differences from these estimates.

In U.S.-based studies the rate of LAC among women with a prior Cesarean delivery averaged 54% (95% CI 42-65%) among term pregnancies and 58% (95% CI 52-65%) overall. The LAC rate has been decreasing since 1996 in the U.S., based on published reports of uterine rupture with LAC and a more conservative

Ensuring that appropriate women with a prior Cesarean birth have the opportunity for VBAC is one of the most effective ways to reduce Cesarean delivery rates.

attitude about required hospital resources for a LAC (Guise et al., 2010). Studies completed before 1996 had average LAC rates of 62%. In those begun after 1996 the average LAC rate was 47%. It is important to note that the resulting successful VBAC rate has remained fairly constant among women who do manage to obtain LAC.

To compute an NNT of “offering” LAC in the U.S. we used the meta-analytic estimates of LAC and VBAC rates from the AHRQ review by Guise and colleagues (2010). They found a LAC rate of 54% for U.S. studies of women at term among studies conducted between 1992 and 2008. Among term women in U.S.-based studies who had LAC, the vaginal delivery rate averaged 73%. We assumed that if 100 eligible women at term were offered LAC and the uptake was 54% that 39 of them would deliver vaginally, resulting in an NNT of 2.5. This number is sensitive to both the actual number of women who would be eligible for and then who would elect LAC. When we computed an NNT using international studies combined with U.S.-based studies we found NNTs ranging from 1.4 to 7.7. **The overall strength of evidence for LAC as a strategy to reduce Cesarean delivery is high.**

The maternal mortality rate is substantially lower for women who elect LAC compared to those who have scheduled repeat Cesarean delivery (SRC)—3.8 versus 13.4 deaths per 100,000 women overall, and 1.9 versus 9.6 deaths per 100,000 women at term. Hysterectomy rates are higher among women having an SRC at term, but not for the population overall, when women who are preterm are included. Rates of hemorrhage or need for transfusion and infection are higher with LAC, but confidence limits overlap substantially for both outcomes. Additionally, length of stay is approximately 1.3 days shorter for LAC compared to SRC (2.55 versus 3.92 days) (Guise et al., 2010).

Longer term risks of SRC for women include increased adhesions which lead to more future perioperative complications, time to delivery in subsequent Cesarean births, and total operative time in future abdominal surgery. Rates of hemorrhage, surgical injury, Cesarean hysterectomy and abnormal placentation (placenta previa and varying degrees of

invasive placenta) increase with increasing numbers of prior Cesarean deliveries (Guise et al., 2010).

The most serious complication of LAC is uterine rupture. The risk estimate from Guise and colleagues (2010) is 0.47% (95% CI 0.28-0.77%) for LAC versus 0.0026% (95% CI 0.009-0.82%) SRC. The risk of perinatal death if a uterine rupture does occur is estimated at 6.2% overall, and 0-2.8% among term gestations. Factors which may increase the risk of uterine rupture include vertical uterine scar, induction of labor (particularly with prostaglandins and especially with misoprostol), and post-dates gestational age. Having had a prior vaginal delivery confers substantially decreased risk of uterine rupture and substantially increased rate of vaginal birth.

The risk of perinatal death for the fetus/neonate is low overall, but increased among women who elect to have a LAC, 1.3 (95% CI 0.59-3.04) versus 0.5 (95% CI 0.07-3.82) per 1000 births (Guise et al., 2010). There do not appear to be increased risks of sepsis, low Apgar scores or NICU admission for the newborn. There is limited and conflicting evidence of higher risk of stillbirth in subsequent pregnancies among women who have had more prior Cesarean deliveries.

Catling-Paull, Johnston, Ryan, Foureur, and Homer (2011) conducted a systematic review of non-clinical interventions that increase the uptake and success of VBAC. The studies included in this SR had some overlap with those described in the section on systems level interventions. They reported that while national guidelines influenced VBAC rates, a greater effect was found with the development and implementation of local guidelines. Local efforts that use opinion leaders adopt a conservative approach to performing Cesarean deliveries, give information to women and feedback to obstetric providers about mode of delivery show increased effectiveness. There is also evidence that providers who have lower Cesarean rates and those who encourage LAC have higher VBAC rates.

## Planned Induction of Labor

### *Induction of Labor after 41 Weeks Gestation*

Accurate determination of gestational age is required in order to make any determination of timing in a pregnancy intervention. The multidisciplinary reVITALize data definition project spearheaded by ACOG in 2012 has proposed draft obstetric data definitions, including those for “term,” “full term,” “preterm,” “early term,” and “late term.” They have suggested that the estimated date of delivery (EDD) is best determined by last menstrual period (LMP) dating if confirmed by early ultrasound, or LMP alone if no ultrasound is performed, or early ultrasound if no known LMP or the ultrasound is not consistent with the LMP, or a known date of conception. The reVITALize group also tasked ACOG with setting the ultrasound margin of error for dating and defining the exact limits of “early” ultrasound (ACOG, 2012b). Final data definitions and supporting materials are expected by mid-2013.

In addition, there are known benefits for accurate dating with regards to induction of labor. A Cochrane review by Whitworth and colleagues (2010) found that routine first trimester ultrasound scanning is effective for reducing induction of labor for “post term” pregnancy by 40% compared to selective or later use of ultrasound.

A Cochrane review by Gülmezoglu, Crowther, Middleton, and Heatley (2012) found that a policy of routine induction of labor after 41 weeks of gestation lowers the risk of Cesarean birth by 26% at 41 weeks, and 9% beyond 41 weeks. The combined NNT is 31. This finding only applies to healthy women with normal fetuses who do not have another defined medical reason for delivery. There are some other caveats about these data. Of the 16 RCTs that contributed to the findings for induction at 41 weeks of gestation or beyond, only five were published more recently than the year 2001, and only one of these was conducted in a country with a comparable health care system to the U.S. These findings should be interpreted somewhat cautiously, given the temporal and geographic changes in obstetric practice. In the U.S., most women who are beyond 41 weeks of gestation are offered induction of labor and those who decline induction

are encouraged to have antenatal testing for fetal wellbeing. An evidence review report commissioned by AHRQ also found that RCTs suggest eIOL at (and beyond) 41 weeks gestation may reduce both the risk of Cesarean delivery and meconium stained amniotic fluid (Caughey et al., 2009a; Caughey et al., 2009b).

A policy of planned induction was also found to lower the risk of perinatal death (stillbirth and neonatal death) by about two-thirds compared to a policy of expectant management (Gülmezoglu et al., 2012). The NNT to prevent one perinatal death is 328 based on these RCTs. The absolute risk of perinatal death was less than 3 per 1,000 births in both the expectantly managed group and the induced group. **The overall strength of evidence for offering IOL for women over 41 weeks of gestation in order to lower the risk of Cesarean birth is high.**

### *Induction of Labor Prior to 41 Weeks Gestation*

Although scheduled induction of labor (IOL) after 41 weeks appears to reduce Cesarean births and perinatal deaths, these benefits may not be the same at earlier periods of gestation where the risk of failed induction is higher and the risk of perinatal death is lower. Therefore,

we looked for information about the benefits and risks of induction of labor without a defined medical indication at term, but before 41 weeks

The AAFP and ACOG recommend that women should **avoid elective, non-medically indicated induction of labor before 41 weeks** gestation.

(from 37 weeks 0 days to 40 weeks 6 days). When there is a definite maternal or fetal indication to hasten delivery then the potential harms of induction can be outweighed by its benefits. Depending on various factors, such as a woman’s parity and the readiness of her cervix for labor, elective induction for an otherwise healthy woman can present some risks, including the risk of Cesarean birth. There is controversy among clinical professionals and researchers about whether IOL without a medical indication provides benefits or increases harms for the mother and infant. Based on the RCTs

included in the Cochrane Review discussed in the prior section (Gülmezoglu et al., 2012), the risk of Cesarean delivery with induction between 37 and 41 weeks of gestation is higher with induction of labor compared with expectant management. Since the intervention (eIOL) is more likely to cause a harm (Cesarean delivery) than a benefit (avoiding a Cesarean delivery) the summary statistic is a “number needed to harm” or NNH. The NNH is similar to the NNT, but indicates the number of women who would need to have the intervention (in this case, elective induction of labor) for one additional adverse outcome (in this case, Cesarean birth) to occur. Based on the Cochrane Review (Gülmezoglu et al., 2012), the NNH is 80 for IOL between 37 and 41 weeks of gestation. Since most U.S. hospitals have or are trying to eliminate early elective term delivery between 37 and 39 weeks of gestation, the more meaningful statistic may be the risk of Cesarean delivery between 39 weeks 0 days and 40 weeks 6 days of gestation. The NNH between 39 and 41 weeks of gestation is 69. The risk of perinatal death during this interval was very low and not statistically different between groups, but was higher in the expectantly managed group with no deaths in the induced group (415 women) and two deaths in the expectantly managed group (395 women). However, all of the previously mentioned caveats about the RCTs included in the Cochrane Review also apply to these findings. There were three relevant RCTs, with publications dates (locations) of 1975 (Scotland), 1989 (Austria) and 2005 (Norway). None of these studies are representative of contemporaneous U.S. practice and may therefore not be widely applicable to the current U.S. situation.

A more recent group of cohort studies, many of which were conducted in the U.S., have found that there is an increased risk of Cesarean birth when elective induction of labor (eIOL) is compared to women in spontaneous labor with a NNH of between 4 and 10 for nulliparas and 62 for multiparas (King, Pilliod & Little, 2010). However, a spontaneous labor control group is not optimal because the risk of Cesarean delivery is lower among women who are already in spontaneous labor. The appropriate control group is an expectantly managed group of women. Because of these types of methodological issues with observational studies, the

AHRQ evidence report on elective induction stated that the evidence about outcomes associated with eIOL prior to 41 weeks gestation is insufficient to draw any conclusions (Caughey, 2009a).

There are four more recently published studies that compare eIOL to expectant management (EM) strategies. Two studies by Osmundson and colleagues (2010; 2011) selected nulliparous women who gave birth between 2006 and 2008. The first Osmundson study (2010) included women with a mean gestational age of almost 40 weeks with a favorable cervix (Bishop score greater or equal to 5) while the second study (2011) examined women with a mean gestational age of 40 weeks in the eIOL group and 40.5 weeks in the EM group and an unfavorable cervix (Bishop score less than 5). Hernandez and colleagues (2011) included births occurring between 1995 and 2004 among women of all parities, but did not report outcomes by parity or cervical status. Stock and colleagues (2012) conducted a population-based analysis of over 500,000 births in Scotland across the 26 year period from 1981 to 2007 and while it included women of all parities also did not report outcomes by parity or cervical status. The Osmundson studies are of high quality while the Stock and Hernandez studies are of low quality due to lack of cohort comparability, intervention ascertainment, and control of confounders.

Osmundson and colleagues (2010) found no differences in Cesarean delivery (20.8% vs. 20.1%,  $p=0.16$ ) or operative vaginal delivery (OVD) (17.2% vs. 23.9%,  $p=0.36$ ) among nulliparas with a favorable cervix. Among nulliparous women with an unfavorable cervix, Osmundson and colleagues (2011) found increased rates of both Cesarean delivery and OVD, but in this statistically underpowered study these differences were not statistically significant (Cesarean: 43.1% vs. 34.3%,  $p=0.16$ , and OVD: 17.2% vs. 23.9%,  $p=0.16$ ). Among women with eIOL at 37 to 38 weeks compared with those who had EM from 39 weeks through 40 weeks of gestation, Hernandez and colleagues (2011) reported no statistically significant increase in either Cesarean delivery (OR 1.31, 95% CI 0.79-2.18) or OVD (OR 0.90, 95% CI 0.41-1.96).

Stock and colleagues (2012) conducted two separate analyses, using different comparator groups. Their primary analysis compared eIOL at each week of gestational age between 37 and 41 weeks to EM beyond that week of gestational age. The secondary analysis used a comparison group that was at or beyond that gestational age. In the primary analysis, eIOL was not associated with increased odds of Cesarean delivery at 37, 38 or 39 weeks of gestation and was associated with decreased odds of Cesarean delivery at 40 weeks (OR 0.83, 99% CI 0.79 to 0.88) and 41 weeks (OR 0.66, 99% CI 0.63 to 0.69) (Stock, 2012). Similarly, the primary analysis found decreased odds of OVD at both 40 weeks (OR 0.85, 99% CI 0.82 to 0.89) and 41 weeks (OR 0.78, 99% CI 0.74 to 0.81). In the secondary analysis there was a small increase in the odds of Cesarean delivery at 39 weeks (OR 1.10, 99% CI 1.02 to 1.19), 40 weeks (OR 1.08, 99% CI 1.03 to 1.13), and 41 weeks (OR 1.06, 99% CI 1.02 to 1.11) of gestation. There were no significant differences for OVD at any gestational age in the secondary analysis, except for a decrease in the odds of OVD in the eIOL group at 41 weeks of gestation (OR 0.88, 99% CI 0.85 to 0.91) (Stock et al., 2012).

Hernandez and colleagues (2011) did not report any neonatal outcomes and neither Osmundson study reported statistically significant differences in NICU admission rates in either the favorable cervix or unfavorable cervix studies. Stock and colleagues (2012) reported risk of “extended perinatal mortality” which they defined as stillbirth or death in the first month of life, excluding deaths associated with congenital anomalies. In both their primary and secondary analyses, they found statistically significant reductions in the odds of extended perinatal mortality at each gestational age between 37 and 41 weeks of gestation. The effect sizes ranged from ORs of 0.15 to 0.31 in the primary analysis to 0.15 to 0.42 in the secondary analysis and all of the 99% CIs were relatively narrow (see Table 2.1 for details). Stock and colleagues (2012) also reported that NICU admissions were significantly increased in both the primary and secondary analyses among the eIOL groups at all gestational ages from 37 to 40 weeks, but not significantly increased at 41 weeks. A group of recent “before-after” or interrupted time series studies may offer the best way to look at the

benefits and harms of induction of labor in more contemporary settings. These studies all examined outcomes in a hospital or health system before and after a change in policy that limited induction of labor at term (IHC, 2012; IHC, 2011; Fisch, English, Pedaline, Brooks & Simhan, 2009; Oshiro, Henry, Wilson, Branch & Varner, 2009; Reisner, Wallin, Zingheim & Luthy, 2009). All three settings limited induction without a medical indication to 39 or greater weeks of gestation. Magee Women’s hospital in Pittsburg required a Bishop score of 8 or greater for nulliparas (6 for multiparas), while Intermountain Health Care (IHC) had more stringent requirements of a Bishop score of 10 for nulliparas (8 for multiparas). Neither of these settings allowed the use of cervical ripening agents to achieve a higher Bishop score. Swedish Medical Center in Seattle allowed elective induction with a Bishop score of 6 or greater for all women and placed no restrictions on the use of cervical ripening agents. For reference, the rate of Cesarean birth with induction of labor and a Bishop score of 8 is approximately equal to the risk of Cesarean with spontaneous labor (ACOG, 2009). The NNT for nulliparas was consistent at 9 to 10, based on two of the studies. The NNT from the published IHC data is 20 for Cesarean for fetal distress among women of all parities.

The IHC study was the only one to report neonatal outcomes (Oshiro et al., 2009). They found that stillbirth decreased by 41% overall, with declines seen at 37, 38, 39, 40, and 41 weeks gestation. The perinatal mortality decrease was statistically significant at both the 37 and 38 week intervals.

***The overall strength of evidence for restricting eIOL between 37 and 41 weeks of gestation in order to reduce Cesarean deliveries is high.***

# Evidence-based Strategies to Safely Reduce Cesarean Birth Rates

Table 2.1. *Maternal & Infant Outcomes After Changes in Elective Induction of Labor (eIOL) Policies*

Study Citation	eIOL Policy Change Implemented	Maternal Outcomes	Infant Outcomes
Fisch et al., 2009 (Magee Womens Hospital, Pittsburg, PA)	New guideline implemented 2006 with eIOL allowed only after 39 weeks, and with a Bishop score of 8 or greater for nulliparas and 6 or greater for multiparas. No cervical ripening agents are allowed.	Total eIOL rate declined from 9.1% to 6.4%. Cesarean rate for nulliparas undergoing eIOL decreased from 34.5% to 13.8% (risk of Cesarean was decreased by 70%) NNT (nulliparas) = 10	Not reported
Oshiro et al., 2009; IHC, 2011; IHC, 2012 (9 urban Intermountain Healthcare hospitals in the western U.S.)	eIOL only after 39 weeks, and with Bishop score of 10 or greater for nulliparas and 8 or greater for multiparas. No cervical ripening agents allowed.	Rate of eIOL at less than 39 weeks declined from 28% in 1999 to 3.4% in 2007. Cesarean delivery for “fetal distress” decreased by 43% after implementation of guidelines (11% to 6%, NNT=20).  The total Cesarean rate for women with Bishop score of 8 was 13.3% and for those with a Bishop score of 10 was 8.1%, compared to rates of 51.4% to 17.6% with Bishop scores of 1 to 5.	Rates of neonatal ventilator use, respiratory distress syndrome, and macrosomia were unchanged. Rate of meconium aspiration declined 43%. Stillbirth rates at 37, 38, 39, 40 and 41 weeks declined by 41% overall, with the weekly difference being statistically significant for the 37 and 38 week intervals and overall.
Reisner et al., 2009 (Swedish Medical Center, Seattle, WA)	eIOL restricted to 39 weeks or above, and Bishop score of greater than or equal to 6	eIOL declined from 4.3% to 0.8% for nulliparas and from 12.5% to 9.3% for multiparas. Unplanned CS after eIOL for nulliparas declined from 26.9% to 17.9% and from 4.5% to 3.0% for multiparas.  NNT (nulliparas) = 9 NNT (multiparas) = 48	Not reported

## During Labor

### Continuous Support in Labor

Continuous support in labor can be provided by professionals (nurses and midwives, for example) or by trained lay women (referred to as “doulas”). Labor support can be provided either before or during the active phase of labor.

When women use doulas for labor support their *risk of Cesarean birth decreases*, and their happiness and *satisfaction increase*.

Some doulas provide care in early labor before a woman comes to the hospital and may meet with the women during pregnancy.

The Cochrane SR by Hodnett, Gates, Hofmeyr, Sakala, and Weston (2011) on continuous support in labor versus usual care included 21 RCTs and over 15,000 women. Overall, the risk of Cesarean delivery was reduced with continuous labor support by about 9% with an NNT of 81. **The overall strength of evidence for support in labor is high.**

Spontaneous vaginal birth rates increased by about 8% with continuous support in labor. Support people who were neither part of the hospital staff nor part of the women’s social network appeared to be more effective. Labor support is also associated with lower risks of instrumental vaginal delivery, need for pain medications or epidural anesthesia, and low 5-minute Apgar scores for infants.

### Using Alternatives to Continuous Electronic Fetal Monitoring

*Intermittent Auscultation (IA) of Fetal Heart Tones vs. Continuous Cardiotocography (CTG)*

There is broad agreement about the value of assessing the fetal heart rate during labor. This can be done intermittently during labor, with either a fetal stethoscope or a hand-held Doppler device, or by a continuous tracing of fetal heart and uterine activity. Continuous CTG (sometimes also called continuous external fetal monitoring or EFM) is used for more than 90% of women in the U.S. (Sakala & Corry, 2008). The use of continuous CTG became commonplace in the U.S. prior to rigorous studies

of its effectiveness. It was originally hoped that continuous fetal monitoring would help to detect a fetus that was hypoxic and acidotic and would thus prevent cerebral palsy and other poor neonatal outcomes. However, this has turned out to be an unrealistic expectation. The prevalence of cerebral palsy has not decreased since the widespread adoption of CTG monitoring in labor (ACOG, 2009). In some locations, fetal scalp blood sampling (FBS) for pH is used as an adjunct to CTG because it is more accurate at determining fetal compromise, but this has largely fallen out of favor in the U.S. because it requires specialized equipment and can be somewhat cumbersome to perform.

The Cochrane SR on CTG (with or without FBS) versus IA includes 10 RCTs and 37,000 women (Alfirevic, Devane & Gyte, 2006). Ten studies contributed findings to the assessment of the risk of Cesarean birth with monitoring modalities. Across all studies they found an elevated risk of Cesarean delivery with CTG (RR 1.66 [95% CI 1.30-2.31], NNT 58). The risk was substantially higher among studies that did not employ FBS, as is the norm in the U.S. (RR 1.96 [95% CI 1.24-3.09], NNT 23) and among studies which were conducted in settings with higher baseline rates of Cesarean delivery (RR 2.24 [95% CI 1.46-3.44], NNT 12). **The overall strength of evidence for using IA as a strategy to reduce Cesarean delivery is high.**

*Continuous electronic fetal monitoring increases the risk of Cesarean delivery, without improving newborn outcomes for most women.*

Although this SR found no overall increase in rates of cerebral palsy, NICU admission, neurodevelopmental disability, perinatal death or other measures of fetal and neonatal harm, there was an overall increased risk of isolated neonatal seizures in the group monitored with IA compared to CTG (with or without FBS) (RR 0.50 [95% CI 0.31-0.80]). The increased risk of neonatal seizures was not significantly elevated among studies that did not use

FBS [RR 0.51 (95% CI 0.18-1.44)]. Infants of high-risk women had an increased risk of developing cerebral palsy in the CTG group (RR 2.54 [95% CI 1.10-5.86]).

Virtually all 10 of the RCTs that contributed to these analyses were conducted in the 1970s and 1980s, with only one conducted in the 1990s. Three of the 10 were done in the U.S., although nine were conducted in developed countries with similar standards of care. Only two RCTs were judged to be of high methodological quality, and when these studies were examined independently, the risk of Cesarean delivery was not found to be statistically elevated (RR 1.27 [96% CI 0.88-1.83]), but the risk of neonatal seizures remained elevated (RR 0.40 [95% CI 0.21-0.77]) with IA. It is, however, important to note that these seizures were isolated and did not correlate with other neonatal or developmental abnormalities.

When continuous electronic fetal monitoring is used, both the NICHD and professional societies suggest there is evidence that a standardized nomenclature and structured method of interpretation be used, in part to help to reduce unnecessary Cesarean deliveries (ACOG, 2010b; ACOG, 2009; Macones, Hankins, Spong, Hauth & Moore, 2008). There is also emerging evidence that a 5-tier system of fetal heart rate tracing interpretation may be superior to the NICHD's suggested 3-tier system in terms of ability to detect fetal acidemia (Coletta, Murphy, Rubeo & Gyamfi-Bannerman, 2012; Parer & Ikeda, 2007). However, further research on the outcomes, including Cesarean delivery, associated with alternative interpretation and management systems, is required. We also note that on both medico-legal and clinical ground that the use of EFM for women who are receiving oxytocin or epidural anesthesia is strongly encouraged.

### *Admission CTG vs. Intermittent Auscultation*

Most U.S. hospitals conduct a short (usually 20 minute) CTG when women present in labor as part of the triage or admission process. Just as the general use of continuous CTG during labor increases rates of Cesarean delivery, the practice of obtaining an "admission strip" increase Cesarean delivery rates by about 20% for low-risk women. Devane, Lalor, Daly,

McGuire, and Smith (2012) conducted a Cochrane Review that included four RCTs and a total of over 13,000 women. They found that admission CTG increases the Cesarean delivery rate over a policy of IA at admission (RR 1.20 [95% CI 1.00-1.41], NNT 135). Use of IA at admission was not associated with neonatal harms, including admission to NICU, low Apgar scores, or neonatal seizures. **The overall strength of evidence for the use of IA at admission for low risk women is high.**

### *Pain Management During Labor*

Based on birth certificate data, more than 61% of U.S. women received epidural/spinal anesthesia for a vaginal birth in 2008 (Osterman & Martin, 2011). Among 27 reporting states, use of regional anesthesia during labor ranged from 21.9% in New Mexico to 78.2% in Kentucky. Reported use in Washington State was 59.5%. This analysis excluded women who had a Cesarean delivery, and thus these data underestimate the proportion of women who actually have epidural or spinal anesthesia during labor.

Anim-Somuah, Smyth, and Jones (2011) conducted a Cochrane Review on epidural versus non-epidural analgesia during labor. The review included 38 RCTs involving nearly 10,000 women. Epidural and combined epidural/spinal anesthesia are widely

*Women are most satisfied when they have alternatives to pharmacologic pain management available to them.*

acknowledged to provide good control of labor pain and the results of the Cochrane Review bore this out, with epidural anesthesia providing better pain relief than opioids or

no anesthesia. None of the trials compared epidural anesthesia to other techniques such as continuous support in labor, immersion in water, or other non-pharmacologic techniques. Epidural anesthesia was associated with an increased risk of assisted vaginal birth (forceps or vacuum) (RR 1.42 [95% CI 1.28-1.57]). Use was not significantly associated with the overall rate of Cesarean delivery (RR 1.10 [95% CI 0.97-1.25]), but did increase the risk of Cesarean for "fetal distress" (RR 1.43 [95% CI 1.02-1.97] NNT=93). Epidural use was also associated with several other adverse effects, including maternal

hypotension, maternal fever, urinary retention, longer second stage of labor, and oxytocin administration. There was substantial heterogeneity among trials, including for the length of second stage and oxytocin administration.

The Cesarean delivery and operative vaginal delivery rates across RCTs in the Cochrane Review were about one-third of current U.S. rates. Use of forceps and vacuum extraction for operative vaginal delivery has decreased rapidly in recent years as more of these deliveries have been accomplished with the use of Cesarean operations (Martin et al., 2012). A systematic review by Kotaska, Klein, and Liston (2006), which included RCTs found in the Cochrane database, sought to assess whether those RCTs had similar labor management practices compared to those currently in use in North America. They found that most of the RCTs included in the Cochrane Review used high dose oxytocin protocols. Among these there was no increase in the rate of Cesarean delivery. However, in the one study that employed a low dose protocol, which is similar to the oxytocin protocols in place across most of North America, the Cesarean delivery rate with epidural anesthesia exhibited a marked increase (25% versus 2%).

The Cochrane overview report on SRs about pain management in labor found that there is some evidence to suggest that the non-pharmacologic techniques of immersion in water, relaxation, acupuncture, and massage may improve management of labor pain with few side effects (Jones et al., 2012). Surveys of U.S. women have found that while few women are afforded the use of such pain management modalities as immersion in water, showers, use of local hot and cold therapies, and use of nitrous oxide, the overwhelming majority of those who did actually use these modalities found them helpful (Sakala & Corry, 2008). **The overall strength of evidence is high that epidural and spinal anesthesia provides effective pain relief in labor. The overall strength of evidence is moderate that epidural anesthesia does not increase the total Cesarean rate, but does increase the rate of Cesarean deliveries due to “fetal distress” and when low dose oxytocin protocols are in place. There is a high strength of evidence that epidural and spinal anesthesia causes a variety of adverse effects, including**

**maternal hypotension, fever, prolonged second stage, need for oxytocin administration and operative vaginal delivery. There is an overall moderate strength of evidence that many alternative pain management strategies are effective and result in few adverse effects.**

## Amnioinfusion for Suspected Cord Compression

Hofmeyr and Lawrie (2012) conducted a Cochrane Review on the use of amnioinfusion for potential or suspected cord compression during labor. Amnioinfusion involves infusing fluid into the uterine cavity. This is usually accomplished by introducing a saline solution via a catheter which is placed into the uterus through the cervix. A total of 13 RCTs and nearly 1,500 women contributed data to the finding that the risk of Cesarean delivery was reduced with the use of transcervical amnioinfusion (OR 0.62 [95% CI 0.46-0.83], NNT=11). Women enrolled in these studies had fetal heart rate decelerations, oligohydramnios or mixed indications for amnioinfusion. Cesarean delivery and forceps or vacuum delivery specifically for “suspected fetal distress” was also significantly lower in the amnioinfusion group. Infants of women in the intervention group were less likely to have low Apgar scores, low arterial cord pH, or birth asphyxia. **The overall strength of evidence for the use of amnioinfusion to help prevent Cesarean delivery is high.**

## Giving Labor More Time

Normal progress in labor is associated with uncomplicated vaginal delivery. “Normal” has long been defined in the U.S. by the Friedman curve, a graphical depiction of “normal” labor progress. The original Friedman curve was developed using observational data from 100 American women in spontaneous labor at term. This group included one woman with a breech presentation and one with a multiple gestation. One in five of these women received caudal anesthesia and 10% had oxytocin augmentation. The average length of labor for nulliparous women based on this curve is 12 hours (Freidman, 1978).

A recent SR on the length of the active stage of labor for low-risk nulliparous women in spontaneous labor identified 18 studies including over 7,000 women and found that the mean duration of active labor was 6 hours and that the mean plus 2SD was 13.4 hours (Neal et al., 2010). The definition of “active labor” across these studies generally required cervical dilation of 3 to 5 cm and the presence of contractions. In contrast, Friedman’s work estimated the median length of the active stage of labor for nulliparas with approximately 4 cm of cervical dilation to be 2.6 hours. The length of labor is longer for women who require augmentation or induction of labor compared to those in spontaneous labor and for nulliparas compared to multiparas. A recent U.S. single institution study of over 5,000 term women found that the mean length of the active phase of induced labor for nulliparas was 5.5 hours (95th percentile 16.8 hours) compared with 5.4 hours for augmented labor (95th percentile 16.8 hours) and 3.8 hours for spontaneous labor (95th percentile 11.8 hours) (Harper et al., 2012). The equivalent values for multiparous women were 4.4 hours (95th percentile 16.2 hours), 4.7 hours (95th percentile 17.5 hours) and 2.4 hours (95th percentile 8.8 hours).

*Patience is a virtue. Giving labor more time, when the mother and fetus are well, decreases the rate of Cesarean birth.*

A recent, large, multicenter observational study from 19 hospitals across the U.S. that included data from 62,415 women with singleton, vertex, vaginal deliveries and normal perinatal outcomes reported that in this contemporaneous setting the length of labor was longer than previously reported (Zhang et al., 2010). They found that while nulliparous and multiparous women tended to progress at a similar pace up to 6 cm of cervical dilation, that the rate of dilation for multiparas increased more rapidly after that point. They found that it can take more than six hours for labor to progress from 4 to 5 cm and may take three hours to progress from 5 to 6 cm. For nulliparas, each additional centimeter of cervical dilation may take from about one and a half to two hours and the average rate of dilation is about 2 cm per hour. For multiparous women each additional centimeter can take from around an hour to two hours of time, but average dilation is about 2 to 3 cm an hour during this period.

A partogram is a graphical depiction of labor progress which can assist in detection of prolonged active stage of labor. There are partograms with 2, 3, and 4 hour “action” lines. This means that some intervention (action) is recommended if labor progress exceeds the time limit of the action line. Interventions might include amniotomy, use of oxytocin augmentation or Cesarean delivery. A Cochrane Review by Lavender, Hart, and Smyth (2012) found that the use of a partogram with a 4-hour action line compared to a 3-hour action line resulted in fewer Cesarean deliveries (RR 1.70 [95% CI 1.07-2.70], NNT 17), based on one RCT of 613 women. There were no adverse effects or harms noted for either mothers or their infants in this SR of six RCTs and quasi-randomized trials which included 7,706 women. There was not a difference in Cesarean delivery rates when the use of a partogram in general was compared to no use of a partogram. One RCT which enrolled 743 women found that the Cesarean rate was higher when a partogram with a latent phase was used, compared to a partogram that did not include the latent phase (RR 2.45 [95% CI 1.72-3.50], NNT=7). **The overall strength of evidence for use of a 4-hour action line partogram is moderate as is the strength of evidence to support longer average lengths of active labor in contemporary obstetric practice.**

Zhang and colleagues (2010) also reported that the average duration of second stage was an hour for nulliparas with epidural anesthesia compared to about 35 minutes without an epidural. For multiparous women, the equivalent average durations of second stage were about 20 minutes with an epidural and about 10 minutes without one. However, the duration of second stage could last nearly as long as 4 hours for nulliparas with an epidural and nearly 3 hours without an epidural. The maximal duration of second stage was roughly cut in half for multiparas.

There is concern about rising rates of Cesarean delivery in the second stage of labor (Unterscheider, McMenamin & Cullinane, 2011). An SR of observational studies found that there was not an increased risk of NICU admission, low umbilical artery pH, or low 5-minute Apgar score, but that prolonged second stage was associated with operative vaginal delivery and Cesarean delivery (Altman

& Lyndon-Rochelle, 2006). Many of the included studies also found an increased risk of postpartum hemorrhage and maternal infection.

Rouse and collaborators (2009) in the NICHD's Maternal and Fetal Medicine Units Network reported on the duration of the second stage of labor and its relationship to maternal and perinatal outcomes. They reported data on over 5,000 women, of whom 4,126 reached the second stage of labor. Increasing duration of second stage was associated with the risk of Cesarean and operative vaginal birth. While only 1.4% of women with a second stage duration of under an hour delivered by Cesarean, 38.3% did so with a duration of 3 to 4 hours and nearly half required Cesarean delivery if the second stage lasted 4 to 5 hours. However, 30% of women still had vaginal births when the duration of second stage exceeded 5 hours. Other adverse maternal outcomes that were associated with the duration of second stage included chorioamnionitis, severe perineal lacerations and uterine atony with the adjusted odds ratios for each of these outcomes between 1.3 and 1.6. The only neonatal outcome that was significantly associated with the length of second stage was brachial plexus injury, although only a total of 11 cases were reported. However, there was not a significant difference for any neonatal outcome when vaginal and Cesarean births, with durations of less than and greater than 3 hours, were compared, with the exception of NICU admission after vaginal delivery. The authors concluded that the duration of second stage is associated with some adverse maternal outcomes, but that neonatal risks are small and that imposing an arbitrary time limit on second stage in the face of reassuring maternal and fetal wellbeing is not indicated. This is in accord with ACOG's recommendation that the length of second stage in and of itself is not an absolute or strong indication for operative delivery (ACOG, 2000).

The 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 held in February 2012 strongly recommended adequate time for latent, active and second stage of labor, particularly when labor is induced (Spong, Berghella, Wenstrom, Mercer & Saade, 2012).

They recommended diagnosis of first-stage arrest only for women who have cervical dilation of 6 centimeters or greater with membrane rupture and no cervical change for 4 or more hours of adequate contractions (e.g. greater than or equal to 200 Montevideo units) or 6 or more hours if contractions are not adequate. Similarly, second-stage arrest is diagnosed when there has been no progress (descent OR rotation) for 4 or more hours in nulliparas with an epidural, 3 hours of more in nulliparas without an epidural or in multiparas with an epidural, or 2 hours or more in multiparas without an epidural. ***The overall strength of evidence that allowing a prolonged second stage, as long as there is demonstrated maternal and fetal wellbeing, will reduce the rate of Cesarean deliveries is moderate.***

## Using Higher Dose Oxytocin for Labor Augmentation

A Cochrane Review by Bugg, Siddiqui, and Thornton (2011) found that there were no significant differences between groups for the use of oxytocin (versus no use or placebo) or the early oxytocin (versus delayed use) in the subsequent rate of Cesarean deliveries for low risk women in the first stage of spontaneous labor. This review encompassed eight RCTs and 1,338 women. However, this review did not account for

*When managed appropriately, higher dose oxytocin protocols, are safe for mother & fetus.*

the dose of oxytocin used for labor augmentation. Another Cochrane Review by Mori, Tokumasu, Pledge, and Kenyon (2011) did examine this question and included four RCTs and over 600 women. They found that when high dose oxytocin protocols were used, compared with low dose protocols, that the risk of Cesarean delivery was nearly halved (RR 0.53 [95%CI 0.38-0.75] NNT=10). This meta-analysis did not demonstrate statistically significant differences in neonatal or maternal adverse events such as admission to the NICU, low 5 minute Apgar score, chorioamnionitis or uterine hyperstimulation. In these trials the high dose protocols used 4 to 7 milliunits (mU) of oxytocin per minutes (the trials used, respectively, 4, 4, 4.5 and 7 mU/min) to begin

and increased it by an equivalent amount every 15 to 30 minutes. The low dose protocols began at 1 to 1.5 mU/min and had a similar pattern of titration to effect. Oxytocin protocols suggested by ACOG include a high dose protocol starting with 6 mU/min with incremental dose increases of 3 to 6 mU/min every 15 to 40 minutes (Shwayder, 2010). However, the pharmacokinetics of oxytocin are such that intervals of less than 30 minutes are not likely to be physiologic and may not be necessary (Clark, Simpson, Knox & Garite, 2009). Oxytocin is a “high risk” drug and its use requires trained personnel and careful attention to detail. Standardized protocols for use help to assure patient safety and reduce liability (Simpson, 2011; Shwayder, 2010; Clark et al., 2009). ***The overall strength of evidence is high that higher dose protocols are more effective at achieving vaginal delivery and present few harms for either the mother or fetus/newborn.***

## Second Opinion for Making Decisions about Cesarean Delivery

In the National Sentinel Caesarean Section Audit (NACSA) in the UK, the presence of a Consultant (senior obstetrician) in the operating room or involved in the decision for Cesarean delivery varied across maternity units (NICE, 2011). This audit gathered information on over 33,400 Cesarean operations conducted in 2000 and 2001 in all regions of the U.K. The NACSA found that consultants were present in the operating room for about 12.5% of Cesarean operations (8.7% of emergent Cesareans and 4.8% of emergent after hours Cesareans). Consultants were involved in the decision (presumably remotely via telephone most of the time) about three-quarters of the time. The presence of a Consultant obstetrician in the operating room reduced the risk of Cesarean delivery for emergent ( $p=0.04$ ) and for afterhours emergent Cesarean operations ( $p=0.04$ ), after case mix adjustment. Any involvement of a Consultant obstetrician in the decision to perform a Cesarean delivery also reduced the risk of Cesarean birth overall ( $p<0.01$ ) and for emergent ( $p=0.01$ ) and after hours emergent operations ( $p=0.01$ ), after case mix adjustment.

A large cluster randomized trial conducted in Latin America randomized public hospitals to a policy of mandatory second opinion prior to Cesarean versus routine management (Althabe et al., 2004). Thirty-four hospitals caring for almost 150,000 women during the study period participated. The baseline Cesarean rate among intervention hospitals was 26.3% and among control hospitals was 24.6%. They found a 7.3% relative rate reduction for Cesarean delivery among intervention hospitals (NNT 14), with a 12.3% relative rate reduction for intrapartum Cesarean operations (NNT 8). The largest effect was seen for the potential indications of maternal reasons, dystocia and “fetal distress.” Other measures of maternal outcomes and neonatal morbidity were unchanged. The authors estimated that this second opinion policy would translate to 22 fewer Cesareans per 1,000 hospital deliveries. Physicians found the intervention quite acceptable and felt it would be feasible to implement in other public hospitals, but questioned whether the policy could be applied in private hospitals.

Two more recent studies, both from the UK, have reported similar findings. A small study by Oláh (2005) found that over five years a Consultant obstetrician’s reassessment reversed the decision to perform a Cesarean delivery in the second stage of labor in 20 of 32 cases (62.5%) (NNT=3). In another small study, Lewis, Barr, and Thomas (2011) reported that when women were taken to the operating room during the second stage of labor there was a 70% (7 of 10) chance of a vaginal delivery if the Consultant obstetrician was present and a 30% (12 of 40) chance if the Consultant was not present (NNT=3).

***The overall strength of evidence for obtaining a second opinion prior to conducting a Cesarean operation in the second stage of labor is moderate although the application of this strategy to the U.S. setting is not direct.***

However, this evidence comports with that of giving more time in the second stage of labor and with some evidence found in the next section on systems level interventions. It is also echoed in the recommendations of the CMQCC to encourage operative vaginal delivery as an alternative to Cesarean delivery when it is appropriate (Main et al., 2011).

## Systems Level Interventions

Systems level interventions include a variety of approaches, including the institutional use of clinical practice guidelines, audit and feedback of practice and outcomes, quality improvement efforts, the support of opinion leaders and mixed or multifaceted strategies. The SRs on these types of interventions are described generally in the next paragraphs. Data on the specific interventions with regard to their effectiveness is detailed in specific sections.

Chaillet and Dumont (2007) conducted a good quality SR on institutional strategies for implementing guidelines and improving quality of care for childbearing women. They included 10 cluster randomized trials, conventionally randomized trials and interrupted time series (ITS) studies in the SR. They judged that there was sufficient data on three strategies: audit and feedback, quality improvement (QI) and multifaceted strategies. Overall, these strategies reduced Cesarean delivery by 19% (95% CI 13-25%). None of the included studies found an increase in perinatal or maternal morbidity associated with reducing Cesarean delivery rates. One study did find a significant decrease in perinatal and neonatal mortality with the intervention. The authors conducted a meta-regression to explore heterogeneity among studies and found that nearly all of the variation in effect could be attributed to three factors: type of strategy (audit and feedback, quality improvement or multifaceted); study design; and whether there was an explicit identification of barriers to change. The evidence on each of these three strategies is presented below.

Khunpradit and colleagues (2011) conducted a Cochrane Review of non-clinical interventions for reducing unnecessary Cesarean deliveries. There was substantial overlap with the studies included in the Chaillet and Dumont (2007) SR for institutional level interventions. They identified 10 studies of interventions targeting health professionals and six that were aimed at pregnant women. There was insufficient evidence about prenatal education, computer-based or written patient decision aids, or intensive group therapy. A nurse-led relaxation training program for women with childbirth-related fear and anxiety and a birth preparation

program were both found to be effective at reducing Cesarean delivery rates when directed at specific groups of pregnant women. One cluster randomized RCT of guideline implementation for mandatory second opinion (Althabe et al., 2004), detailed in the preceding section found a small, but significant, decrease in Cesarean delivery rates. Another ITS study of peer review at obstetric department meetings and mandatory second opinion for Cesarean deliveries found a significant effect on repeat Cesarean deliveries, but not primary operations (Liang et al., 2004). The Cochrane Review included one study using opinion leaders (Lomas, 1991) that had been excluded by Chaillet and Dumont (2007). This study intervention targeted only women with a history of prior Cesarean delivery, finding an absolute difference of 13.5%, but statistical testing was not provided. Khunpradit and colleagues (2011) found insufficient evidence on public health nurse training, insurance reform, external peer review and legislative changes.

### Audit & Feedback

Chaillet and Dumont (2007) included four fair to good quality cluster RCTs and ITS studies of audit and feedback conducted in South America, Taiwan, the UK and the U.S. Study subjects were obstetricians and other health care professionals. These studies included data on the deliveries of over 900,000 women.

They found that Cesarean risk was reduced (RR 0.87 [95% CI 0.81-0.93]) and NNTs ranged from 16-53.

Having clinicians understand *what they do and its result* is one of the most important ways to *improve care*.

Audits were conducted on various aspects of care across these studies, including a mandatory second opinion policy, regular presentation of cases, and encouragement of trial of labor after Cesarean (TOLAC). Feedback was provided by peers, leaders or outside teams, depending on the study. In general, the more intensively the feedback was provided, the more effective the intervention. In contrast to the review by Chaillet and Dumont (2007), the Cochrane Review by Khunpradit and colleagues (2011) did not find sufficient evidence to support

audit and feedback strategies, but the Chaillet and Dumont review included one additional large study on the intervention and also analyzed its effect when combined with other interventions. The SR on guideline implementation strategies by Chaillet and colleagues (2006) described below also identified 11 studies that incorporated audit and feedback for obstetric guideline implementation and found that nine of them had a positive impact. **The overall strength of evidence is moderate.**

## Quality Improvement

Four (three RCTs and one ITS) studies of QI strategies were included. Three were of good quality and one was rated as fair. These interventions, conducted in the U.S. and Australia, involved mixed groups of health professionals and included deliveries of about 30,000 women. Various QI interventions carried out among these studies included active management of labor, continuity team-based midwifery, promotion of VBAC, and the appropriate use of electronic fetal monitoring. As a group these interventions effectively reduced Cesarean rates (RR 0.73 [95% CI 0.70-0.77]), although the NNTs varied from 14-200 across the studies. The results were reasonably consistent with the exception of one RCT on active management of the third stage of labor. **The overall strength of evidence is moderate, primarily because the numbers and varieties of programs studied creates clinical and statistical heterogeneity.**

## Multifaceted Strategies

Two ITS studies of multifaceted interventions were included in the Chaillet and Dumont SR (2007). Both involved U.S. obstetricians as study subjects and included data from about 25,000 deliveries. These strategies included items such as professional and public education, implementation of clinical practice guidelines, peer review and feedback, hospital payment and liability reforms, nursing staff education and performance reporting. These complex interventions were effective for Cesarean delivery reduction (RR 0.73 [95% CI 0.68-0.79]) with NNTs of 12 and 19. **The overall strength of evidence is moderate, largely due to heterogeneity among studies.**

In summary, the Chaillet and Dumont (2007) SR found that audit and feedback, quality improvement and multifaceted strategies to reduce Cesarean delivery all appear to be safe, with no increased risk of maternal or perinatal morbidity or mortality. The authors found that when the study incorporated identification of barriers and facilitators for change interventions were more likely to be effective in reducing Cesarean deliveries. The Kuhnpradit Cochrane (2011) SR generally agreed with these findings. **There is an overall moderate strength of evidence for each of these types of strategies for safely reducing the rate of Cesarean delivery.**

## Strategies for Guideline Implementation

Chaillet and colleagues (2006) conducted a related systematic review of evidence-based strategies for implementing guidelines in obstetrics. They included 33 studies with 10 cluster randomized trials, six RCTs, one controlled before-after study and 16 ITS studies. Guideline subjects included clinical prevention services (e.g. antenatal care), diagnosis (e.g. fetal intolerance of labor), management of labor (e.g. preeclampsia) and procedures (e.g. Cesarean delivery). Guideline implementation strategies included mailings, continuing education, audit and feedback, opinion leaders, QI, academic detailing, reminders, and multifaceted interventions. They found that in obstetrics, educational strategies with medical providers are generally ineffective. Interventions using opinion leaders, education of paramedical providers, QI, and academic detailing have reported mixed effects. Audit and feedback, reminders, and multifaceted strategies were generally found to be effective strategies for guideline implementation. Strategies that employed prospective identification of barriers to change were more likely to be effective. They concluded that identification of barriers combined with a multifaceted approach employing audit and feedback and facilitated by local opinion leaders should be recommended to allow successful behavior change and guideline adoption. **No overall NNT could be calculated due to the varied nature of evidence. Audit and feedback, reminders and multifaceted strategies are effective in changing obstetric provider behavior in accord with guideline recommendations, although the magnitude of that effect is likely specific to settings and interventions.**

## Evidence Summary

Table 2.2 summarizes the evidence for the interventions described above with the NNT for each. It is indicated where the data were not sufficient to allow calculation of an NNT. There are multiple interventions with high quality evidence, indicating that their use or avoidance can reduce the risk of Cesarean delivery. Quality improvement is most effective when these interventions are implemented in a systematic fashion as part of an overall program of quality and outcomes management. Providers of maternity care should also take note of the possible associated harms and benefits of these strategies. If there are significant trade-offs between lowering the risk of Cesarean delivery and maternal or perinatal morbidity, then women and families should be given clear information and support for decision-making. The preceding sections have highlights where there are significant potential harms associated with an intervention, however, this review is not intended to be a comprehensive reviews of all potential risks and benefits of each intervention.

Click on the **strategy** to jump to that section in the text.

Table 2.2. Number Needed to Treat (NNT) for Strategies to Reduce Risk of Cesarean Birth

Strategy	NNT	Additional Considerations	Strength of Evidence
<b>BEFORE LABOR</b>			
<a href="#">Social support for at-risk women</a>	33	Form of emotional support, place support provided, personnel providing support & additional tangible assistance provided varied among studies	HIGH
<b>Turning breech fetuses</b>			
External cephalic version (ECV) for breech presentation at term	6	Requires skilled provider	HIGH
Terbutaline to assist with ECV	6	Medications used may result in some short-term adverse effects	HIGH
Spinal or epidural anesthesia (with or without terbutaline) to assist ECV	7	Medications used may result in some short-term adverse effects	HIGH
Moxibustion & acupuncture	7	Requires early identification of breech presentation & skilled TCM provider	MODERATE
<b>Planned out of hospital birth</b>			
Planned home birth for low-risk women	13-34	May increase perinatal morbidity or mortality, particularly for nulliparous women, and higher-risk pregnancies (i.e. breech, twins, post-maturity)  Requires skilled providers Availability of consultation, referral, and transfer widely seen as enhancing safety	HIGH
Planned birth center or midwifery unit birth	14		
<a href="#">Delay admission until active labor has started</a>	8-34	Requires appropriate patient education, expectations, & support	LOW

Table 2.2 Continued. Number Needed to Treat (NNT) for Strategies to Reduce Risk of Cesarean Birth

Strategy	NNT	Additional Considerations	Strength of Evidence
<b>Planned VBAC</b>	3 (among U.S.-based studies of women at term)	Maternal mortality, hysterectomy, length of stay all higher with scheduled repeat Cesarean  Uterine rupture occurs in approximately 1 of 200 LAC  Perinatal death rate low overall, but may increase with LAC	HIGH
<b>Planned induction of labor</b>			HIGH
Offer induction of labor after 41 weeks of gestation	31	IOL after 41 weeks also reduces perinatal mortality, although absolute risks are low	HIGH
Restrict elective induction of labor at 37-41 weeks of gestation			HIGH
Nulliparous women	9-20	Few & conflicting data about fetal/neonatal effects of eIOL restriction, but clear association between early term delivery & both short & longer term medical, behavioral, and educational sequelae	
Multiparous women	43		
<b>DURING LABOR</b>			
<b>Continuous support in labor</b>	81	Multiple other benefits, including lower operative vaginal delivery rates, need for pain medications, low Apgar scores	HIGH
<b>Using alternatives to continuous electronic fetal monitoring</b>			HIGH
Intermittent auscultation during labor	12-58	May increase risk of isolated neonatal seizures, but IA may decrease risk of cerebral palsy among infants of high-risk women  Requires training & skilled personnel	HIGH
Intermittent auscultation rather than admission CTG	135	Use of IA not associated with neonatal harms	HIGH

Table 2.2 Continued. Number Needed to Treat (NNT) for Strategies to Reduce Risk of Cesarean Birth

Strategy	NNT	Additional Considerations	Strength of Evidence
<b><u>Pain management alternatives</u></b>	Insufficient data to calculate for most alternatives (NNH=93 for epidural use & Cesarean for “fetal distress”)	Epidural anesthesia provided good pain control, but has multiple adverse effects, including higher risk of operative vaginal delivery, intrapartum fever, labor dystocia & hypertension  May increase Cesarean in some circumstances (particularly when low dose oxytocin protocols used)	MODERATE
<b><u>Amnioinfusion for suspected cord compression</u></b>	11	Also lowers risk of operative vaginal delivery and improves neonatal outcomes (low Apgar scores, cord pH, and birth asphyxia)	HIGH
<b><u>Giving labor more time</u></b>		Prolonged second stage may increase risk of some maternal outcomes (chorioamnionitis, perineal damage, uterine atony), but neonatal risks are few	MODERATE
Using a 4 hour action line partograph	17	No adverse effects noted	MODERATE
Using a partograph with a latent phase	7	Updated ACOG active labor definitions: 6 cm for nulliparous women and 5 cm for multiparous women	MODERATE
<b><u>Using higher dose oxytocin for labor augmentation</u></b>	10	Oxytocin is a high risk medication and needs to be managed carefully, by skilled personnel  High dose protocols did not demonstrate adverse maternal or neonatal effects in meta-analysis of RCTs	HIGH
<b><u>Second opinion for making decisions about Cesarean delivery</u></b>	3-14	Consultation may increase rate of operative vaginal delivery as alternative to Cesarean	MODERATE
<b>SYSTEMS LEVEL INTERVENTIONS</b>			
<b><u>Audit and feedback</u></b>	16-53	For all systems interventions:	MODERATE
<b><u>Quality improvement strategies</u></b>	14-200		MODERATE
<b><u>Multifaceted strategies</u></b>	12-19	More intensive feedback is more effective  Identification of potential barriers and facilitators for change improves efficacy  No maternal or neonatal harms noted	MODERATE

## 2. Evidence-based Strategies to Safely Reduce Cesarean Birth Rates *Comparing Other Recommendations & Guidelines to the Evidence*

The 1997 Institute for Healthcare Improvement's (IHI) Breakthrough Series Guide Reducing Cesarean Section Rates While Maintaining Maternal and Infant Outcomes recommended key strategies for QI in the arena of reducing Cesarean deliveries: 1) preventing admissions for women who are not in active labor, 2) avoiding unnecessary induction of labor, 3) encouraging a trial of labor after prior Cesarean, 4) pre-certifying elective repeat Cesarean deliveries, 5) increasing nurses' awareness of their impact on Cesarean delivery rates, 6) managing pain during labor, and 7) creating the will for change (Flamm et al., 1997).

A decade and a half later, the California Maternal Quality Care Collaborative (CMQCC) released a white paper, *Cesarean Deliveries, Outcomes and Opportunities for Change in California: Toward a Public Agenda for Maternity Care Safety and Quality*, that recommended eight clinical improvement strategies (Main et al., 2011). Recommended strategies included:

- Reducing admissions in early labor (latent labor)
- Eliminating elective labor induction prior to 41 weeks, especially for first births with an unfavorable cervix
- Improving diagnostic and treatment approaches for labor disorders (dystocia and failure to progress)
- Standardizing diagnosis and management of fetal heart rate abnormalities during labor
- Reducing uterine hyperstimulation associated with oxytocin (oxytocin safety protocols)
- Encouraging patience in the active phase of labor and in the second stage of labor (pushing)
- Encouraging easy operative vaginal delivery as alternative to Cesarean delivery in appropriate cases
- Encouraging trial of labor after Cesarean (TOLAC) and vaginal birth after Cesarean (VBAC) with hospital policies and supportive care in labor

Washington State's Robert Bree Collaborative, established in 2011 by legislative mandate, brought together stakeholders to develop focus areas for obstetric quality improvement. After review of existing evidence-based literature and existing efforts, the

Collaborative focused on three goals: 1) Eliminate all elective deliveries before 39 weeks of gestation; 2) Decrease elective induction of labor between 39 and 41 weeks of gestation and require a minimum Bishop score of 6 for elective induction along with a specific patient consent detailing the risks of elective induction; and 3) Decrease unsupported variation in primary Cesarean rates. The first goal was well underway and so the Collaborative's role was to support that effort (Bree Collaborative, 2012).

Initial work on the second Bree Collaborative goal has focused on obtaining baseline data about the rate of elective labor induction between 39 and 41 weeks of gestation. In a report covering the first two quarters of 2012 for participating hospitals (9 hospitals, and 6,750 births), OB COAP (Obstetrics Clinical Outcomes Assessment Program), a program of Washington State's Foundation for Health Care Quality, reported that 24% of laboring patients were induced and that 38% of these were elective inductions (E. Kauffman, personal communication, January 28, 2013).

Recognizing that clear national guidelines for diagnosis and management of labor dystocia do not exist and that there is wide variation in primary Cesarean rates among Washington State hospitals, the Bree Collaborative OB subgroup recommended that hospitals adopt the following evidence-based labor and delivery management standards with the goal of reducing primary Cesarean delivery: 1) Admit spontaneously laboring women at term who present with no fetal or maternal compromise only when the cervix is 4 centimeters or more dilated; 2) Allow first stage labor arrest Cesarean, with reassuring fetal and maternal status, only in the active phase (at least 6 centimeters cervical dilation); 3) Allow adequate time in the active phase of labor (4 to 6 hours) with use of appropriate clinical interventions before making a diagnosis of active phase arrest; and 4) Allow sufficient time with appropriate clinical interventions in the 2nd stage before diagnosis of 2nd stage arrest or "failure to descend" (Bree Collaborative, 2012). The Washington State Hospital Association reported NTSV Cesarean rates from the first two quarters of 2012 for all Washington State hospitals providing maternity care and found that rates vary from 9.1% to 41.7% (WSHA, 2012).

The National Institute for Health and Clinical Excellence (NICE), the Royal College of Obstetricians and Gynaecologists (RCOG), and the Royal College of Midwives (RCM) in the UK, jointly issued the second edition of their guideline on Cesarean delivery in 2011. While much of the guideline addresses planned Cesarean delivery, the procedural aspects of the operation, and care of both the woman and her infant after Cesarean delivery, there are several recommendations about interventions that can help to reduce the rate of unnecessary Cesarean. The guideline recommends that planned Cesarean delivery not be routinely offered to women with uncomplicated twin gestation where the first twin is vertex (head first); those with HIV who are receiving highly active antiretroviral therapy (HAART) and have a viral load less than 400 copies per ml; those with Hepatitis B or C; women with recurrent genital herpes at term; and women with a BMI over 50 and no other risk factors. NICE, RCOG, and the RCM recommend that women be informed that planning a home birth reduces the likelihood of a Cesarean birth. They also suggest the following interventions as having the potential to reduce the rate of Cesarean deliveries:

- Involving consultant obstetrician in the decision-making for Cesarean delivery
- Offering external cephalic version at 36 weeks gestation
- Facilitating continuous support in labor
- Offering induction of labor beyond 41 weeks gestation
- Performing fetal scalp blood sampling prior to Cesarean delivery for women with abnormal CTG in labor if it is technically possible
- Using partogram with a 4-hour action line for women in spontaneous labor

No U.S. professional society has issued a comprehensive guideline on Cesarean delivery such as the one in place in the UK. However, all three main professional societies (ACOG, AAFP and ACNM) as well as the NIH encourage offering LAC to most women with a history of a prior Cesarean delivery (ACNM, 2011a; ACOG, 2010a; NIH, 2010; AAFP, 2005). These organizations have also issued various policies, opinions and guideline recommendations about many individual aspects of care which may influence Cesarean delivery rates. For example, ACOG recommend

offering induction of labor after 41 weeks of gestation (ACOG, 2009) and ACNM recommends that induction of labor without a medical indication is inappropriate (ACNM, 2011b). The AAFP and ACOG issued 2013 recommendations in the “Choosing Wisely” campaign to eliminate elective delivery prior to 39 weeks and to discourage non-indicated induction of labor between 39 and 41 weeks gestation.

Table 2.3 presents a summary of interventions discussed in this section and whether or not these interventions are generally supported by professional societies. This chart also includes the strategies recommended by the CMQCC, IHI, and the Washington State Bree Collaborative. The strength of evidence rating indicates how certain we can be that implementation of the strategy actually decrease Cesarean delivery rates. We used the symbols “+++”, “++” and “+” to indicate high, moderate, and low overall strength of evidence (SOE) and a “?” when there were insufficient data or indirect data on a strategy. Use of many of these strategies with uncertain SOE is supported by recommendation from professional groups, indirect evidence, face validity, and low risk of harm. We have also provided a column rating the net benefit of the strategy modified from the method used by BMJ Clinical Evidence which was in turn adapted from a system developed by the Cochrane Collaboration in their *Guide to Effective Care in Pregnancy and Childbirth* (Enkin et al., 1998). A rating of “beneficial” means that clear evidence of effectiveness based on high quality studies has been demonstrated and that the expectation of harms is small compared with the benefits. A rating of “likely to be beneficial” indicates that effectiveness may be less well established than that in the “beneficial” category, but that the evidence still points toward greater good than harm. The category of “trade-off between benefit and harm” is used when there are both positive and potential negative outcomes associated with the strategy. In these cases, patients and their caregivers should discuss the options carefully and make a decision that best fits the woman and her particular situation.

Table 2.3. Recommendations & Evidence to Support Cesarean Reduction Strategies

Recommended Intervention	Supported by Quality Collaboratives	Supported by Professional Societies	Evidence Rating	Net Benefit
<b>BEFORE LABOR</b>				
<b>Social support for at-risk women</b>		ACNM	+++	Beneficial
<b>Turning breech fetuses</b>		ACOG	+++	Beneficial
<b>Planned out of hospital birth</b>		ACNM	+++	Trade-off between benefits & harms
<b>Delay admission until active labor has started</b>	CMQCC IHI WA Bree Collab.	ACNM	+	Likely to be beneficial
<b>Planned VBAC</b>	CMQCC IHI	AAFP ACNM ACOG	+++	Likely to be beneficial
<b>Avoid unnecessary induction of labor</b>	CMQCC IHI WA Bree Collab.	AAFP ACNM ACOG	+++	Beneficial
<b>DURING LABOR</b>				
<b>Continuous support in labor</b>		ACNM	+++	Beneficial
<b>Intermittent auscultation for fetal heart rate monitoring</b>		ACNM ACOG	+++	Likely to be beneficial
<b>Pain management alternatives</b>	IHI	ACNM	++	Likely to be beneficial
<b>Amnioinfusion for suspected cord compression</b>		ACOG	+++	Beneficial
<b>Giving labor more time</b>	CMQCC WA Bree Collab.		++	Likely to be beneficial
<b>Use higher dose oxytocin protocol for labor augmentation</b>		ACOG	+++	Likely to be beneficial
<b>Second opinion for making the decision about Cesarean delivery</b>			++	Likely to be beneficial
<b>Improve diagnosis and treatment of labor dystocia</b>	CMQCC WA Bree Collab.		§	Low risk & likely to be beneficial §
<b>Standardize diagnosis and treatment of fetal heart rate abnormalities</b>	CMQCC	ACOG	§	Low risk & likely to be beneficial §
<b>Encourage operative vaginal delivery when appropriate</b>	CMQCC		§	Low risk & likely to be beneficial §
<b>SYSTEMS LEVEL INTERVENTIONS</b>				
<b>Audit and feedback</b>	WA Bree Collab.		++	Beneficial
<b>Quality improvement strategies</b>	CMQCC IHI WA Bree Collab.	ACNM ACOG	++	Beneficial
<b>Multifaceted strategies</b>	CMQCC IHI WA Bree Collab		++	Beneficial
<b>Guideline implementation strategies</b>			++	Beneficial
<b>Create will for change</b>	IHI		§	Low risk & likely to be beneficial §

**Strength of Evidence**

+++ = high      ++ = moderate      + = low

§ = strategy not included in evidence review, but recommended by organizations in table

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# Section 3. Innovative Models



### 3. Innovative Models

This section outlines the processes, methods and outcomes from five different hospitals and systems as they have worked to improve maternal and infant outcomes. Many of these systems have concentrated on reducing early elective delivery. Their stories can serve as a template for improving other types of maternity care. Local challenges are often common across settings. For example, resistance to change from people at all levels of an organization is common. The ways that these systems and hospitals tackled their challenges can help provide ideas for others institutions and issues. In preparing these profiles we interviewed representatives from each institution and thank them for their time and insights. Where there are publications available about their efforts we have included references. In the next chapter, **Managing Change**, you can read more about the specific methods that organizations can use to innovate and make positive change for women and their infants.

This section includes overviews of successful change initiatives from:

- Group Health Cooperative
- Ohio Perinatal Quality Collaborative (OPQC)
- Seton Health
- Swedish Health Services
- Yakima Valley Memorial Hospital (YVMH)

Table 3.1 provides an overview of methods employed by each hospital or system to implement change.

Table 3.1. *Methods Used by Innovative Models*

System	CS process measure vs. outcome measure	Hard stop or guideline change	Local leadership	Audit & Feedback	Targeted data	Multi-disciplinary teams	QI & rapid cycle change	Provider & patient education	Early physician champion	Local variability in guideline implementation
Group Health		✓	✓			✓			✓	✓
OPQC	✓		✓	✓	✓	✓	✓	✓	✓	✓
Seton	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Swedish		✓	✓	✓	✓	✓		✓	✓	
YVMH		✓	✓	✓	✓	✓		✓	✓	

## Group Health Cooperative

**Who** Founded in 1947 in Seattle, Washington, Group Health Cooperative is an innovative nonprofit health care system that serves over 600,000 individuals in Washington and Idaho. Group Health is the only system described in this section offering home birth services with contracted midwives.

**Why** Group Health's early elective induction rates have historically been low, predating Washington's 39 Week Initiative. Leadership attributes this success to a culture of maternity care providers who utilize evidence-based medicine and best practices in order to "do the right thing" for their patients.

## How

- Established safety culture of practitioners valuing evidence-based practices, and doing what is best for patients
- Utilized strong leadership to define culture of best practices, shared philosophical approach towards patient care
- Utilized a dynamic and engaged hospital laborist model to support practitioners
  - Laborists are involved with all labors on the unit
  - Board sign-out twice daily involves all maternity care providers and encourages multidisciplinary conferences on intrapartum management
- Implemented payment reform so that physicians are salaried and therefore not incentivized nor penalized for delivery mode and procedures
- Delay patient admission until active labor
  - Longer stays at home for low-risk women after their membranes have ruptured
- Encouraged use of doulas and continuous labor support during labor
- Encouraged labor after Cesarean
- Cultivated relationships with doulas and home birth midwives
- Empowered nurses to openly discuss safety issues
- Provided training for nurses and providers through AHRQs TeamSTEPPS® Project

## Challenges

- Outlying providers reluctant to change practice
- Presenting targeted data on individual level

## Facilitators

- Payment model does not favor surgery over vaginal delivery
- Low epidural utilization among patients
- Many providers have worked outside the U.S. and have experienced maternity care models different from current U.S. practice environments

## Successes

- Consistently one of the highest VBAC rates in Washington State
- Consistently low elective induction rates

## Bottom Line

*Innovative staffing and payment models influence culture of care and ultimately patient safety and outcomes*

# Ohio Perinatal Quality Collaborative

Rose, B. (2012). The Ohio Perinatal Quality Collaborative (OPQC): Launching and sustaining a successful state PQC. *PowerPoint slides*. Retrieved from March of Dimes website: [https://www.marchofdimes.com/pdf/kansas/9Rose\\_Compressed\\_Presentation\\_small.pdf](https://www.marchofdimes.com/pdf/kansas/9Rose_Compressed_Presentation_small.pdf)

**Who** Founded in 2007, the Ohio Perinatal Quality Collaborative (OPQC) is a statewide consortium of perinatal clinicians, hospitals, and policymakers dedicated to reducing preterm births and improving outcomes of preterm newborns through “collaborative improvement science methods.” The OPQC is comprised of 21 obstetric teams voluntarily striving to improve perinatal outcomes in the state of Ohio. OPQC hospitals account for 47% births in Ohio.

**Why** The Collaborative came together with concerns over neonatal intensive care unit admissions and avoidable perinatal mortality from early delivery. Nationally, Ohio ranked 35th in infant mortality and 31st in premature births. The Collaborative developed an initiative to curtail elective delivery at less than 39 weeks of gestation that launched in 20 metropolitan sites across Ohio.

## How

- Partnered with local opinion leaders at each institution to encourage all staff buy-in
- Created improvement teams to participate in monthly phone calls, webinars, and three in-person learning sessions
  - Teams had of at least one nurse, data manager, and physician
- Introduced strategies to reduce unnecessary early birth including:
  - Determination of gestational age by ultrasound
  - Utilization of ACOG guidelines for medical indications for induction of labor
- Provided education for providers and patients to increase awareness of early term birth risks
- Designed media campaigns with strategic messaging
- Improved communication between obstetricians and pediatricians
- Allowed each site to adopt and modify interventions based on local needs

- Convened local quality assurance committees to determine appropriates of induction indications
- Developed a OPQC Scheduled Birth Data Form to standardize data collection
- Centralized data collection and rapid-response data feedback
- Ensured staffing patterns to reduce demand on provider time
- Improved documentation of induction and delivery indications based on ACOG criteria

## Challenges

- OPQC had no regulatory authority and could only serve as a forum for collaboration
- Infrastructure is complex and requires financial support

## Facilitators

- Rapid data feedback
- Education and collaboration led by respected champions

## Successes

- Reduced elective delivery prior to 39 weeks gestation from 25% to less than 5% among participating hospitals
- Based on birth certificates, IOL without an indication declined from 13% to 8%
- Dating criteria documented in 99% of charts



## Bottom Line

***Strong leadership, effective utilization of data tracking, analysis, and reporting support change management processes***

## Seton Health

**Who** Originating in Austin, Texas in 1902, the Seton systems serve 11 counties in central Texas. In 1999, the Daughters of Charity National Health System, under which Seton operated, and the St. Joseph health system merged to form Ascension Health – the nation’s largest Catholic and largest non-profit health system.

**Why** As part of a perinatal safety initiative to eliminate birth trauma, Ascension Health aimed to eliminate non-medically indicated induction of labor less than 39 weeks.

## How

- CEO backing for quality improvement and safety change initiatives
- Recruited local physician champions
- Established interdisciplinary teams including senior administrators, physician specialists, nurses, risk managers, and quality leaders
  - Engaged vocal naysayers to create buy-in
- Integrated standardized order sets into the work flow of the labor and delivery units, sharing best practices in team meetings and conference calls
- Utilized transformation practice tools (“bundles”) to promote safety by reducing birth trauma, targeting elective induction, and augmentation
- Collected and shared data monthly, focusing on shared, blinded physician-specific data
  - Demonstrated benefits without additional harms after implementing safety bundles
- Encouraged local variation in implementation at specific sites
- Emphasized use of common terminology for fetal heart rate monitoring and training with simulations to enhance communication and teamwork
- Empowered unit secretary not to schedule IOL without proper documentation
- Utilized audit and feedback with providers resulting in improved adherence to guidelines

- Implemented policy requiring a favorable Bishop score and must be >39 weeks gestation for induction of labor
- Peer reviewed cases of induction resulting in Cesarean birth and communicated directly with providers

## Challenges

- Initial physician resistance to individual practice changes
- Lack of provider awareness of adverse maternal and neonatal outcomes from elective inductions <39 weeks until provided with individual and comparative data

## Facilitators

- Strong quality improvement environment
- Leadership committed to making change

## Successes

- Transformed initial skeptics into active proponents of change
- Maintained low primary Cesarean delivery rates for 8 years
- Reduced “convenience scheduling” of deliveries
- Decreased hospital stay duration in conjunction with reduced elective induction of labor
- No elective inductions prior to 39 weeks in the Seton system since 2005
- Although not an initial target, Seton decreased Cesarean delivery rates as a result of improved patient safety and care through the implementation of labor augmentation and elective induction bundles

## Bottom Line

***Implementing standardized care bundles reduces variation, increases patient safety, and measurably and sustainably improves clinical outcomes***

# Swedish Health Services

Reisner, D.P., Wallin, T.K., Zingheim, R.W. & Luthy, D.A. (2009). Reduction of elective inductions in a large community hospital. *American Journal of Obstetrics & Gynecology*, 200: 674.e1-7.

**Who** Swedish has been providing health care to greater Seattle, Washington since 1910. As the largest nonprofit provider in the area, Swedish operates four hospitals, 17 primary care clinics, specialty and emergency facilities. Swedish facilities delivered approximately 7,000 babies per year at the time of the labor induction project in 2007 data evaluation.

**Why** There was concern that labor induction was driving unplanned Cesarean births, operative vaginal deliveries, increased epidural use and longer lengths of stay. Swedish aimed to lower primary Cesarean deliveries by reducing elective induction of labor for both nulliparous (<2%) and multiparous women (<10%).

## How

- Formed a multidisciplinary committee representing obstetricians, family medicine physicians, midwives, perinatologists, nurses, management, and labor and delivery staff to design the intervention and jointly craft forms
- Reviewed own data and literature to come to consensus on a list of urgent conditions requiring delivery, and to separate high priority conditions requiring scheduled delivery
- Required favorable Bishop score  $\geq 6$  for elective inductions > 39 weeks
- Prohibited cervical ripening agents for elective inductions
- Ensured sufficient lead time to educate and train all parties, including office practice managers and clinicians
- Provided clinicians with individual, blinded data for comparison with peers
- Brought multiple stakeholder groups together to develop process for change
- Invested time up front addressing concerns and vetting policies and paperwork prior to implementation

- Involved nursing staff
- Held regular obstetric quality improvement meetings

## Challenges

- Multiple independent private practitioner groups (versus employed physicians) made arriving at consensus on guidelines for practice change more complex
- Providers were concerned that guidelines would limit their autonomy or limit care options

## Facilitators

- Leadership committed to outcomes imperative for guiding the process and motivating staff
- Guidance was provided for doctors, midwives and staff to create new work flow, thus they were invested in process changes

## Successes

- Women who presented in spontaneous labor spent fewer hours in labor and delivery (9.6 hours for nulliparas, 5 for multiparas) compared to those for whom labor was induced (14.8 hours for nulliparas, 9 hours for multiparas)
- Reduced elective inductions for both nulliparas (4.3% to 0.8%) and multiparas (12.5% to 9.3%)
- Decreased unplanned primary Cesarean delivery rates for women in spontaneous labor versus those who were electively induced, among both nulliparous (26.9% to 17.9%) and multiparous women (4.0% to 1.9%)



## Bottom Line

***It is possible to bring together disparate groups of providers to craft a change process acceptable to all stakeholders that results in improved maternal and neonatal outcomes—multidisciplinary involvement and committed leadership are imperative***

# Yakima Valley Memorial Hospital

**Who** Yakima Valley Memorial Hospital (YVMH) is a non-profit community hospital serving central Washington.

**Why** Wide variation in Cesarean delivery rates across providers prompted quality improvement efforts to reduce Cesarean deliveries in the early 1990s. Yakima aimed to eliminate all elective inductions of labor prior to 39 weeks gestation and has reported some of the best process and outcome metrics in Washington State.

## How

- Collected and provided blinded individual data to all clinicians for peer review; reviewed aggregate data quarterly
  - Utilized individual interventions for outliers via audit and feedback
- Utilized organizational commitment at departmental level, and included OB/GYNs, family physicians, and midwives in discussions about changing guidelines
- Provided seamless patient care with provider-nurse care teams
  - Empowered and trained nurses to discuss concerns with providers and developed strong nursing support for Cesarean reduction initiatives
- Developed guidelines, standardized booking forms, and consent documentation
- Implemented a hard stop policy for elective inductions prior to 39 weeks by requiring scheduling clerk to determine appropriate (indicated) inductions, and empowered the scheduling clerk with authority to enforce new policies
- Required all scheduling forms to be in labor and delivery department the day before scheduled induction in order to have request reviewed
  - Reviewed questionable requests (medical director or head nurse)
- Provided education at departmental meetings for providers and nurses

- Ensured maternity care staff skilled in operative vaginal delivery, vaginal breech within protocol, and comfortable with prolonged active phase labor (adopted longer partogram)
- Maintained presence of labor and delivery technicians who could function as continuous labor support staff (doulas) while decentralized monitoring encouraged bedside nursing support
- Encouraged labor after Cesarean

## Challenges

- Difficult to impact behavior of private physicians in solo practice
- Initial physician resistance to change

## Facilitators

- Many providers lived near the hospital, minimizing expedited delivery to “get home”
- Obstetrician and Family Physician staff skilled with operative vaginal and vaginal breech delivery techniques
- Patient population was desirous of vaginal delivery, and community had a positive legal environment with very low risk of malpractice claims

## Successes

- Maintains one of the lowest NTSV Cesarean delivery rates in Washington State
- Reduced elective inductions prior to 39 weeks from 11% to 4% within two years
- Over 90% of patients have births attended by their own provider



## Bottom Line

***Involving all providers affected by new policies in developing guidelines and procedural tools, as well as utilizing existing organizational culture, facilitates successful implementation***

# Section 4. Managing Change



## 4. Managing Change

### Introduction

*“Every system is perfectly designed to get the results it gets.”*

*— Paul Batalden, MD*

This section offers a conceptual model for managing change, establishing an environment conducive to change, leveraging evidence, and using the Institute for Healthcare Innovation’s (IHI) Model for Improvement to bring about lasting change. Washington State has implemented several quality improvement initiatives aimed at improving maternal and neonatal outcomes such as making data publicly available, payment reform and efforts to reduce early elective delivery. Despite these statewide programs, national guidelines and available evidence, variations in practice across health systems and providers remain. Managing change in complex healthcare systems requires tailored approaches that consider the challenges within, and external to, each system. Although no single roadmap can drive improvement for all health systems, adapting practical strategies and tools to the local environment can help institutions manage change.

Quality Improvement (QI) methodologies are broadly used across the health care sector to enact change. Six Sigma is a quality improvement methodology developed by Japanese manufacturers and brought to the U.S. in the 1980s by the communications company Motorola. Six Sigma uses data and statistical methods to identify variation in the products of manufacturing processes and identify and correct the factors leading to variability (Larson, 2003). It also uses specially trained staff (e.g. “black belts”) to facilitate change. While originally developed for manufacturing, Six Sigma has been adopted by many sectors of the economy, including healthcare. Hospital systems now routinely employ “black belts” and use Six Sigma methodologies to improve quality, mitigate waste and reduce errors (Pande, Neuman & Cavanaugh, 2001; Larson, 2003).

There is a vast amount of literature on Six Sigma QI methodologies, some of which has been tailored to the healthcare setting. This section on managing change offers a conceptual model for establishing an environment, based on Six Sigma methodologies, that is conducive to change and leverages the evidence provided in this toolkit, using the Institute for Healthcare Innovation’s Model for Improvement to bring about lasting change (see [www.ihl.org](http://www.ihl.org) for additional information, tools, publication, white papers and other materials).

## Establishing an Environment Conducive to Change

It is important to establish a change-oriented environment throughout an organization to facilitate adoption of QI efforts. The Six Sigma literature describes the ideal environment needed to create continuous and long-lasting culture change (Figure 4.1).

Figure 4.1. *Components of a Successful Change Environment* (Larson, 2003)



### Senior Executive Behavior

The backing of senior executives is key to initiating and maintaining culture change. Senior executives have the power to establish “stretch” goals and hold others accountable to achieve them. They have tools to spark and reinforce changes, such as policies and procedures, financial resources, and communications vehicles (Larson, 2003). In the IHI Breakthrough Series on Reducing Cesarean Section Rates, Flamm and colleagues (1997) contend that senior leadership commitment to an effort is likely “the most important single variable in an organization’s ability to achieve breakthrough improvement.”

### Facilitators

Facilitators are individuals with the skill and expertise needed to promote and expedite the desired changes. For example, strategies to reduce Cesarean deliveries that involve enforcing “hard stop” policies (e.g. no scheduled elective inductions under 39 weeks) are often carried out by nurses. Thus, having nurses as an integral part of the

improvement team can help to facilitate this type of change effort (Bingham & Main, 2010).

In complex environments like healthcare, change is best accomplished by improvement teams made up of facilitators from a variety of areas and experience. For example, an improvement team for a labor intervention might, depending upon the objectives, include an obstetrician, a lead nurse, a community doula, an anesthesiologist, a quality improvement specialist (e.g. a Six Sigma black-belt), and a statistician. Including frontline workers on the QI team can be strategic given the influence they have on day-to-day decisions critical to change efforts (Bingham & Main, 2010).

### Uniform Measurement

Chaillet and colleagues (2006) assert that establishing uniform measurement processes allows organizations to track the results of interventions and lends credibility to overall QI efforts. Six Sigma is a data-driven discipline and provides a variety of easily accessed tools and methodologies to identify and track areas for improvement. The **Evidence-based Strategies** section of this toolkit also indicates moderate strength of evidence that conducting data audits and providing feedback to key decision makers (e.g. obstetricians, lead nurses, management) are successful methods for reducing Cesarean deliveries (Chaillet & Dumont, 2007).

### Communication & Training

Bingham and Main (2010) discuss the silos within healthcare systems as one of several barriers to QI. They suggest that formal and informal communication, including communication tools such as guidelines and checklists, help to overcome these barriers.

While providing training to physicians and hospital staff alone is not likely to bring about change in practice, training combined with the communication of “hard stop” hospital policies communicated to physicians has been shown to be effective at reducing Cesarean deliveries (Clark et al., 2010). Audit and feedback, as discussed earlier, is another

## Case Study:

### *Reducing Cesarean deliveries in a high-functioning change environment*

Intermountain Healthcare in Utah is widely acknowledged for its innovative and tenacious approach to continuous QI. Intermountain is comprised of 22 hospitals, over 800 physicians and 33,000 employees. Intermountain's initiative to decrease planned induction of labor provides an illustration of how a successful QI environment can facilitate rapid and lasting change.

In 2001, Intermountain was responsible for over 50% of the births in the state of Utah (Oshiro, Henry, Wilson, Branch & Varner, 2009). Nine of its urban facilities in Utah and Idaho engaged in a QI program to reduce Cesarean births by reducing early-term (prior to 39 weeks gestation) elective deliveries. Baseline data taken from Intermountain's electronic health system (EHR) showed that 28% of all Intermountain elective deliveries were early-term. Within six months of beginning their QI project, the prevalence of early elective deliveries decreased to less than 10%, and after six years remained at less than 3% (Oshiro et al., 2009).

The factors described as optimal to lasting culture change were all present during Intermountain's initiative. **Senior executives** supported the QI effort and the improvement team included people necessary to **facilitate** the initiative. Intermountain had a ready QI group, the "Women and Newborn Service Line Quality Team," comprised of physicians, nurse and administrative leaders, a statistician, and a data manager. At the time the QI goal was identified this team was already established and empowered by leadership to take action.

The team's first step was to collect baseline data and identify the root causes of the high rate of early elective deliveries. The team analyzed data from Intermountain's EHR and met with providers to understand the barriers to implementing a new policy to eliminate elective deliveries.

Through this investigation they discovered the following:

- Women induced were most likely to deliver on weekdays during the day, indicating a possible association of induction with provider convenience
- Obstetric care providers believed that the American College of Obstetricians and Gynecologists' guidelines regarding early elective delivery were unwarranted and that the practice was safe
- Physicians wanted to make independent decisions
- Providers choosing elective inductions were unaware of the individual and system-wide outcomes of early-term induction
- Nurses were uncomfortable enforcing guidelines around induction

Taking into account the baseline data and the concerns of nurses, the QI team developed a final policy requiring a mandatory second opinion from the hospital's obstetrics and gynecology chairperson or from the attending perinatologist. They implemented a **communication and training** program for physicians that included presenting the new policy along with evidence-based data on harms. They also created education materials for patients (Oshiro et al., 2009).

As the initiative continued, the team provided **uniform data** reports to obstetricians and nurses. The reports included system, hospital, and individual-level process and outcomes data. Intermountain reports that this audit and feedback was central to physician adoption of the new policy (Oshiro et al., 2009).

In addition to the resources Intermountain executives devoted to maintaining the QI team, which implemented and sustained this work, hospital administrative leaders were **rewarded** through incentive compensation for achieving the goals of reducing elective early-term deliveries (Oshiro et al., 2009).

communication strategy that can help to reduce Cesarean deliveries (Chaillet & Dumont, 2007).

## Reward & Recognition

Ultimately, celebrating achievements that improve quality through reward and recognition helps to reinforce organizational focus on QI (Larson, 2003). Examples include financial incentives and public recognition for reduction in Cesarean deliveries while maintaining or improving health outcomes.

## Leveraging Evidence & Tools for Rapid Quality Improvement

Even with an effective change environment, such as Intermountain's, designing, implementing and sustaining change in the fast-paced and often under-resourced healthcare sector can be challenging. Fortunately there is evidence for and guidance from contemporary examples of how to successfully carry out obstetric change initiatives in diverse clinical settings (Fisch, English, Pedaline, Brooks & Simhan, 2009; Reisner, Wallin, Zingheim & Luthy, 2009; Clark et al., 2010; Donovan, Lannon, Bailit, Rose, Iams & Byczkowski, 2010). A variety of tools exist to facilitate change management, including the IHI Plan-Do-Study-Act (PDSA) rapid cycles of change and others. Since IHI's materials are readily accessible and have already been adopted in many healthcare settings, this section explores using PDSA cycles to implement evidence-based interventions to reduce Cesarean deliveries.

### The Model for Improvement

The Model for Improvement provides a framework for conducting rapid cycle quality improvement efforts (Langley, Nolan, Nolan, Norman & Provost,

Figure 4.2. Model for Improvement (adapted from Langley et al., 1996)



1996). This model has been used widely in healthcare due to its conceptual simplicity and focus on incremental change. The Model for Improvement describes preliminary planning steps followed by an improvement process referred to as the Plan-Do-Study-Act cycle (PDSA) (Figure 4.2).

### Establishing Aims, Prioritizing Changes & Determining Measures Using Evidence

The preliminary steps in the Model for Improvement include selecting aims and determining which interventions to undertake. While setting the overarching aim of a QI effort may be simple (e.g. to reduce Cesarean deliveries by 20% or to achieve an NTSV rate of 20%), deciding on sub-aims and prioritizing interventions can be complex. Table 2.2 *Number Needed to Treat (NNT) for Strategies to Reduce Risk of Cesarean Birth in the Evidence-based Strategies* section of this toolkit identifies multiple strategies with moderate to high strength of evidence for reducing Cesarean deliveries. The process of determining which strategies to implement and in what order should be as data-driven as possible.

Table 4.1. Example: Ranking Possible Quality Improvement Interventions

Recommended Intervention	Hospital Baseline Data	NNT	Potential Barriers	Est. Marginal Cost	Potential Cost/ Quality Savings***	Potential ROI	Rank
Turning breech fetuses	Breech presentation at term is 10% (150) compared to 4% (60) nationally	6-7	Need buy-in from non-employed OBs	\$10,000/yr communication campaign, trainings, audit & feedback, small financial incentives	18 avoided Cesarean births/yr \$230,481 savings	2,205%	1
Social support for at-risk women	29% of births via Cesarean delivery	33	Gaining participation by targeted group could be challenging	\$20,000/yr social worker time, outreach coordination	10 avoided Cesarean births/yr \$128,045 savings	540%	2

Ranking possible evidence-based interventions using a uniform rubric, such as the example provided in Table 4.1 could facilitate prioritizing interventions. Factors to consider include:

- Institutional metrics related to each evidence-based intervention (i.e. how big a problem is this in this hospital?)
- Number needed to treat (i.e. to avoid one Cesarean delivery) according to the evidence (e.g. how big an effect are we likely to get in this facility?)
- Barriers to implementation such as complex drivers of Cesarean deliveries for your population (e.g. prior failed QI efforts, low stakeholder support)
- Estimated cost of the intervention and potential annual cost savings (using hospital metrics, local and national cost data and expected NNT)
- Possible return on investment based on these estimates

Once the QI intervention has been selected, aims developed and measures agreed upon, the team is ready to begin implementing a Plan-Do-Study-Act (PDSA) cycle (IHI’s model for rapid QI test cycles).

## Implementing the Interventions: Plan-Do-Study-Act (PDSA) Cycle

Each PDSA cycle undertakes a small effort over a brief time frame and is intended to move the organization closer to its overarching aim (Langley et al., 1996). The four steps in the PDSA cycle are described next using turning breech fetuses as an example.

**PLAN:** Determine the objective, actions & outcome, process & balance measures for the PDSA cycle, and set expectations for the test

In the example of turning breech fetuses, the team must first develop its overarching objective, such as:

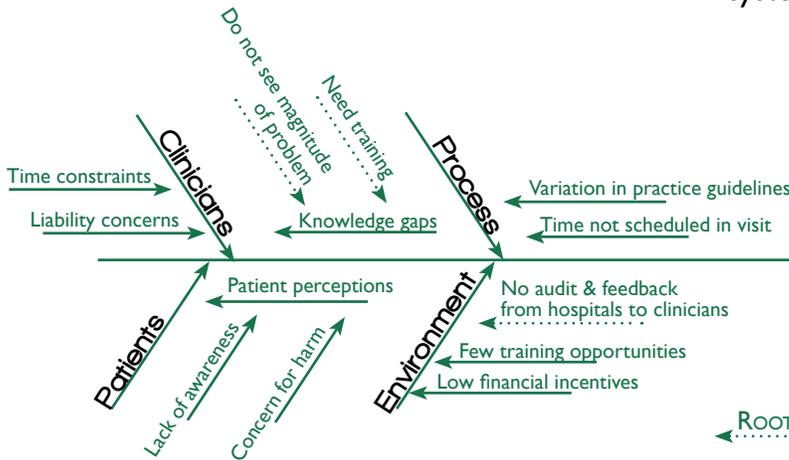
*During the first year of the intervention, our physicians will attempt to turn breech fetuses 50% of the time, and we will have avoided 116 Cesarean deliveries.*

The next step in planning is to determine which tactics have the potential to accomplish the intended goal. It may be helpful for the team to spend additional time understanding the root causes of problems in order to plan appropriately to overcome the identified barriers. A helpful QI tool is called “root cause analysis,” and a “fishbone” diagram (Figure 4.3) is a commonly used method to depict

the factors that contribute to a problem (Larson, 2003).

Figure 4.3. Turning Breech Fetuses Fishbone Diagram & Root Cause Identification

In this fishbone example, many of the barriers relate



to physicians needing, but not having, information. The team can consider evidence-based tactics to address these barriers.

Adequate time spent planning the QI intervention is key to its success. Bringing in team members with QI or project management experience to help flesh out the work plan for the intervention will help ensure it proceeds as planned. Using evidence-based interventions can also increase the likelihood of success. There are a number of system-level changes described in the literature that demonstrate a moderate strength of evidence for decreasing Cesarean deliveries:

- Mandatory second opinion policy
- Regular presentation of cases
- Peer, leader, or outside team feedback
- Professional & public education
- Clinical practice guideline implementation
- Hospital payment & liability forms
- Nursing staff education
- Audit & feedback

In the turning breech fetuses example above, professional education and audit and feedback were presented as possible strategies to achieve change.

## Establish Measures

Part of the planning process is deciding on metrics that are closely tied to the expected results of the intervention. These metrics need to be measured systematically and communicated regularly so that

the team can determine quickly and easily if the intervention is having the desired effect. There are three types of measures needed for each QI intervention: outcome, process, and balance (IHI, 2011).

Examples of outcome, process and balance measures for turning breech

fetuses are included in Figure 4.4.

Figure 4.4. Example of Quality Improvement Measures

Outcome Measures	Process Measures	Balance Measures
During Year 1, our physicians will attempt to turn 80% of breech fetuses to avoid 18 Cesarean deliveries.	95% of our physicians will be able to correctly answer follow-up questions on required education for turning breech fetuses.	There will be no statistically significant increase in adverse events due to attempts to turn breech fetuses.
	Aggregate data (by practice & physician) will be provided as a baseline, and then on monthly basis.	
	100% of eligible women will be offered external cephalic version.	
	Each quarter, Cesarean births due to breech fetuses will decrease by 5.	

**Outcome measures** are those which directly relate to the desired future state. While outcome measures are important, they are longer term metrics than are needed to know if the QI effort is successfully progressing.

**Process measures** are those intermediate metrics that help determine if the planned steps are occurring, and if they are helping the organization work toward the desired outcome.

**Balance measures** alert the team to unintended outcomes that may arise when implementing system change. It is important to be vigilant about potential harms of QI interventions in healthcare. Balance measures assist in determining whether a change is an improvement or possibly causing harm.

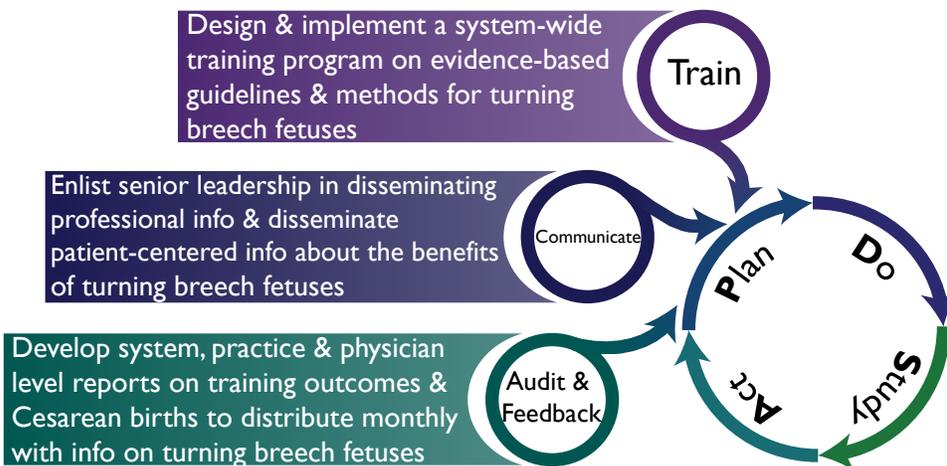
**DO:** Implement the test & collect the data to measure its effects

This is the part of the PDSA cycle when the team implements its plan, takes measurements, and begins to see if the plan is leading to improvements.

It is easy to experience planning fatigue which can lead to poor QI implementation. This is the time to ensure that the team has adequate time and resources to implement its plan.

In the turning breech fetuses example, the team might adopt a multi-pronged approach such as that described in Figure 4.5.

Figure 4.5. Plan Components



**STUDY:** Analyze the results of the test & compare those to pre-determined expectations

As discussed above, collecting and analyzing data during and after the “do” part of the cycle helps the team determine if the intervention is working as planned, needs to be modified to better address the problem identified for change, or needs to be stopped due to adverse events. The team’s “black

belts” and data staff can add tremendous value to the QI endeavor by ensuring that the uniform data collected during the implementation of the test are properly analyzed for statistical significance.

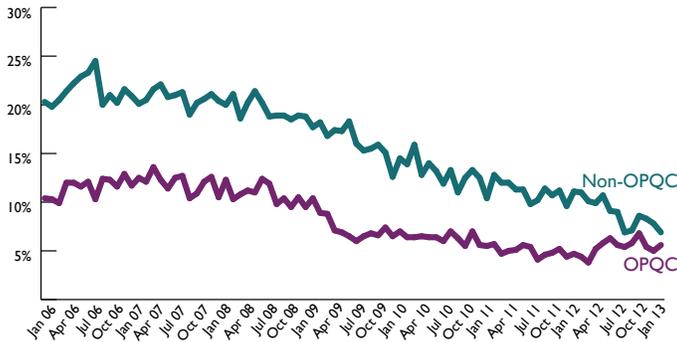
**ACT:** Consider what changes should be made, if any, to make the intervention more successful

With an implementation cycle complete and data reviewed, it is time to decide the next step. This may include rolling out the intervention on a larger scale, modifying it in some way and re-doing a PDSA cycle to increase its effectiveness, or determining that the test is unsuccessful, and after documenting lessons learned, shelving it.

Depending upon its resources and tolerance for change efforts, an institution may elect to implement several PDSA cycles at one time. As long as the metrics selected enable the team to determine which of the improvement efforts is creating the desired change, an institution may go further faster towards its goal of reducing Cesarean births.

To assist change efforts and PDSA cycles, Main suggests the addition of systemic and rigorous audit and feedback (2011). For a hospital or hospital system this might include benchmarking to regional, state or national norms. A local system or hospital might start with monitoring the Joint Commission Perinatal Care (PC) set of measures (i.e. PC-01 Elective Delivery, PC-02 Cesarean Section, PC-03 Antenatal Steroids) by provider or provider groups using run-charts similar to those used in the Ohio Perinatal Quality Collaborative (OPQC, 2010). These types of reporting, whether they be public and private reporting of providers’ outcomes, can assist in prioritizing PDSA efforts and help to detect an underlying causes to variations in care (Figure 4.5). Woodall offers a comprehensive review of controls charting in health care with examples; advantages and disadvantages of charting methods, and details on how a control charting might support quality efforts (2006).

Figure 4.5. Percent of Ohio Births Induced at 37-38 Weeks with No Apparent Medical Indication for Early Delivery, by OPQC Member Status & Month (January 2006-February 2013)



Source: Ohio Perinatal Quality Collaborative (2013)

## Conclusion

Managing change to reduce Cesarean births is a substantial undertaking. Although each setting is different and presents its own challenges, incorporating evidence, using a framework for ensuring the environment is conducive to change and utilizing the Model for Improvement can help to bring about lasting quality improvement.

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# Section 5. Resources



## 5. Resources

### *For Clinicians, Women & Families*

This section includes external hyperlinks to resources, tools, and information specific to the needs of clinicians, women, and families. This section is organized by the strategies outlined in the **Evidence-based Strategies** section. Many of the original URLs for the resources provided in this section were too long for inclusion and have therefore been shortened for ease of use using [www.tinyurl.com](http://www.tinyurl.com). By following the tinyurl links below you will be directed to the original source pages.

#### For Clinicians

The Cost of Having a Baby in the United States

[tinyurl.com/CCcostofbaby](http://tinyurl.com/CCcostofbaby)

A study of the cost (as measured by the amount that employers, Medicaid, and others) pay to hospitals, clinicians, and service providers for the birth of a child. Report commissioned by the Childbirth Connection (2013).

Evidence-Based Maternity Care

[tinyurl.com/CCEBmaternity](http://tinyurl.com/CCEBmaternity)

Report on ways to improve maternity care through evidence-based practice from the Childbirth Connection, Reforming States Group, and the Milbank Memorial Fund (2008).

Midwifery: Evidence-based Practice

[tinyurl.com/ACNMmidwifery](http://tinyurl.com/ACNMmidwifery)

A summary of research on midwifery practice in the U.S. from the American College of Nurse-Midwives (2012).

Quality Patient Care in Labor and Delivery: A Call to Action

[tinyurl.com/Qualityl-d](http://tinyurl.com/Qualityl-d)

A joint statement from the American Academy of Family Physicians, American Academy of Pediatrics, American College of Nurse-Midwives, American College of Obstetricians and Gynecologists, American College of Osteopathic Obstetricians & Gynecologists, Association of Women's Health, Obstetric and Neonatal Medicine, and the Society for Maternal-Fetal Medicine (2011).

#### For Women & Families

Avoid Unnecessary Interventions

[www.lamaze.org/d/do/7](http://www.lamaze.org/d/do/7)

Lamaze International consumer guide to avoiding interventions that are not medically indicated.

Choosing Wisely

[www.choosingwisely.org](http://www.choosingwisely.org)

ABIM Foundation initiative to promote physician-patient conversations.

Cochrane Consumer Network

[consumers.cochrane.org](http://consumers.cochrane.org)

The Cochrane Collaboration's consumer site, including links to abstracts.

Cochrane Summaries

[summaries.cochrane.org](http://summaries.cochrane.org)

Cochrane Collaboration summaries of reviews with links to abstracts and other resources.

Compare Hospitals

[www.leapfroggroup.org/cp](http://www.leapfroggroup.org/cp)

Leapfrog Group consumer tool to compare hospitals for maternity care and high-risk birth safety ratings.

Tools for Pregnant Women & New Moms

[tinyurl.com/CDCtools](http://tinyurl.com/CDCtools)

CDC tools to keep moms and babies healthy.

Safe & Healthy Birth Practices

[www.lamaze.org/d/do/3](http://www.lamaze.org/d/do/3)

Lamaze International consumer guide to healthy birth.

Reproductive Health & Birth

[tinyurl.com/IHOrepro](http://tinyurl.com/IHOrepro)

Informed Health Online's consumer resources on pregnancy and childbirth.

## Before Labor

### *Social Support*

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#### For Clinicians

Antenatal and Postnatal Mental Health  
[tinyurl.com/NICEmental](http://tinyurl.com/NICEmental)  
 Clinical guidelines from the National Institute for Health and Clinical Excellence (2007).

Creating Circles of Support for Pregnant Women and New Parents  
[tinyurl.com/Supportcirc](http://tinyurl.com/Supportcirc)  
 A manual for clinicians and service providers to support women's mental health in pregnancy and postpartum from the Best Start Resource Centre (2009).

Michigan Maternal Infant Health Program  
[tinyurl.com/MImaternal](http://tinyurl.com/MImaternal)  
 Brochure for the Michigan Department of Community Health's Maternal Infant Health Program aimed at helping women care for themselves and their babies.

North Carolina's Friendship Project  
[tinyurl.com/NCfriendship](http://tinyurl.com/NCfriendship)  
 Information on the North Carolina Healthy Start's Friendship Project—a social support program that pairs volunteers with pregnant women to provide emotional and social support during pregnancy and postpartum.

#### For Women & Families

text4baby  
[text4baby.org](http://text4baby.org)  
 Free text messages sent three times per week with tips for a healthy pregnancy and baby.



## *Turning Breech Fetuses*

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#### For Clinicians

External Cephalic Version  
 Evidence review of external cephalic version in UpToDate (2013). *Requires subscription to access.*

Vaginal Delivery of Breech Presentation  
[tinyurl.com/SOGCbreech](http://tinyurl.com/SOGCbreech)  
 Clinical practice guideline from the Society of Obstetricians and Gynecologists of Canada (2009).

#### For Women & Families

Breech Childbirth  
[tinyurl.com/SOGCbreechbirth](http://tinyurl.com/SOGCbreechbirth)  
 SOGC consumer information on breech childbirth.

If Your Baby Is Breech  
[tinyurl.com/ACOGbreech](http://tinyurl.com/ACOGbreech)  
 ACOG consumer information on breech presentation.

### *Planned Out of Hospital Birth*

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#### For Clinicians

Home Birth

[tinyurl.com/ACNMhomebirth](http://tinyurl.com/ACNMhomebirth)

ACNM position statement (2011).

Medicaid Coverage of Freestanding Birth Centers

[tinyurl.com/ACNMaca](http://tinyurl.com/ACNMaca)

Issue brief of the Patient Protection and Affordable Care Act's establishment of recognition of freestanding birth centers under Medicaid.

Planned Home Birth

[tinyurl.com/AAPhomebirth](http://tinyurl.com/AAPhomebirth)

AAP policy statement (2013).

Workshop on Research Issues in the Assessment of Birth Settings

[tinyurl.com/IOMworkshop](http://tinyurl.com/IOMworkshop)

Institute of Medicine workshop held March 6, 2013 on birth settings.

#### For Women & Families

Choosing Where to Have Your Baby

[tinyurl.com/ACNMwhere](http://tinyurl.com/ACNMwhere)

ACNM consumer guide to selecting a birth setting.

Choosing a Place of Birth

[tinyurl.com/CCplace](http://tinyurl.com/CCplace)

Childbirth Connection consumer guide for selecting a birth setting.

Questions to Ask When Choosing Your Care Provider

[www.lamaze.org/QuestionsToAsk](http://www.lamaze.org/QuestionsToAsk)

Lamaze International consumer guide to selecting a care provider.

How to Choose a Birth Center

[tinyurl.com/AABCbirthcenter](http://tinyurl.com/AABCbirthcenter)

The American Association of Birth Centers' guide for selecting a birth setting.

### *Delay of Admission*

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#### For Clinicians

Spontaneous Vaginal Delivery

[tinyurl.com/AAFPsvd](http://tinyurl.com/AAFPsvd)

2008 article from the American Academy of Family Physicians.

Labor: Preparations for Labor and Delivery

[tinyurl.com/Berghella](http://tinyurl.com/Berghella)

2009 publication from Vincenzo Berghella in the online Obstetrics Guide.

The Latent Phase of Labor: Diagnosis and Management

[tinyurl.com/JMWHlatent](http://tinyurl.com/JMWHlatent)

2010 article in the Journal of Midwifery & Women's Health.

#### For Women & Families

Am I in Labor

[tinyurl.com/ACNMLabor](http://tinyurl.com/ACNMLabor)

ACNM consumer guide for recognizing the onset of labor and recommendations for early labor management including a decision diagram.



## Vaginal Birth After Cesarean & Cesarean Delivery

### For Clinicians

Care for Women Desiring Vaginal Birth After Cesarean

[tinyurl.com/ACNMvbac](http://tinyurl.com/ACNMvbac)

ACNM evidence-based guideline on care of women with a previous Cesarean delivery.

Clinical Guidelines: Caesarean Section

[guidance.nice.org.uk/CG132](http://guidance.nice.org.uk/CG132)

NICE's evidence-based guideline for the care of women who: 1) have had a previous Cesarean delivery, 2) have a clinical indication for a Cesarean delivery, or 3) are considering a Cesarean delivery without medical indication (update 2011).

White Paper: *Cesarean Deliveries, Outcomes, and Opportunities for Change in California*

[www.cmqcc.org/resources/2079](http://www.cmqcc.org/resources/2079)

CMQCC White Paper on strategies to reduce Cesarean delivery and maintain optimal maternal and neonatal outcomes.

Vaginal Birth After Cesarean Delivery

[tinyurl.com/ACNMvbac2](http://tinyurl.com/ACNMvbac2)

ACNM position statement (2011).

Vaginal Birth After Cesarean: New Insights (2010)

[tinyurl.com/AHRQvbac](http://tinyurl.com/AHRQvbac)

AHRQ evidence report on VBAC.

Vaginal or Cesarean Birth: What is at stake for women and babies?

[tinyurl.com/CCevidence](http://tinyurl.com/CCevidence)

A best evidence review from Childbirth Connection (2012).

VBAC Guidelines

[www.nnepqin.org/VBAC.asp](http://www.nnepqin.org/VBAC.asp)

NNEPQIN recommendations for VBAC care, based on a review of the literature.

VBAC Consent Form

[www.nnepqin.org/VBAC.asp](http://www.nnepqin.org/VBAC.asp)

NNEPQIN patient consent form for VBAC.

### For Women & Families

Birth Choices After a Cesarean

[www.nnepqin.org/VBAC.asp](http://www.nnepqin.org/VBAC.asp)

NNEPQIN patient guide to VBAC.

Preventing Cesarean Birth

[tinyurl.com/ACNMpreventCS](http://tinyurl.com/ACNMpreventCS)

ACNM consumer guide to Cesarean delivery, risks, ways to avoid Cesarean, and questions to ask your provider.

Should I Have a Cesarean Section?

[tinyurl.com/ACNMcs](http://tinyurl.com/ACNMcs)

ACNM consumer guide to Cesarean delivery, including decision diagram.

Vaginal Birth After Cesarean Delivery: Deciding on a Trial of Labor After Cesarean Delivery

[tinyurl.com/ACOGtolac](http://tinyurl.com/ACOGtolac)

ACOG consumer information on VBAC and TOLAC.

Vaginal Birth After Cesarean Section

[tinyurl.com/SOGCvbac](http://tinyurl.com/SOGCvbac)

SOGC consumer information on VBAC.

Vaginal Birth After Cesarean and Planned Repeat Cesarean Birth

[tinyurl.com/PPvbac](http://tinyurl.com/PPvbac)

The Power to Push Campaign's patient guide for pregnant women who have previously delivered by Cesarean and are considering VBAC.

Vaginal Birth and Cesarean Birth: How Do the Risks Compare?

[tinyurl.com/CCvbacrisk](http://tinyurl.com/CCvbacrisk)

Companion chart to Childbirth Connection's booklet on Cesarean section.

What Every Pregnant Woman Needs to Know About Cesarean Section

[tinyurl.com/CCcsinfo](http://tinyurl.com/CCcsinfo)

Consumer guide to understating maternity care from Childbirth Connection.

## Planned Induction of Labor

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### For Clinicians

Elective Induction of Labor: Safety and Harms  
[tinyurl.com/AHRQeioI](http://tinyurl.com/AHRQeioI)  
AHRQ clinician guide on elective induction of labor includes clinical issues, brief review of evidence, risk and harms, and other considerations.

Elimination of Non-medically Indicated (Elective) Deliveries Before 39 Weeks Gestational Age  
[tinyurl.com/MODToolkit](http://tinyurl.com/MODToolkit)  
CMQCC toolkit to support hospitals in eliminating non-medically indicated deliveries before 39 weeks.

Induction of Labor  
[tinyurl.com/ACNMiol](http://tinyurl.com/ACNMiol)  
ACNM position statement (2010).

Management of Elective Labor Induction  
[tinyurl.com/IHCEiol](http://tinyurl.com/IHCEiol)  
Summary of treatment guidelines created by the Obstetrical Development Team of the Women and Newborns Clinical Program at Intermountain Healthcare (2012).

Medically Indicated Late-Preterm & Early-Term Deliveries  
[tinyurl.com/acog560](http://tinyurl.com/acog560)  
ACOG committee opinion (2013).

Nonmedically Indicated Early-Term Deliveries  
[tinyurl.com/acog561](http://tinyurl.com/acog561)  
ACOG committee opinion (2013).

### For Women & Families

Baby Knows Best  
[www.lamaze.org/TheWaitingGame](http://www.lamaze.org/TheWaitingGame)  
Lamaze International consumer information on waiting for labor to begin.

Due Date Dance  
[www.lamaze.org/DueDateDance](http://www.lamaze.org/DueDateDance)  
Lamaze International consumer information from on why a due date may not be a birth date.

Elective Labor Induction – When Is It Okay?  
[tinyurl.com/IHCEiol2](http://tinyurl.com/IHCEiol2)  
Intermountain Healthcare’s fact sheet for patients and families on induction of labor.

Induction of Labor  
[tinyurl.com/ACNMiol2](http://tinyurl.com/ACNMiol2)  
ACNM consumer guide on induction of labor.

Induction of Labor  
[tinyurl.com/CCinduction](http://tinyurl.com/CCinduction)  
Childbirth Connection consumer information on induction of labor.

Labor Induction  
[tinyurl.com/ACOGinduction](http://tinyurl.com/ACOGinduction)  
ACOG consumer information on induction of labor.

Let Labor Begin on Its Own  
[www.lamaze.org/d/do/4](http://www.lamaze.org/d/do/4)  
Lamaze International consumer guide on labor.

Scheduled Delivery Patient Guide  
[opqc.net/webfm\\_send/20](http://opqc.net/webfm_send/20)  
OPQC consumer guide on scheduled deliveries, including information on risk of a near-term birth.

Stripping Membranes  
[tinyurl.com/ACNMmembranes](http://tinyurl.com/ACNMmembranes)  
ACNM consumer guide on membrane sweeping to prevent prolonged pregnancy.

Quick Facts about Induction of Labor  
[tinyurl.com/CCinductionfacts](http://tinyurl.com/CCinductionfacts)  
Consumer information from Childbirth Connection.



## During Labor

### *Continuous Support*

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#### For Clinicians

Continuous Support for Women during Childbirth  
[tinyurl.com/CochSupport](http://tinyurl.com/CochSupport)  
 Cochrane review from 2011.

#### For Women & Families

Have Continuous Support  
[www.lamaze.org/d/dol6](http://www.lamaze.org/d/dol6)  
 Lamaze International consumer guide to finding a family, friends, or a doula for labor support.

Professional Labor Support  
[www.lamaze.org/TipsforFindingADoula](http://www.lamaze.org/TipsforFindingADoula)  
 Lamaze International consumer tips for finding a doula, either professional or friends and family.

What is a Doula?  
[www.dona.org/mothers](http://www.dona.org/mothers)  
 DONA consumer guide on doulas, as well as resources for finding local doulas.

### *Fetal Monitoring*

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#### For Clinicians

Fetal Electrocardiogram (ECG) for Fetal Monitoring During Labour (Review)  
[tinyurl.com/CochECG](http://tinyurl.com/CochECG)  
 Cochrane Collaboration review of ECG (2011).

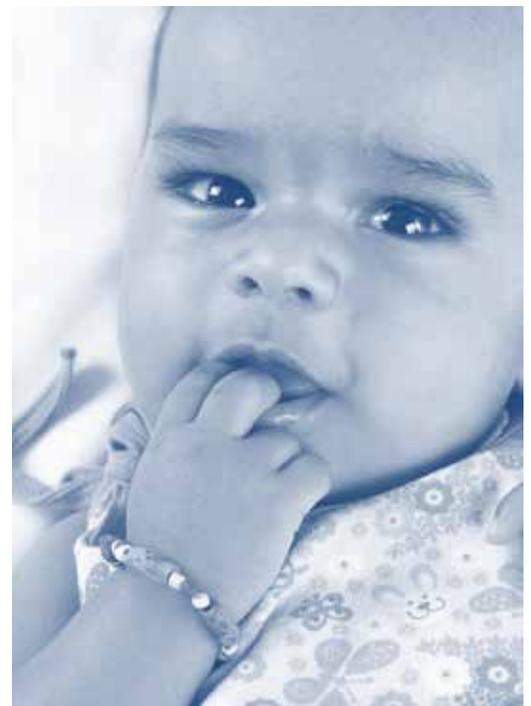
Intermittent Auscultation for Intrapartum Fetal Heart Rate Surveillance  
[tinyurl.com/ACNMheart](http://tinyurl.com/ACNMheart)  
 ACNMS clinical bulletin (2010).

Intrapartum Fetal Heart Rate Monitoring  
 ACOG practice bulletin (2009). *Requires subscription to access.*

Intrapartum Fetal Monitoring  
[tinyurl.com/RBailey09](http://tinyurl.com/RBailey09)  
 Article from Bailey, R.E. (2009). Intrapartum fetal monitoring. *American Family Physician*, 80(12): 1388-96.

#### For Women & Families

Fetal Heart Rate Monitoring During Labor  
[tinyurl.com/ACOGheart](http://tinyurl.com/ACOGheart)  
 ACOG consumer information on fetal heart rate monitoring during labor.



## *Pain Management*

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### For Clinicians

The Nature and Management of Labor Pain:  
Executive summary

[tinyurl.com/CCpainmanage](http://tinyurl.com/CCpainmanage)

Childbirth Connection summary of project on understanding and improving the management of labor pain.

The Nature and Management of Labor Pain

[tinyurl.com/AJOGpain](http://tinyurl.com/AJOGpain)

Full journal issue with articles from symposium on understanding and managing labor pain from the *American Journal of Obstetrics & Gynecology*.



### For Women & Families

10 Labor Tips

[www.lamaze.org/10LaborTips](http://www.lamaze.org/10LaborTips)

Lamaze International consumer information on ways to relieve labor pain.

Comfort in Labor

[tinyurl.com/CCcomfort](http://tinyurl.com/CCcomfort)

Childbirth Connection consumer guide to positioning and labor pain management.

Epidural and Anesthesia

[www.lamaze.org/EpiduralAndAnesthesia](http://www.lamaze.org/EpiduralAndAnesthesia)

Lamaze International consumer information on medical management of labor pain.

Get Upright & Follow Urges to Push

[www.lamaze.org/d/do/8](http://www.lamaze.org/d/do/8)

Lamaze International consumer guide birth positions and pushing.

Labor Pain

[tinyurl.com/CClaborpain](http://tinyurl.com/CClaborpain)

Childbirth Connection consumer guide to understating labor pain relief options.

Pain Relief During Labor and Delivery

[tinyurl.com/ACOGrelief](http://tinyurl.com/ACOGrelief)

ACOG consumer information on pain management during labor.

Pain During Childbirth

[tinyurl.com/ACNMPain](http://tinyurl.com/ACNMPain)

ACNM consumer guide on labor pain and options for management.

Second Stage of Labor: Pushing Your Baby Out

[tinyurl.com/ACNMPush](http://tinyurl.com/ACNMPush)

ACNM consumer guide to the second stage of labor, including knowing when to push and positions.

Walk, Move & Change Positions

[www.lamaze.org/d/do/5](http://www.lamaze.org/d/do/5)

Lamaze International consumer guide to movement and positioning to manage labor pain.

## Systems Level

### For Clinicians & Other Leaders

How-to Guide: Prevent Obstetrical Adverse Events

[tinyurl.com/IHlguide](https://tinyurl.com/IHlguide)

The Guide describes essential elements of preventing obstetrical adverse events, including the safe use of oxytocin and key evidence-based care components in the Institute for Healthcare Improvement's Perinatal Bundles. The Guide describes how to implement interventions and recommends measures to gauge improvement.

IHI Model for Improvement

[tinyurl.com/IHIModel](https://tinyurl.com/IHIModel)

The Model for Improvement (developed by Associates in Process Improvement) is a simple, yet powerful, tool for accelerating improvement. The model is not meant to replace change models that organizations may already be using, but rather to accelerate improvement.

Elimination of Non-medically Indicated (Elective) Deliveries Before 39 Weeks Gestational Age

[tinyurl.com/MODToolkit](https://tinyurl.com/MODToolkit)

The California Maternal Quality Care Collaborative's toolkit to support hospitals in eliminating non-medically indicated deliveries before 39 weeks.

MAP-IT

[tinyurl.com/KYmapit](https://tinyurl.com/KYmapit)

MAP-IT (Mobilize, Assess, Plan, Implement, and Track) is a framework that can be used to plan and evaluate public health interventions in a community.

OPQC Obstetric Tools

[opqc.net/resources](https://opqc.net/resources)

Tools including topic selection matrix, key driver diagram, scheduled delivery at 36.0-38.6 weeks form, scheduled delivery form (English and Spanish language), obstetric measures table, safety checklists, and others from the Ohio Perinatal Quality Collaborative.

Optimizing Protocols in Obstetrics

[tinyurl.com/ACOGdistrict2](https://tinyurl.com/ACOGdistrict2)

ACOG District II lessons learned and tools from their initiative to eliminate non-medically indicated deliveries prior to 39 weeks gestation.

Perinatal Quality Measures

[tinyurl.com/Periqm](https://tinyurl.com/Periqm)

A collection of perinatal quality measures from Leapfrog, AHRQ, the Joint Commission, and others, including ICD-9-CM codes and definitions.

Plan-Do-Study-Act (PDSA) Worksheet

[tinyurl.com/IHlpdsa](https://tinyurl.com/IHlpdsa)

The PDSA worksheet is a useful tool for documenting a test of change.

Reducing Elective Deliveries Before 39 Weeks

[tinyurl.com/WSPC39](https://tinyurl.com/WSPC39)

Information, resources, and tools utilized by the Washington State Perinatal Collaborative's quality improvement initiative around reducing non-medically indicated deliveries prior to 39 weeks gestation.

TeamSTEPPS®

[teamstepps.ahrq.gov](https://teamstepps.ahrq.gov)

An Agency for Healthcare Research and Quality program to improve communication and teamwork skills of health care workers. Materials are available on their website, and there are several trainings for instructors each year.

Toolkit for Building State Collaboratives

[tinyurl.com/OPQCToolkit](https://tinyurl.com/OPQCToolkit)

A continuously evolving compilation of lessons learned, concepts and methods for initiating, supporting and sustaining a statewide improvement collaborative developed by representatives from the State Improvement Collaboratives. The toolkit is peer-produced using "commons" methods by which anyone can contribute, all versions are stored, all changes include specific attributions or citations, and editing is conducted by the lead states involved.

# Organizations & Collaborations

### American Academy of Family Physicians

[www.aafp.org](http://www.aafp.org)

The American Academy of Family Physicians (AAFP) is the professional organization representing family physicians in the U.S. The AAFP promotes high quality maternity and newborn care through its emphasis on evidence-based practice, quality improvement and education. The AAFP's continuing education course on Family-Centered Maternity Care helps clinicians integrate the best and most recent evidence into their care of pregnant women and newborns. The AAFP's Advanced Life Support in Obstetrics (ALSO) course helps physicians, midwives, labor and delivery nurses, and other health care providers develop and maintain the knowledge and skills they need to effectively manage potential emergencies during the perinatal period ([www.aafp.org/also](http://www.aafp.org/also)).

### American College of Nurse-Midwives

[www.midwife.org](http://www.midwife.org)

The American College of Nurse-Midwives (ACNM) is the professional association representing certified nurse-midwives and certified midwives in the U.S. ACNM provides research, administers and promotes continuing education programs, establishes clinical practice guidelines, and creates liaisons with state and federal agencies and members of Congress.

### American College of Obstetricians and Gynecologists

[www.acog.org](http://www.acog.org)

The American College of Obstetricians and Gynecologists (ACOG) is a professional organization of obstetricians and gynecologists and providers of women's health care. ACOG provides high-quality education, continuous improvement of health care for women through practice and research, advocacy for women's health care issues nationally, and organizational support and services for members.

### California Maternal Quality Care Collaborative

[www.cmqcc.org](http://www.cmqcc.org)

The California Maternal Quality Care Collaborative (CMQCC) is comprised of state agencies, public organizations, professional groups, health systems, and universities working together to end preventable morbidity, mortality, and racial disparities in California maternity care.

### Cesareanrates.com

[www.cesareanrates.com](http://www.cesareanrates.com)

Website compiling the most current hospital-level data accessible to the public of Cesarean delivery rates. The initial goals of the site are to: a) show the (poor) quality and inaccessibility of information available to the public, b) to assess whether there is a public demand for this information, and c) to work toward establishing a precedent for hospital data transparency.

### Childbirth Connection

[www.childbirthconnection.org](http://www.childbirthconnection.org)

A national non-profit organization with the mission to improve the quality and value of maternity care through consumer engagement and health system transformation. The Childbirth Connection promotes safe, effective, and satisfying evidence-based maternity care while being a voice for the needs and interests of childbearing families.

### The Community Tool Box

[ctb.ku.edu](http://ctb.ku.edu)

The Community Tool Box is a public resource developed and managed by the Work Group for Community Health and Development at the University of Kansas. The purpose of the Tool Box is to build capacity to promote community health and development by connecting people with resources and ideas.

### DONA International

[www.dona.org](http://www.dona.org)

DONA is an international non-profit organization of doulas that strives to have every doula trained to provide the highest quality for and post-partum support for birthing women and their families.

### Institute for Healthcare Improvement

[www.ihl.org](http://www.ihl.org)

The Institute for Healthcare Improvement (IHI) is an independent non-profit organization dedicated to improving safety in health care and offers a wide range of resources and teaching tools to help health care professionals lead effective improvement efforts to enhance clinical outcomes. Their materials are high quality and free of charge.

### Lamaze International

[www.lamaze.org](http://www.lamaze.org)

Lamaze is a non-profit organization that promotes natural, healthy, and safe approaches to pregnancy, childbirth and early parenting.

### Northern New England Perinatal Quality Improvement Network

[www.nnepqin.org](http://www.nnepqin.org)

The Northern New England Perinatal Quality Improvement Network (NNEPQIN) is a voluntary consortium of organizations involved in perinatal care including hospitals, home birth provider groups, state health departments, and the March of Dimes. NNEPQIN writes collaborative, evidence-based guidelines and patient education materials to help improve perinatal outcomes across the U.S.

### Obstetrics Clinical Outcomes Assessment Program

[www.qualityhealth.org/obcoap](http://www.qualityhealth.org/obcoap)

The Obstetrics Clinical Outcomes Assessment Program (OB COAP) is a clinician-led, chart-abstracted database of the intrapartum care of pregnant women in Washington State. It is one of the clinical programs of the Foundation for Health Care Quality, a nonprofit organization dedicated to providing a trusted, independent, third party resource to all participants in the health care community. The OB COAP database includes nine of the NQF guidelines for perinatal care. As perinatal care measures change, OB COAP's flexibility allows changes to be incorporated into its reporting.

### Ohio Perinatal Quality Collaborative (OPQC)

[opqc.net](http://opqc.net)

The Ohio Perinatal Quality Collaborative (OPQC) is a statewide, multi-stakeholder network dedicated to improving perinatal health in Ohio. The OPQC employs a modified version of the Institute for Healthcare Improvement's (IHI) Breakthrough Series Model to focus on neonatal and obstetrical initiatives.

### Our Bodies Ourselves

[www.ourbodiesourselves.org](http://www.ourbodiesourselves.org)

Our Bodies Ourselves, originally the Boston Women's Health Book Collective, is a nonprofit with the goal of promoting accurate, evidence-based information on girls' and women's reproductive health and sexuality.

### Power to Push Campaign

[www.powertopush.ca](http://www.powertopush.ca)

Launched in 2010 by BC Women's Hospital & Health Centre with the goal of providing up-to-date resources for pregnant women and their families, encouraging them to know their options, advocate for their choices, and push for the safest and best birth possible. The Campaign and BC Women's Hospital Cesarean Task Force released a report in 2013 on their initiatives and achievements to optimize Cesarean delivery rates and inform women about their childbirth options. The full report can be downloaded from the Power to Push website.

### The Robert Bree Collaborative

[www.hta.hca.wa.gov/bree](http://www.hta.hca.wa.gov/bree)

The Robert Bree Collaborative (Bree) is a legislatively mandated collaboration of public and private health care purchasers, health carriers, and providers in Washington. The Bree is charged with identifying topics with variation or quality concerns and recommending effective, evidence-based strategies to improve quality health outcomes and cost-effectiveness.

### Transforming Maternity Care

[transform.childbirthconnection.org](http://transform.childbirthconnection.org)

In 2008, the Childbirth Connection convened a Vision Team of innovators in maternity care delivery and health systems to define the fundamental values, principles, and goals for high-quality, high-value maternity care systems. The Transforming Maternity Care site provides a blueprint for action and other resources to for systems and providers interested in transforming care.

### Washington State Perinatal Collaborative

[www.waperinatal.org](http://www.waperinatal.org)

The Washington State Perinatal Collaborative (WSPC) is comprised of public and private organizations and agencies dedicated to improving maternal and child health in Washington. The WSPC seeks to understand the reasons for variation among hospitals in Cesarean delivery, VBAC, and induction rates, to identify modifiable causes, and to target initiatives to improve care. Their website includes tools, resources, and extensive information on their 39 Week Initiative.

## 5. Templates & Tools

### *Forms, Templates & Other Resources*

This section includes two sample scheduling forms, one for induction of labor and one for Cesarean delivery, that you can adapt for your own practice or institution. These forms have been developed based on reviewed evidence and existing examples from organizations and hospital systems. In addition to these sample scheduling forms, please see the links below for scheduling forms and patient safety checklists, suggested guidelines for induction of labor and vaginal birth, and patient information and consent forms. This section also includes additional resources for women and clinicians under the appropriate resources sections for vaginal birth after Cesarean and induction of labor.

#### **American Congress of Obstetricians and Gynecologists**

[Trial of Labor After Previous Cesarean Delivery](#)

[Appropriateness of Trial of Labor After Previous Cesarean Delivery](#)

[Scheduling Induction of Labor](#)

[Inpatient Induction of Labor](#)

[Scheduling Planned Cesarean Delivery](#)

[Preoperative Planned Cesarean Delivery](#)

#### **Community Care of North Carolina**

[Pregnancy Medical Home Program Care Pathway](#)

#### **Northern New England Perinatal Quality Improvement Network**

[Guideline Suggestions for Elective Labor Induction](#)

[Guideline for Use of Oxytocin](#)

[Guideline for Fetal Monitoring in Labor & Delivery](#)

In addition NNEPQIN has resources at [www.nnepqin.org/guidelines.asp](http://www.nnepqin.org/guidelines.asp), including:

- [Indicated Labor Induction](#)
- [Vaginal Birth After Cesarean](#)
- [Home Birth](#)
- [Emergency Cesarean Section](#)

#### **Intermountain Healthcare**

[Patient Fact Sheet: Elective Labor Induction - When is it okay?](#)

[Patient Fact Sheet: Elective Labor Induction - What to expect from your care](#)

## Cesarean Delivery Scheduling Form

Date: \_\_\_\_\_

Patient Name: \_\_\_\_\_

Requesting Clinician: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Best EDD: \_\_\_\_\_

MR#: \_\_\_\_\_

EDD based on:

- Ultrasound at less than 20 weeks gestation
- Heart tones present by Doppler for 30 weeks
- $\geq 36$  weeks since positive serum or urine HCG test result
- Other: \_\_\_\_\_

Requested Date of Cesarean: \_\_\_\_\_

Best Estimate Gestational Age (on req date): \_\_\_\_\_

Type of Cesarean:  Primary  Repeat (Number of prior Cesarean operations: \_\_\_\_\_)

### Elective Indication for Scheduled Cesarean

### Results of Pertinent Lab Tests & Findings

### Medical Indication for Scheduled Cesarean

- Breech presentation
- Transverse presentation
- Presumed macrosomia
- Psychosocial (specify): \_\_\_\_\_
- Other (specify): \_\_\_\_\_

- Amniocentesis  
Date: \_\_\_\_\_  
Result: \_\_\_\_\_
- Group B Step testing  
Date: \_\_\_\_\_  
Result: \_\_\_\_\_
- Drug or other allergies: \_\_\_\_\_

*Fetal conditions (applies only if labor induction contraindicated)*

- Multiple gestation
- Abnormal fetal testing (specify): \_\_\_\_\_
- IUGR (<10th percentile)
- Isoimmunization
- Fetal demise
- Fetal anomaly (specify): \_\_\_\_\_
- Other (specify): \_\_\_\_\_

Note: Elective Cesarean delivery requires

- $\geq 39$  weeks gestation
- Contraindication to labor or other compelling circumstance

Note: Elective Cesarean delivery requires

- $\geq 39$  weeks gestation
- Contraindication to labor or other compelling circumstance

*Maternal conditions (applies only if labor induction contraindicated)*

- Previous myomectomy
- Previous vertical uterine scar
- Placenta previa
- Placenta accreta
- Chorioamnionitis
- Active herpes
- Severe hypertension
- Premature rupture of membranes
- Mild preeclampsia (delivery recommended at  $\geq 37$  weeks\*)
- Severe preeclampsia (expedited delivery recommendation applies after 34 weeks\*)
- Poorly controlled pregestational or gestational diabetes (delivery before 39 weeks recommended\*)
- Well controlled pregestational or gestational diabetes (with or without medications) (delivery after 39 weeks recommended\*)
- Other (specify): \_\_\_\_\_

### Scheduling

- Approved for scheduling (meets criteria above)
- Not approved for scheduling (does not meet criteria above)
- Scheduling requires approval by \_\_\_\_\_

Date of Review: \_\_\_\_\_

\* For further information on indications for late preterm and early term delivery see: Spong, C.Y., Mercer, B.M., D'Alton, M., Kilpatrick, S., Blackwell, S. & Saade, G. (2012). Timing of Indicated Late-Preterm and Early-Term Birth. *Obstetrics & Gynecology*, 118(2 pt 1): 323-33.

## Induction of Labor Scheduling Form

Date: \_\_\_\_\_

Patient Name: \_\_\_\_\_

Requesting Clinician: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Best EDD: \_\_\_\_\_

MR#: \_\_\_\_\_

EDD based on:

- Ultrasound at less than 20 weeks gestation
- Heart tones present by Doppler for 30 weeks
- $\geq 36$  weeks since positive serum or urine HCG test result
- Other: \_\_\_\_\_

Requested IOL Date: \_\_\_\_\_

Best Estimate Gestational Age (on requested date): \_\_\_\_\_

Planned Method of IOL:  Misoprostol  Other prostaglandin (e.g. dinoprostone insert)  Mechanical (e.g. Foley bulb)  
 AROM  Oxytocin  Other (specify): \_\_\_\_\_

### Indication: High Priority

*High maternal or perinatal risk, immediate IOL*

### Indication: Immediate Priority

*Medically indicated*

### Indication: Elective

*Not medically indicated*

- Abnormal fetal testing (specify): \_\_\_\_\_
- Fetal growth restriction ( $< 10^{\text{th}}$  percentile)
- Oligohydramnios, persistent and isolated (AFI  $< 5$ )
- Severe hypertension
- Premature rupture of membranes
- Other (specify): \_\_\_\_\_

- Post-term gestation ( $> 41$  wks EGA)
- Mild preeclampsia (IOL recommended at  $\geq 37$  weeks\*)
- Severe preeclampsia (IOL recommendation only applies after 34 weeks\*)
- Poorly controlled pregestational or gestational diabetes (IOL before 39 weeks recommended\*)
- Well controlled pregestational or gestational diabetes (with or without medications) (IOL after 39 weeks recommended\*)
- Maternal medical condition (specify): \_\_\_\_\_
- Twins ( $\geq 37$  weeks)
- Fetal demise
- Other (specify): \_\_\_\_\_

- Maternal request
- Prodromal labor/prolonged latent phase
- Psychosocial factors
- Isoimmunization
- History of rapid labor/distance from hospital
- Presumed macrosomia
- Prior fetal demise
- Other (specify): \_\_\_\_\_

*Note: Elective IOL requires*

- $\geq 39$  weeks gestation
- Bishop score  $\geq 8$  for nulliparas and  $\geq 6$  for multiparas
- No cervical ripening allowed (method of IOL must be oxytocin with or without AROM)

**Bishop Score:** \_\_\_\_\_

### Fetal Position:

- ROA  ROP
- LOA  LOP
- Direct OA  Direct OP
- Other (specify): \_\_\_\_\_

**Group B Strep Status:** \_\_\_\_\_

Date of most recent GBS test: \_\_\_\_\_

Result:  Positive  Negative

### Drug Allergies

List drug and type/severity of reaction: \_\_\_\_\_

If PCN/other antibiotic allergy, list GBS sensitivities from most recent culture: \_\_\_\_\_

### Scheduling

- Approved for scheduling (meets criteria above)
- Not approved for scheduling (does not meet criteria above)
- Scheduling requires approval by \_\_\_\_\_

Date of Review: \_\_\_\_\_

\* For further information on indications for late preterm and early term delivery see: Spong, C.Y., Mercer, B.M., D'Alton, M., Kilpatrick, S., Blackwell, S. & Saade, G. (2012). Timing of Indicated Late-Preterm and Early-Term Birth. *Obstetrics & Gynecology*, 118(2 pt 1): 323-33.

# Section 6. Appendices



## 6. Appendices

### *Additional Information & Resources*

The materials in these appendices are definitions and resources that you may find useful as your institution works to improve maternity care. Appendix A contains common data and performance measure definitions being used by various professional, government, payer and quality organizations. Included in this section are the applicable draft definitions from the reVITALize project which aims to standardize data definitions in maternity care across all data users. The final definitions are expected to be released in mid-2013. Appendix B is the Washington Perinatal Quality Improvement Survey which was administered in late 2012 and will be repeated periodically to track the policies and practices of birth facilities in the state. The 2012 survey report will be posted on the Washington State Perinatal Collaborative website ([www.waperinatal.org](http://www.waperinatal.org)) in mid-2013.

Many different groups issue definitions for data elements and quality or performance measures. These groups include government, insurers, quality organizations, and others. This appendix is not a comprehensive catalog of organizations and their data definitions, but highlights several key data definitions.

### The Joint Commission

The Joint Commission Perinatal Care (PC) set of measures includes the following five measures:

- PC-01 Elective Delivery
- PC-02 Cesarean Section
- PC-03 Antenatal Steroids
- PC-04 Health Care-Associated Bloodstream Infections in Newborns
- PC-05 Exclusive Breast Milk Feeding

All hospitals, beginning in 2014, must submit National Quality Forum (NQF) measure #0469 (*The Joint Commission Perinatal Care PC-01*) Elective Delivery Measure to the Centers for Medicare and Medicaid Services (CMS) as part of the Hospital Inpatient Quality Reporting (IQR) Program. All hospitals with 1,100 or more births will also be required to submit the entire Perinatal Care (PC) Measure Set to the Joint Commission for accreditation. The Joint Commission requires this entire set because of the high volume of births in the U.S. and because most hospitals provide maternity care services. The Joint Commission expects that the 1,100 birth threshold will be lowered over time to include more hospitals. It also encourages hospitals to consider adopting this measure set before the required effective date of January 1, 2014.

Additional information on the Joint Commission Perinatal Care definitions can be found in the ***Specifications Manual for Joint Commission National Quality Measures***.

### New CMS 2013 Data Submission Requirements

All hospitals in Washington State received the information on the following page regarding mandatory collection and reporting of early elective deliveries to CMS from the Washington State Hospital Association. As of the beginning of 2013, hospitals (that are not critical access hospitals) are required to submit these data to CMS, and beginning in 2015 hospitals will receive pay for reporting incentives.

The letter also contained additional resources and links, including:

***Information for CMS Hospital IQR Program***, the Specifications Manual and optional paper-based PC-01 data collection form.

### ***Joint Commission 2013AI PC-01 definition***

***Joint Commission Appendix A*** (including Table 11.07 – Conditions Possibly Justifying Delivery Prior to 39 Completed Weeks), 2013AI version.

# Appendix A: Data & Performance Measure Definitions

Dear Perinatal Nurse Managers,

We wanted to give you information regarding a new CMS 2013 data submission requirement for Elective Delivery < 39 weeks. The Washington State Hospital Association will also be including this information in their upcoming electronic Partnership for Patients Newsletter, which goes to a broad list of hospital administrators and quality improvement leaders.

Beginning with 1/1/2013 maternal discharges, all non- critical access hospitals will be required to report performance to CMS QualNet on **PC-01: Elective Early-Term Delivery**

- PC-01 Elective Delivery is being added to the list of Inpatient Quality Reporting (IQR) metrics
- CMS requirement will follow the PC-01 Joint Commission measure definition and specifications version in effect for the maternal discharge date (v2013A1 starting January 1, 2013)
- Pay-For-Reporting determination will begin with Federal Fiscal Year 2015

Current rules state that the numerator, denominator, exclusion counts and total population per hospital must be entered into Quality Net similar to other structural measures. Data submitted will be aggregate only rather than individual patient-level data.

- CMS will allow sampling according to Joint Commission specifications
- Data elements required for submission to CMS include:
  - Total population: maternal delivering patients between 8-64 years of age with a length of stay  $\leq 120$  days
  - Denominator: patients with deliveries  $\geq 37$  and  $< 39$  weeks of gestation and no exclusions
  - Numerator: patients with inductions and cesarean deliveries not in labor and not experiencing spontaneous rupture of membranes
  - Exclusions in four categories: determined in order of Joint Commission abstraction skip logic:
    - 1) ICD-9-CM diagnosis code on exclusion list (Table 11.07 of JC Appendix A)
    - 2) Enrolled in OB randomized clinical trial
    - 3) Prior uterine surgery or uterine injury (see JC for specific definitions)
    - 4) Gestational age at delivery 37 to  $< 39$  weeks gestation
- Sampling method selected by hospital: Quarterly, Monthly, No Sampling
  - Hospitals are to submit data quarterly, with submission windows and deadlines similar to other Core Measures
  - Jan-Mar, 2013 discharges will be due by July 1 to Aug 15, 2013
  - Apr-June, 2013 discharges will be due by Oct 1 to Nov 15, 2013
  - July-Sep 2013 discharges will be due by Jan 1 to Feb 15, 2014
  - Oct-Dec 2013 discharges will be due by Apr 1 to May 15, 2014

## **CMS PC-01 Elective Delivery Data Collection Recommendations for Hospitals:**

If your hospital already has a Joint Commission Core Measure vendor, which includes support for the Perinatal Care Core Measures, we recommend using that vendor data collection system for chart abstraction and collection of final aggregate data required by CMS. This method would be the most efficient due to the complexity of data collection for the four exclusion categories in the order of Joint Commission skip logic. Because of this skip logic order, some chart abstraction will occur for deliveries in all gestational age ranges. If your hospital does not currently have a Joint Commission Core Measure vendor we recommend that you use the CMS paper-based data collection method provided by CMS Quality Net. The CMS Abstraction and Reporting Tool (CART), does not contain collection for the Perinatal Care Core Measures. This is because CMS Quality Net is only requiring hospitals to submit aggregate data at this time for PC-01 Elective Delivery rather than the patient level data, which the CART system collects.

## **Recommendations regarding abstraction of medical records by Joint Commission Random Sampling vs. 100% chart abstraction to meet CMS requirements:**

For those hospitals with stable low rates per quarter of  $\leq 10\%$ : Random Sampling per Joint Commission specifications would be most efficient for determining data needed for CMS submission.

For those hospitals with unstable rates or rates  $> 10\%$ : 100% chart review is recommended in order to continue vigilant efforts to identify reasons for fall-out cases and reduce rates

## **2013 Elective Delivery Data Submission for WSHA Partnership for Patients**

Because of the large increased chart abstraction burden for hospitals to meet the CMS 2013 requirements we have decided to further simplify data submission for the WSHA Partnership for Patients effort. Data elements required in 2013 for submission are:

- 1) Numerator
- 2) Denominator
- 3) Hospital Sampling Choice: Random Sampling or 100% Review



## The National Quality Forum

The National Quality Forum (NQF) Board of Directors approved 14 quality measures on perinatal care in April 2012. The measures cover care from several maternity care areas, including childbirth, pregnancy and postpartum, and newborn care. The following is the list of NQF endorsed measures along with their sponsor organization:

- 0469: PC-01 Elective Delivery (Joint Commission)
- 0470: Incidence of Episiotomy (Christiana Care Health System)
- 0471: PC-02 Cesarean Section (Joint Commission)
- 0472: Appropriate Prophylactic Antibiotic Received Within One Hour Prior to Surgical Incision— Cesarean Section (Massachusetts General Hospital/Partners Health Care System)
- 0473: Appropriate DVT Prophylaxis in Women Undergoing Cesarean Delivery (Hospital Corporation of America)
- 0475: Hepatitis B Vaccine Coverage Among All Live Newborn Infants Prior to Hospital or Birthing Facility Discharge (Centers for Disease Control and Prevention)
- 0476: PC-03 Antenatal Steroids (Joint Commission)
- 1746: Intrapartum Antibiotic Prophylaxis for Group B Streptococcus (GBS) (Massachusetts General Hospital)
- 0477: Under 1500g Infant Not Delivered at Appropriate Level of Care (California Maternal Quality Care Collaborative)
- 0478: Neonatal Blood Stream Infection Rate (NQI #3) (Agency for Healthcare Research and Quality)
- 1731: Health Care-Associated Bloodstream Infections in Newborns (Joint Commission)
- 0304: Late Sepsis or Meningitis in Very Low Birth Weight (VLBW) Neonates (risk-adjusted) (Vermont Oxford Network)
- 0480: PC-05 Exclusive Breast Milk Feeding (Joint Commission)

- 0483: Proportion of Infants 22 to 29 Weeks Gestation Screened for Retinopathy of Prematurity (Vermont Oxford Network)

## The Obstetrics Clinical Outcomes Assessment Program

The Obstetrics Clinical Outcomes Assessment Program (OB COAP) is a clinician-led, chart-abstracted database of the intrapartum care of pregnant women in Washington State. It is one of the clinical programs of the Foundation for Health Care Quality, a nonprofit organization dedicated to providing a trusted, independent, third-party resource to all participants in the health care community – including patients, providers, payers, employers, government agencies, and public health professionals. The OB COAP database includes collection of nine of the NQF guidelines for perinatal care. As perinatal care measures change, OB COAP's flexibility allows changes to be incorporated.

## reVITALize Obstetric Data Definitions

The reVITALize Obstetric Data Definitions Conference brought together over 80 national leaders in women's health care with the common goal of standardizing clinical obstetric data definitions for use in registries, electronic medical record systems, and vital statistics. The meeting took place in August 2012 over a two day period. During the meeting, and over the months that followed, more than 60 obstetrical definitions were reviewed, discussed, and refined. Data element categories included: delivery, gestational age and term, labor, current maternal co-morbidities and complications, and maternal historical diagnoses.



For more information, see the *Executive Summary of the reVITALize Obstetric Data Definitions Conference*.

Comments on the proposed revised draft definitions were collected from November 15, 2012 to January 15, 2013. Comments received are being reviewed and final definitions are expected to be released in mid-2013.

## Appendix A: Data & Performance Measure Definitions

The definitions which were posted for comment are included at the end of this appendix. Each term has a proposed definition and includes additional considerations that were identified and highlighted for those who commented on them. The following are the refined definitions for the Gestational Age & Term, Labor, and Maternal Indicators categories (public comment period closed January 15, 2013).

### Gestational Age & Term

#### Gestational Age (Formula)

Gestational age (written with both weeks and days, e.g. 39 weeks and 0 days) is calculated using the best obstetrical EDD based on the following formula:  $[(280 \text{ days} - (\text{EDD} - \text{reference date})) / 7]$

**Example:**  $[(280 \text{ days} - (\text{July 10} - \text{July 1})) / 7] = (280 - 9) / 7 = 38 \text{ weeks and } 5 \text{ days}$

*Notes: The above formula should be read as 280 days less the number of days between the EDD and reference date. The formula does not work properly when dates do not fall within the same month.*

#### Estimated Date of Delivery

The best obstetrical Estimated Date of Delivery (EDD) is determined by: 1) last menstrual period (LMP) if confirmed by early ultrasound or no ultrasound performed, or 2) early ultrasound if no known LMP or the ultrasound is not consistent with LMP, or 3) known date of conception (e.g. ART, IUI)

*Notes: 1) Ultrasound margin of error and “early” to be defined by ACOG, 2) pregnancy should not be re-dated by a later ultrasound after a best obstetrical estimate of EDD has been established.*

#### Preterm

Less than or equal to 36 weeks 6 days

#### Early Term

37 weeks 0 days through 38 weeks 6 days

#### Full Term

39 weeks 0 days through 40 weeks 6 days.

#### Late Term

41 weeks 0 days through 41 weeks 6 days.

#### Post Term

42 weeks 0 days and beyond.

### Labor

Uterine contractions resulting in concomitant cervical change (dilation and/or effacement).

Phases: 1) Latent phase –from the onset of labor to the onset of the active phase, 2) Active phase – accelerated cervical dilation generally beginning at 5 cm for multiparous and at 6 cm for nulliparous

*Notes: 1) Avoid term “prodromal labor,” 2) is either spontaneous or induced.*

### Labor After Cesarean (LAC)

Labor in a woman who has had a previous Cesarean delivery. Planned LAC occurs in a woman intending to achieve a vaginal delivery. Unplanned LAC occurs in a woman intending an elective repeat Cesarean delivery.

### Onset of Labor

The time when uterine contractions began that resulted in labor with or without the use of pharmacological and/or mechanical interventions to initiate labor.

### Augmentation of Labor

The stimulation of uterine contractions to increase their frequency and/or strength following the onset of spontaneous labor. Does not apply if the following is performed: induction of labor. Still applies even if any the following is performed: stimulation of existing uterine contractions following spontaneous ruptured membranes.

### Induction of Labor

The use of pharmacological and/or mechanical methods to initiate labor. Examples of methods include, but are not limited to: artificial rupture of membranes, balloons, oxytocin, prostglandin, laminaria, or other cervical ripening agents. Still applies even if any of the following are performed: 1) Attempts at initiating labor even if unsuccessful, 2) initiation of labor following spontaneous ruptured membranes without contractions.

### Pharmacologic Induction of Labor

Included cervical ripening agents.

## Appendix A: Data & Performance Measure Definitions

### Non-Medically Indicated Induction of Labor or Cesarean Delivery

An induction performed in the absence of medical (maternal and/or fetal) indication(s).

### Number of Centimeters Dilated on Admission

The last documented cervical dilation, in centimeters, when the provider orders initiation of extended ante-partum or intra-partum care.

*Notes: 1) Cervical dilation may be unknown with: a) Preterm labor (Transvaginal cervical length or results of fetal fibronectin may be sufficient for admission), B) rupture of membranes, C) vaginal bleeding; 2) Cervical assessment may be done by nurse or provider.*

### Spontaneous Onset of Labor

Labor without the use of pharmacological and/or mechanical interventions to initiate labor. Does not apply if the following is performed: artificial rupture of membranes.

*Notes: May occur at any gestational age.*

### Spontaneous Labor & Birth

Initiation of labor without the use of pharmacological and/or mechanical interventions resulting in a non-operative vaginal birth. Does not apply if any of the following are used or performed: 1) cervical ripening agents, mechanical dilators, and induction of labor, 2) episiotomy, 3) forceps or vacuum assistance, 4) Cesarean section.

*Notes: Augmentation of labor and regional anesthesia are not exclusions.*

### Physiologic Childbirth

Spontaneous labor and birth at term without the use of pharmacologic and/or mechanical interventions throughout labor and birth. Does not apply if any of the following are used or performed: 1) opiates, 2) augmentation of labor, 3) regional anesthesia except for the purpose of spontaneous laceration repair.

### Duration of Ruptured Membranes

Duration from rupture of membranes to delivery (in hours).

### Artificial Rupture of Membranes

An intervention that perforates the amniotic sac. Still applies even if the following are performed: Interventions that occur transvaginally. Does not apply if any of the following are used or performed: Invasive procedures such as amniocentesis, laser therapy.

*Notes: May first occur at Cesarean delivery.*

### Pre-Labor Rupture of Membranes

Spontaneous rupture of membranes that occurs before the onset of labor.

*Notes: Modified by gestational age categories (i.e. preterm, early term)*

### Spontaneous Rupture of Membranes

A naturally occurring rupture of the amniotic sac. Does not apply if the following is performed: artificial rupture of membranes.

*Notes: May occur at any gestational age.*

## Maternal Indicators: Current Co-Morbidities & Complications

### Abruption

Placental separation from the uterus with bleeding (concealed or vaginal) before fetal delivery, with or without maternal/fetal compromise. Does not apply if the following occurs: Placenta previa.

### Early Postpartum Hemorrhage

Cumulative blood loss of  $\geq 1000$ ml OR blood loss accompanied by sign/symptoms of hypovolemia within the first 24 hours following delivery.

*Notes: 1) Signs/symptoms of hypovolemia may include tachycardia, hypotension, tachypnea, oliguria, pallor, dizziness, or altered mental status, 2) cumulative blood loss of 500-999ml alone should trigger increased supervision and potential interventions as clinically indicated, 3) a fall in hematocrit of  $>10\%$  can be supportive data but generally does not make the diagnosis of postpartum hemorrhage alone.*

# Appendix A: Data & Performance Measure Definitions

## Antenatal Small for Gestational Age

Estimated fetal weight by ultrasound less than the 10th percentile for gestational age.

*Notes: While most growth-restricted fetuses are “antenatal small for gestational age,” the reverse is not true. Therefore, the terms “fetal growth restriction” (FGR) and “intrauterine growth restriction” (IUGR) should not be used interchangeably with “antenatal small for gestational age.” Fetal growth restriction (FGR) and intrauterine growth restriction (IUGR) should be reserved for those situations where there is additional evidence that the health of the fetus is affected. Findings that would corroborate that smallness is the result of a pathologic process, rather than a constitutional finding, include abnormal umbilical artery Doppler indices, oligohydramnios, associated maternal co-morbidity known to affect utero-placental perfusion, or an abnormal fetal growth trajectory.*

## Any Antenatal Steroids

Either full course or partial course of corticosteroids for fetal lung development. Full course: a complete course of corticosteroids given with delivery 48 hours or later from the first dose. Partial course: corticosteroid started, but full course not completed.

## Clinical Chorioamnionitis

Clinical diagnosis of chorioamnionitis during labor or after pre-labor rupture of membranes. Usually includes unexplained fever (at or above 38 degree C (100.4 F)) with one or more of the following: uterine tenderness and/or irritability, leukocytosis, fetal tachycardia, maternal tachycardia, ruptured membranes >18 hrs.

*Notes: Non-laboring, intact membranes with unexplained fever requires additional testing.*

## Depression

Refer to the most current version of DSM for definition.

## Maternal Indicators: Historical Diagnosis

### Chronic Hypertension

Chronic Hypertension (existing prior to pregnancy): See National Center for Health Statistics (NCHS) definition: Elevation of blood pressure above normal for age, gender, and physiological condition. Diagnosis prior to the onset of this pregnancy-does not include gestational (pregnancy induced hypertension (PIH)).  
Chronic Hypertension Diagnosed During Current Pregnancy: Hypertension diagnosed before the 20th week of current pregnancy.

## Pregestational Diabetes

Glucose intolerance diagnosed before current pregnancy (coordinate with GDM).

## Positive GBS Risk Status

1) Rectal vaginal culture positive within 5 weeks prior to delivery, or 2) Urine GBS culture positive\* or GBS bacteria at any point in current pregnancy, or 3) Prior infant affected by GBS.

\*As defined by the CDC

## Gravida

A woman who currently is pregnant or has been in the past, irrespective of the pregnancy outcome.  
Gravidity: The number of pregnancies, current and past, regardless of the pregnancy outcome.

## Plurality

The number of fetuses delivered live or dead at any time in the pregnancy regardless of gestational age, or if the fetuses were delivered at different dates in the pregnancy. Does not apply if the following occurs: “Reabsorbed” fetuses (those that are not delivered: expelled or extracted from the mother).

## Parity

The number of pregnancies delivered at 20 weeks 0 days, or beyond, regardless of the number of fetuses alive or dead.

## Nulliparous

A woman who has never completed a pregnancy beyond 20 weeks gestation (linked with parity).

## Non-Cesarean Uterine Surgery

Surgery/injury and healing of the myometrium prior to delivery other than from Cesarean delivery.

## Maternal Weight Gain During Pregnancy

The weight at delivery minus the weight immediately prior to pregnancy.

Additional definitions and updates can be found on ACOG’s **reVITALize** website.

### Washington State Perinatal Quality Improvement Survey

In 2009, the Department of Health in collaboration with the Washington State Perinatal Advisory Group and the Washington State Hospital Association administered an online survey to delivery hospitals to learn about obstetric quality improvement and data collection practices. Results from this initial survey informed the development of the Washington State Perinatal Collaborative (WSPC) and statewide quality improvement efforts. These efforts initially focused on reducing elective deliveries before 39 weeks gestation. In 2012, the WSPC transitioned to a focus on strategies to reduce unwarranted variability in Cesarean delivery rates. The group wanted to resurvey hospitals to provide more current information to help focus efforts. The 2012 survey was completely redesigned to focus on obstetric policies and practices related to labor admission, labor management, scheduled induction of labor, scheduled Cesarean delivery, trial of labor after Cesarean birth, staffing, and training. The survey also obtained information on data collection, data sharing and benchmarking, and quality improvement efforts. It was administered online in fall 2012 and is currently being analyzed. The survey will be an ongoing part of statewide quality improvement efforts in Washington. The survey has been able to provide a picture of the landscape of policies and practices in place in Washington. The Department of Health and WSPC anticipate resurveying hospitals every few years to evaluate whether changes in education and training result in policy and practice changes, as well as whether these changes are impacting outcomes and goals.

#### Survey

We want to learn about your hospital's obstetric policies and procedures to help improve perinatal care across the state. The Washington State Perinatal Advisory Committee (PAC) is conducting this survey to gather information regarding perinatal policies, data tracking and quality improvement efforts. We will use the data to develop strategies and recommendations related to perinatal quality improvement in Washington State. We hope to repeat this survey every few year to monitor changes in hospital practices.

Though this survey will not take long to complete, we strongly recommend that you first review the printable version, located here: [\[LINK\]](#). It may be helpful to research and prepare your answer in advance. Please submit only one response from your hospital. This survey is voluntary but we ask that at a minimum you provide your name and hospital name so we can track who has been contacted to participate.

If you have any questions about the survey, please contact [\[NAME, PHONE, EMAIL\]](#).

First, please provide your name and contact information:

Name: \_\_\_\_\_

Hospital: \_\_\_\_\_

City/Town: \_\_\_\_\_

Email Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_

What is your role at the hospital? If you serve multiple roles, please check the one that best characterizes your role as the respondent to this survey:

OB Medical Director

OB Charge Nurse

Labor & Delivery Staff Nurse

Hospital Quality Improvement Director

Hospital Medical Director

Other, please specify: \_\_\_\_\_

## Appendix B: WA Perinatal Quality Improvement Survey

### Section 1: Data Collection and Quality Improvement

The next few questions address the data that your hospital collects and reviews as part of its perinatal quality improvement or performance improvement efforts.

1. Do you have a perinatal dashboard or set of indicators you collect and track on a regular basis over time?  
 Yes  
 No (please go to question 7)
2. How often are these perinatal data shared with providers?  
 Data aren't shared with providers  
 Yearly  
 Quarterly  
 Other, please describe: \_\_\_\_\_
3. What indicators do you track (please check all that apply)?  
 Cesarean section (C-section) rate  
 Primary C-section rate  
 C-section rate for nulliparous term singleton vertex (NTSV) pregnancies  
 Indication for C-section  
 Vaginal birth after Cesarean (VBAC) rate for women with prior C-sections  
 Trial of labor after Cesarean (TOLAC) rate  
 Newborn birth trauma  
 OB trauma (3rd or 4th degree lacerations) - vaginal with instrument  
 OB trauma (3rd or 4th degree lacerations) - vaginal without instrument  
 Incidence of episiotomy  
 Elective C-section/induction prior to 39 weeks gestation  
 Medical inductions prior to 39 weeks gestation  
 Elective inductions 39-41 weeks gestation  
 Indication for induction  
 Breastfeeding initiation  
 Exclusive breastmilk feeding during the hospital stay
4. Do you compare or report your data with any of the following regional and/or national benchmarking data (please check all that apply)?  
 JCAHO (The Joint Commission)  
 VON (Vermont Oxford Network)  
 The Leapfrog Group  
 NPIC (National Perinatal Information Center)  
 OB COAP (Obstetrics Clinical Outcomes Assessment Program)  
 WSPC/WSHA (Washington State Perinatal Collaborative/Washington State Hospital Association)  
 Other, please describe: \_\_\_\_\_

## Appendix B: WA Perinatal Quality Improvement Survey

5. Do you track data by provider?

Yes, for all indicators tracked

Yes, for selected indicators tracked, please specify: \_\_\_\_\_

No (please go to question 7)

6. How often do you share provider-specific data with providers?

Data aren't shared with providers

Yearly

Quarterly

Other, please describe: \_\_\_\_\_

7. Did your hospital participate in the statewide initiative to reduce Early Elective Delivery before 39 weeks gestational age?

Yes

No (please go to question 9)

8. What best describes your current hospital policy regarding induction of labor or scheduling of Cesarean section (C/S) prior to 39 weeks when there is not medical indication? (Please check ONE answer and fill in "other" if needed)

No inductions or C/S prior to 39 weeks unless case has condition on the Joint Commission exclusion list, enforced by hospital staff (sometimes referred to as a hard stop)

Same as above with exception clause allowing for appeal to medical director or chief of department prior to delivery

No elective induction or C/S prior to 39 weeks allowed by policy, but provider may override policy and perform - all exceptions go to Peer Review after delivery

Elective induction or C/S prior to 39 weeks allowed at provider discretion, but discouraged by intensive education

Other, please explain: \_\_\_\_\_

9. Have there been any other obstetric quality initiatives in the past two years at your hospital?

Yes

No

If yes, please describe: \_\_\_\_\_

10. Do you anticipate any obstetric quality initiatives in the year to come?

Yes

No

If yes, please describe: \_\_\_\_\_

## Appendix B: WA Perinatal Quality Improvement Survey

### Section 2: Labor Admission

The next few questions address your hospital's policies and practices related to admitting women in labor.

11. How does your hospital establish an admitted woman's gestational age?

- Record what admitting provider reports
- Record what admitting provider reports and note source of information
- Establish gestational age using standard protocol

12. Does your hospital have a written policy or protocol for delaying admission of low risk women who present in prodromal labor?

- Yes
- No (please go to question 15)

Comments: \_\_\_\_\_

13. Does this policy include specific criteria to distinguish prodromal labor from active labor?

- Yes
- No (please go to question 15)

What are the criteria: \_\_\_\_\_

14. If a woman does not meet the active labor criteria, is she:

- Sent home by hospital staff
- Not admitted, but allowed to labor in a designated area of the hospital until she meets criteria
- Admitted to hospital for observation (not admitted to labor and delivery)
- Admitted to hospital labor and delivery only after provider call and consults with appropriate chain of command, e.g. Obstetric Medical Director
- Admitted to hospital labor and delivery and chart is sent for peer review of exception to policy
- Other, please explain: \_\_\_\_\_

15. Please check the items below that would justify admitting a woman in prodromal labor at your hospital (please check all that apply):

- Residence is a significant distance from hospital
- Provider preference
- Medico-legal issues
- Extenuating circumstances (e.g. husband is about to be deployed)

16. Does your hospital have a lounge or place where women in early labor can rest and wait to see if they progress to active stage?

- Yes (please go to question 18)
- No

17. What are the barriers to providing a place for women in early labor (please check all that apply)?

- No space available
- Cost
- Staffing
- Liability
- Other, please describe: \_\_\_\_\_

### Section 3: Labor Management

The next few questions address your hospital's policies and practices related to labor management.

18. Does your hospital have a written policy regarding fetal monitoring in low-risk women?

- Yes
- No

19. What is your hospital's policy or normal practice regarding fetal monitoring in low-risk women?

- Most low risk women have continuous fetal monitoring
- Most low risk women have intermittent auscultation
- Other, please describe: \_\_\_\_\_

20. Does your hospital use central fetal monitoring?

- Yes
- No

21. Does your hospital have standard definitions of labor arrest for:

1<sup>st</sup> stage labor arrest

- Yes, please define: \_\_\_\_\_
- No

2<sup>nd</sup> stage labor arrest

- Yes, please define: \_\_\_\_\_
- No

22. Does your hospital require a documented second opinion for a Cesarean section due to a diagnosis of labor arrest?

- Yes, by whom: \_\_\_\_\_
- No

23. Does your hospital require a documented second opinion for a Cesarean section due to a diagnosis of fetal intolerance of labor?

- Yes, by whom: \_\_\_\_\_
- No

## Appendix B: WA Perinatal Quality Improvement Survey

24. Approximately what percent of deliveries use doulas for one-on-one labor support/coaching at your hospital?

- None
- < 5%
- 5-9%
- ≥ 10%

25. What are the barriers to using doulas for one-on-one labor support/coaching at your hospital (please check all that apply)?

- Patient cost
- Hospital cost
- Supervision/oversight
- Patients haven't requested doulas
- Nursing staff don't support doulas
- Variation in doula training
- Variation in doula ability to work as part of labor and delivery team

26. How often are nurses at your hospital able to provide one-on-one labor support/coaching during active labor?

- Almost always (please go to question 28)
- Sometimes (please go to question 28)
- Never

27. What are the barriers to nurses providing one-on-one labor support/coaching (check all that apply)?

- Cost
- Staffing
- Patient load too high
- Other, please specify: \_\_\_\_\_

28. Does your hospital provide women information or a form to complete a birth plan describing their labor and delivery preferences?

- Yes
- No

## Section 4: Induction of Labor

The following questions relate to your hospital's policy and practices around scheduled labor induction.

29. Who does the provider's office contact in order to schedule an induction of labor?

- Labor and delivery nurse
- Labor and delivery secretary/administrator
- Obstetrics charge nurse
- Other, please specify: \_\_\_\_\_

30. How far in advance can a provider schedule an induction of labor?

- days    OR     weeks    OR     any time

31. Does your hospital have a written policy for scheduling an induction of labor?

- Yes
- No (please go to question 35)

32. Does your hospital policy for scheduling an induction of labor include:

- Patient counseling using a written tool showing risks/benefits of induction (e.g. using a patient decision aid)
- Specific criteria for scheduling induction of labor
- Completion of an induction form/checklist which is filled out prior to admission (go to question 34)

33. Does the form/checklist include (check all that apply):

- Gestational age
- Method of determining estimated date of delivery
- Gravidity/parity
- Indications for induction
- Bishop score
- Method of induction
- Estimated fetal weight
- Fetal presentation
- Group B Strep status
- Induction consent form signed
- Other, please specify: \_\_\_\_\_

34. If a woman does not meet the criteria for induction of labor, is the induction (please check ONE answer and fill in "other" if needed):

- Not allowed by policy, with hospital staff as enforcers (sometimes referred to as a hard stop)
- Same as above with exception clause allowing for appeal to medical director or chief of department prior to induction and delivery
- Not scheduled by policy, but provider may override policy and perform - all exception go to Peer Review after delivery
- Scheduled at provider discretion, but discouraged by intensive education
- Other, please explain: \_\_\_\_\_

## Appendix B: WA Perinatal Quality Improvement Survey

### Section 5: Scheduled Cesarean Section

The following questions relate to your hospital's policies and practices related to **scheduling** Cesarean sections.

35. Who does the provider's office contact in order to schedule a planned Cesarean section?

- Operating Room scheduler
- Labor and delivery nurse
- Labor and delivery secretary/administrator
- Obstetrics charge nurse
- Other, please specify: \_\_\_\_\_

36. How far in advance can a provider schedule a Cesarean section?

- days    OR     weeks    OR     any time

37. Does your hospital have a written policy for scheduling a Cesarean section?

- Yes
- No (please go to question 41)

38. Does your hospital policy for scheduling a Cesarean section include:

- Patient counseling using a written tool showing risks/benefits of Cesarean section (e.g. using a patient decision aid)
- Completion of informed consent form for Cesarean section
- Specific criteria for scheduling Cesarean section
- Completion of an induction form/checklist which is filled out prior to admission (go to question 40)

39. Does the scheduled Cesarean form/checklist include (check all that apply):

- Gestational age
- Method of determining estimated date of delivery
- Gravidity/parity
- Indications for scheduled Cesarean section
- Consent form signed
- Other, please specify: \_\_\_\_\_

40. If a woman does not meet the criteria for scheduling a Cesarean section, is the Cesarean section (please check ONE answer and fill in "other" if needed):

- Not allowed by policy, with hospital staff as enforcers (sometimes referred to as a hard stop)
- Same as above with exception clause allowing for appeal to medical director or chief of department prior to induction and delivery
- Not scheduled by policy, but provider may override policy and perform - all exception go to Peer Review after delivery
- Scheduled at provider discretion, but discouraged by intensive education
- Other, please explain: \_\_\_\_\_

### Section 6: Vaginal Birth/Trial of Labor After Cesarean Section

The following questions relate to your hospital's policies and practices related to trial of labor after prior Cesarean section.

41. Does your hospital offer trial of labor after Cesarean deliveries (TOLAC)?

- Yes
- Not currently, but in planning stages to offer TOLAC (please go to question 45)
- No (please go to question 45)

42. Does your hospital have a written policy which establishes criteria for attempting a trial of labor after previous Cesarean delivery?

- Yes
- No (please go to question 45)

43. Does your hospital policy for offering TOLAC include:

- Patient counseling using a written tool showing risks/benefits of trial of labor after previous Cesarean section (e.g. using a patient decision aid)
- Completion of informed consent form for trial of labor after Cesarean
- Specific physician or staff requirements for performing TOLAC
- Specific patient criteria for performing trial of labor after Cesarean
- Completion of an induction form/checklist which is filled out prior to admission (go to question 45)

44. Does the trial of labor form/checklist include (check all that apply):

- Gestational age
- Method of determining estimated date of delivery
- Gravidity/parity
- Fetal presentation
- History of uterine rupture
- Number of prior Cesarean sections
- Documentation of uterine scar
- Prior VBAC
- Prior vaginal birth
- Indication for prior Cesarean section
- Trial of labor consent form signed
- Other, please specify: \_\_\_\_\_

## Appendix B: WA Perinatal Quality Improvement Survey

### Section 7: Staffing and Training

The next several questions address types of providers in your labor and delivery service, as well as training and education of nursing staff.

45. Does your hospital employ Laborists (also called OB Hospitalists)?

- Yes
- No (please go to question 48)

46. What days are Laborists working on-site at your hospital?

- 7 days a week
- Monday-Friday only
- Weekends only
- Other, please specify: \_\_\_\_\_

47. What hours are Laborists working on-site at your hospital?

- 24 hours a day
- Daytime only
- Nights only
- Other, please specify: \_\_\_\_\_

48. Do Certified Nurse Midwives have delivery privileges at your hospital?

- Yes
- No (please go to question 50)

49. Approximately what percent of deliveries are attended by Certified Nurse Midwives at your hospital?

- ≤ 5%
- 6-10%
- 11-15%
- > 15%

50. Does your hospital have a formal affiliation or Memorandum of Understanding with a birth center staffed by Licensed Midwives or Certified Nurse Midwives?

- Yes
- No

51. How do nurses at your hospital stay current on labor support techniques and approaches (check all that apply)?

- In-person training offered on-site
- Webinar organized by your hospital
- Webinar organized by nursing experts, such as AWHONN, Certified Nurse Educator, UW School of Nursing
- Other, please describe: \_\_\_\_\_

52. How often does your hospital require continuing education credits on labor support for your labor and delivery nurses?

- Annually
- Every other year
- Every 5 years
- No requirement
- Other, please specify: \_\_\_\_\_

53. How often does your hospital offer on-site in-person training on labor support techniques and approaches?

- Periodically, but less than yearly
- Yearly
- New staff orientation only
- Don't offer on-site in-person training on labor support
- Other, please specify: \_\_\_\_\_

54. How often does your hospital require continuing education credits on fetal heart rate tracing interpretation and description for your labor and delivery nurses?

- Annually
- Every other year
- Every 5 years
- No requirement
- Other, please specify: \_\_\_\_\_

55. How often does your hospital offer on-site in-person training on fetal heart rate tracing interpretation and description?

- Periodically, but less than yearly
- Yearly
- New staff orientation only
- Don't offer on-site in-person training on fetal heart rate tracing
- Other, please specify: \_\_\_\_\_

56. Does your hospital require training on using standard language to describe fetal heart rate tracing in labor?

- Yes, we require training for labor and delivery nurses
- Yes, we require documented training for provider delivery privileges
- No, we do not require training

57. Does your hospital require training on standards for intermittent auscultation (check all that apply)?

- Yes, we require training for labor and delivery nurses
- Yes, we require documented training for provider delivery privileges
- No, we do not require training

## Appendix B: WA Perinatal Quality Improvement Survey

58. Do providers delivering at your hospital have a strong preference to attend the deliveries of their own patients?

- Yes, most providers at our hospital prefer to deliver their own patients
- Yes, some providers at our hospital prefer to deliver their own patients
- No, providers at our hospital do not seem to have a strong preference

59. Earlier in the survey we asked several questions about a variety of hospital policies regarding labor and delivery management. At your facility, are there consequences for providers if these policies are not followed?

- Yes
- No

If yes, please describe briefly: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

60. Are there materials or training the Washington State Perinatal Collaborative could provide which would help you improve the efficacy, safety and quality of obstetric care at your hospital?

- Yes
- No

If yes, please elaborate: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

61. Is there anything we may have overlooked? If you have additional comments regarding perinatal practices or this survey that you would like to provide, please note them below.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Thank you very much for completing this survey!





If you would like to share your experiences using this toolkit, success stories, or other feedback, please send an email to [centerebp@ohsu.edu](mailto:centerebp@ohsu.edu).

Washington State  
Health Care Authority

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