

# Prevention of the Primary Cesarean Section

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- No Disclosures

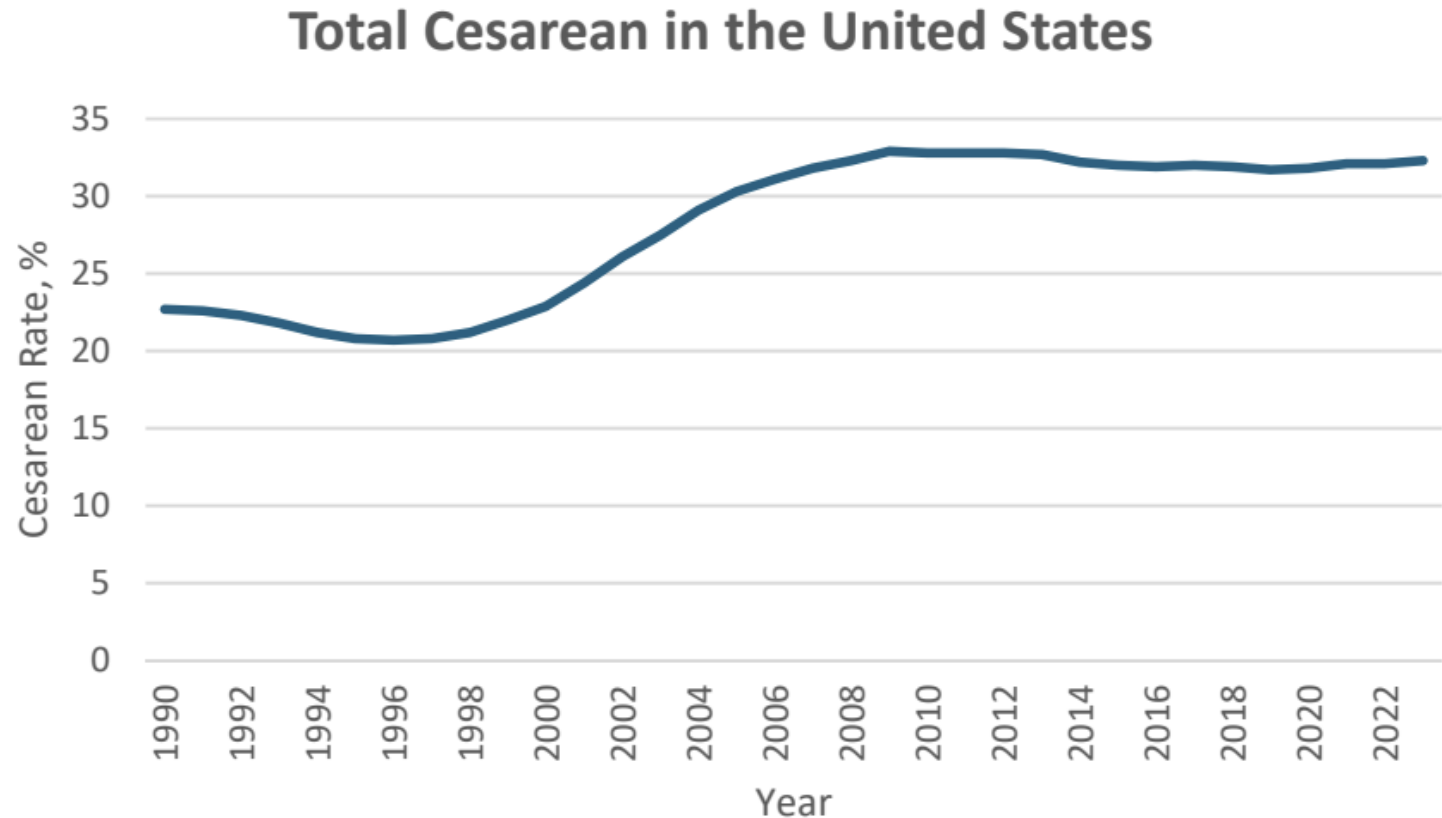
Approximately 1 in 3 women in the United States give birth by cesarean.



There has been a rapid increase in cesarean birth **without** concomitant decrease in maternal or neonatal morbidity and mortality suggesting that cesarean is **overused**.

**FIGURE 1**

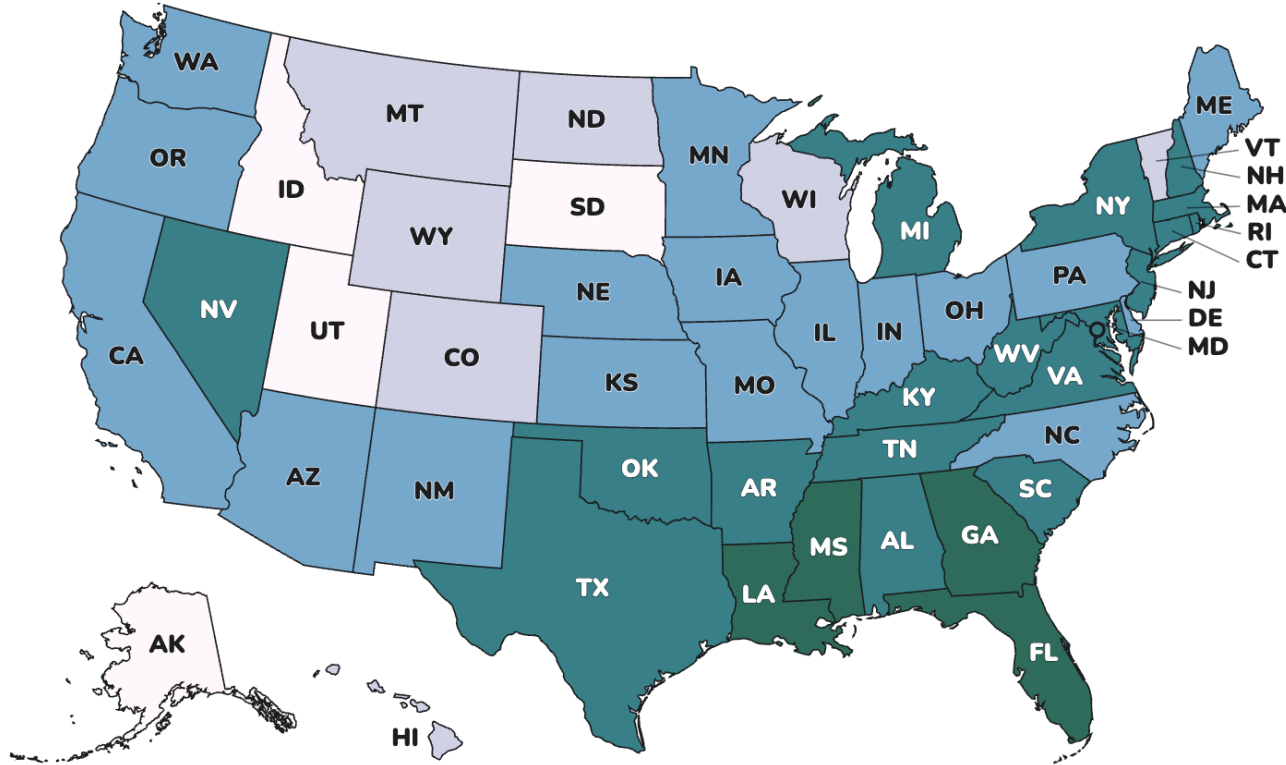
**Changes in the rate of total cesarean delivery in the United States from 1990 to 2023**



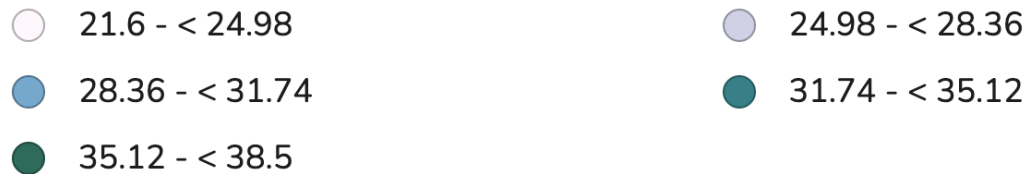
Data are from the National Vital Statistics System birth data.

Year

2023



Percent of all live births that were cesarean deliveries



Wide variation in cesarean rates among States suggest practice variation among hospitals, systems, and health care providers contribute to these rates.

Figure 3. Summary of Maternal Risks Associated with Cesarean Birth 4,8-30

## Maternal Risks of Cesarean Birth

### Physiologic

#### LONG TERM & SUBSEQUENT

- Subsequent cesarean births
- Abnormal placentation (placenta previa and placenta accreta) resulting in increased risk of severe morbidity, life-threatening hemorrhage, and hysterectomy
- Uterine rupture
- Surgical adhesions
- Bowel injury
- Bowel obstruction
- Delayed interval from incision to birth (neonatal risk)

#### ACUTE

- Longer hospital stay
- Increased pain and fatigue
- Slower return to normal activities and productivity
- Delayed and difficult breastfeeding
- Anesthesia complications
- Postpartum hemorrhage
- Wound infection
- Deep vein thrombosis
- Maternal death

### Psychological



#### ACUTE

- Delayed and/or ineffective bonding with neonate
- Maternal anxiety

#### LONG TERM & SUBSEQUENT PREGNANCIES

- Postpartum anxiety and depression
- Post Traumatic Stress Disorder (PTSD)

# Risks of Cesarean Section

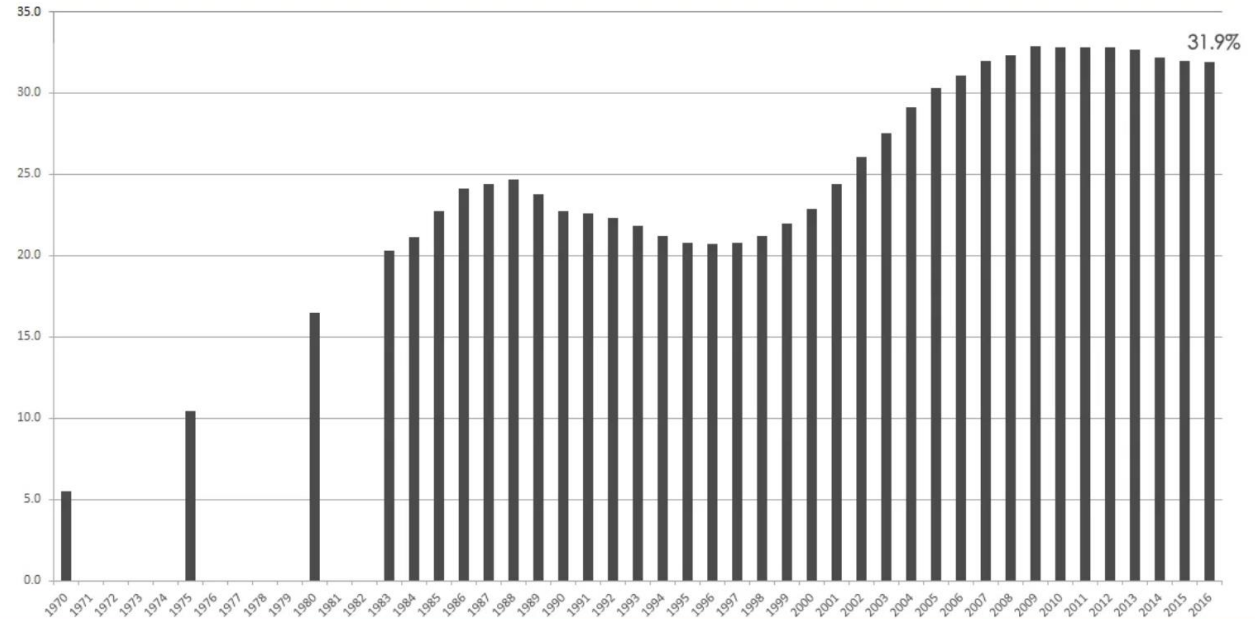
The risk of placenta previa increases with each additional cesarean.

| <u>CESAREAN</u> | <u>RISK OF ACCRETA*</u> |
|-----------------|-------------------------|
| Primary         | 3%                      |
| 2nd             | 11%                     |
| 3rd             | 40%                     |
| 4th             | 61%                     |
| 5th             | 67%                     |

\*WHEN PLACENTA PREVIA PRESENT

RISK OF ACCRETA INCREASES  
DRAMATICALLY WITH EACH  
SUBSEQUENT CESAREAN

## U.S. Cesarean Rate, 1970 - 2016



1980's

Placenta accreta occurred in about  
**1 in 1,250**  
pregnancies.

Placenta accreta now occurs in approximately

**1 in 333**  
pregnancies

and its incidence has paralleled the  
increasing cesarean rate.

[www.preventaccreta.org/parallel](http://www.preventaccreta.org/parallel)

**national accreta  
foundation**



# Prevention of the PRIMARY Cesarean

# ACOG/SMFM OBSTETRIC CARE CONSENSUS

## Safe prevention of the primary cesarean delivery



Society for  
Maternal • Fetal  
Medicine

This document was developed jointly by the American College of Obstetricians and Gynecologists (the College) and the Society for Maternal–Fetal Medicine with the assistance of Aaron B. Caughey, MD, PhD; Alison G. Cahill, MD, MSCI; Jeanne-Marie Guise, MD, MPH; and Dwight J. Rouse, MD, MSPH

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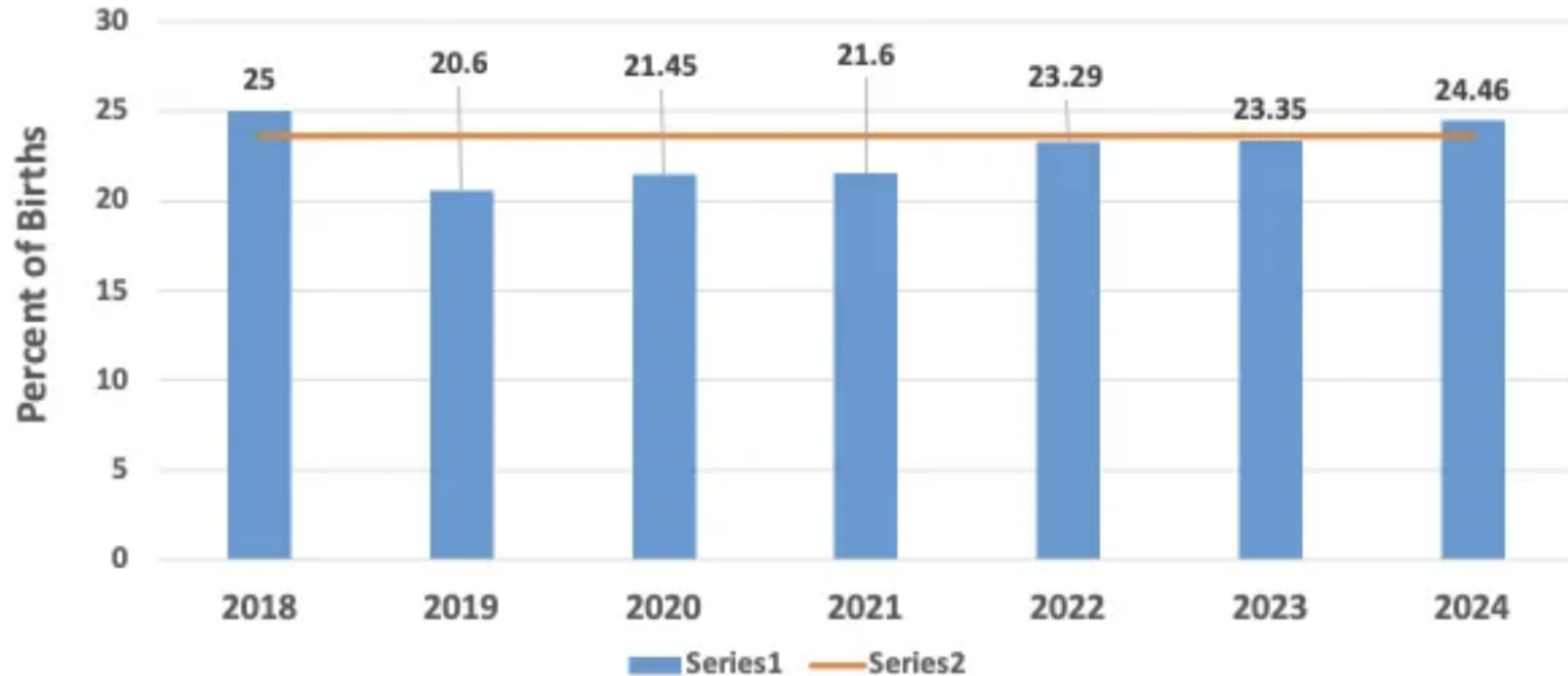
2014

**NTSV –**  
Nulliparous  
Term  
Singleton  
Vertex

- A metric that was created to evaluate obstetric care and compare performance across similar hospitals and regions
- Current National Rate – 25.6%
- Healthy People 2030 Goal – 23.6%

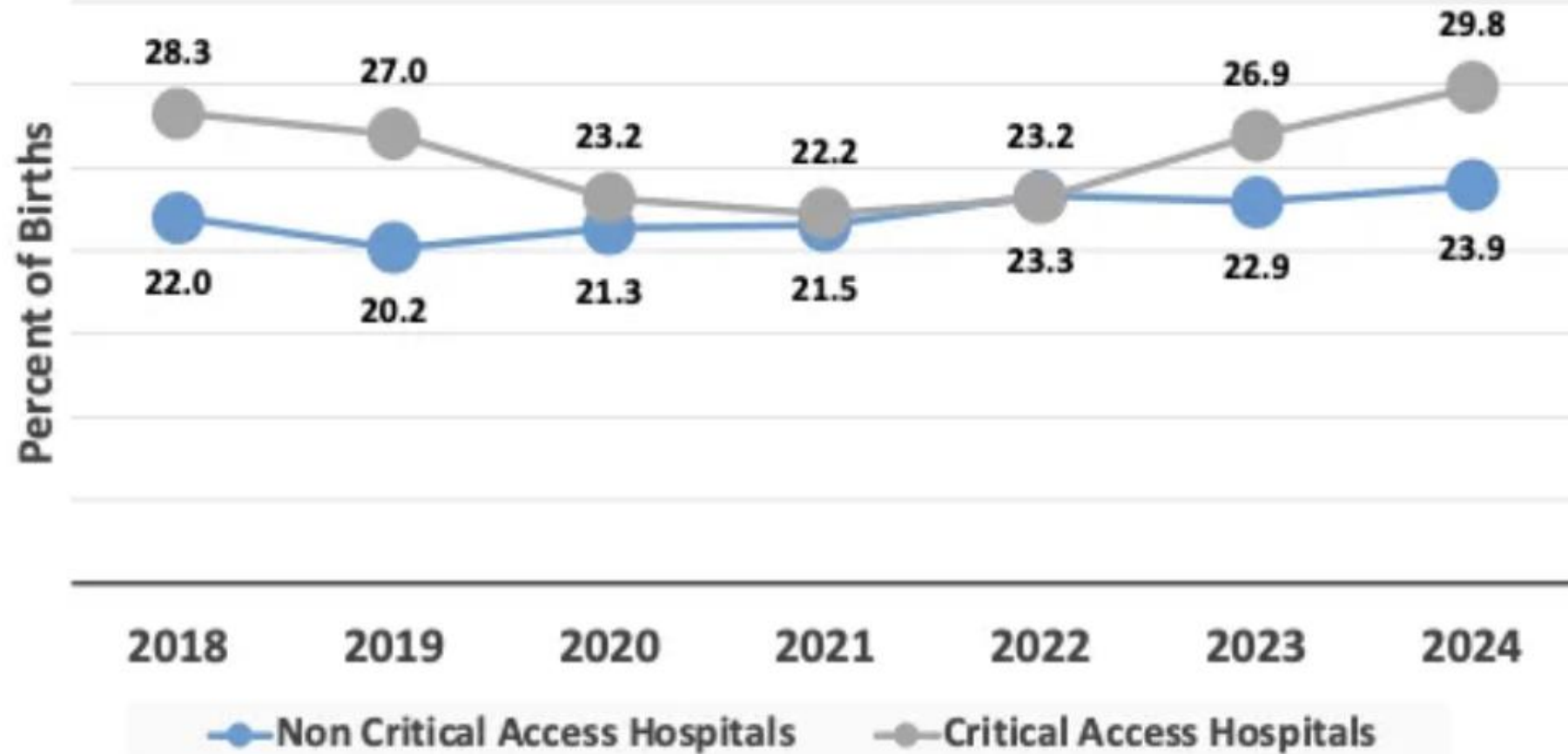
# NEBRASKA

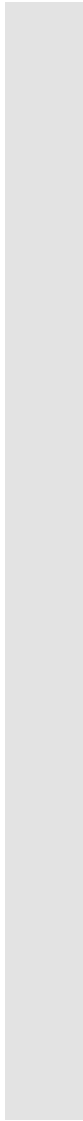

NTSV Cesarean Delivery Rates  
(Nulliparous, Term, Singleton, Vertex)



## NTSV CESAREAN DELIVERIES BY HOSPITAL ACCESS

**NEBRASKA**





How can a hospital  
work to reduce its  
NTSV rate?

# CMQCC

California Maternal  
Quality Care Collaborative

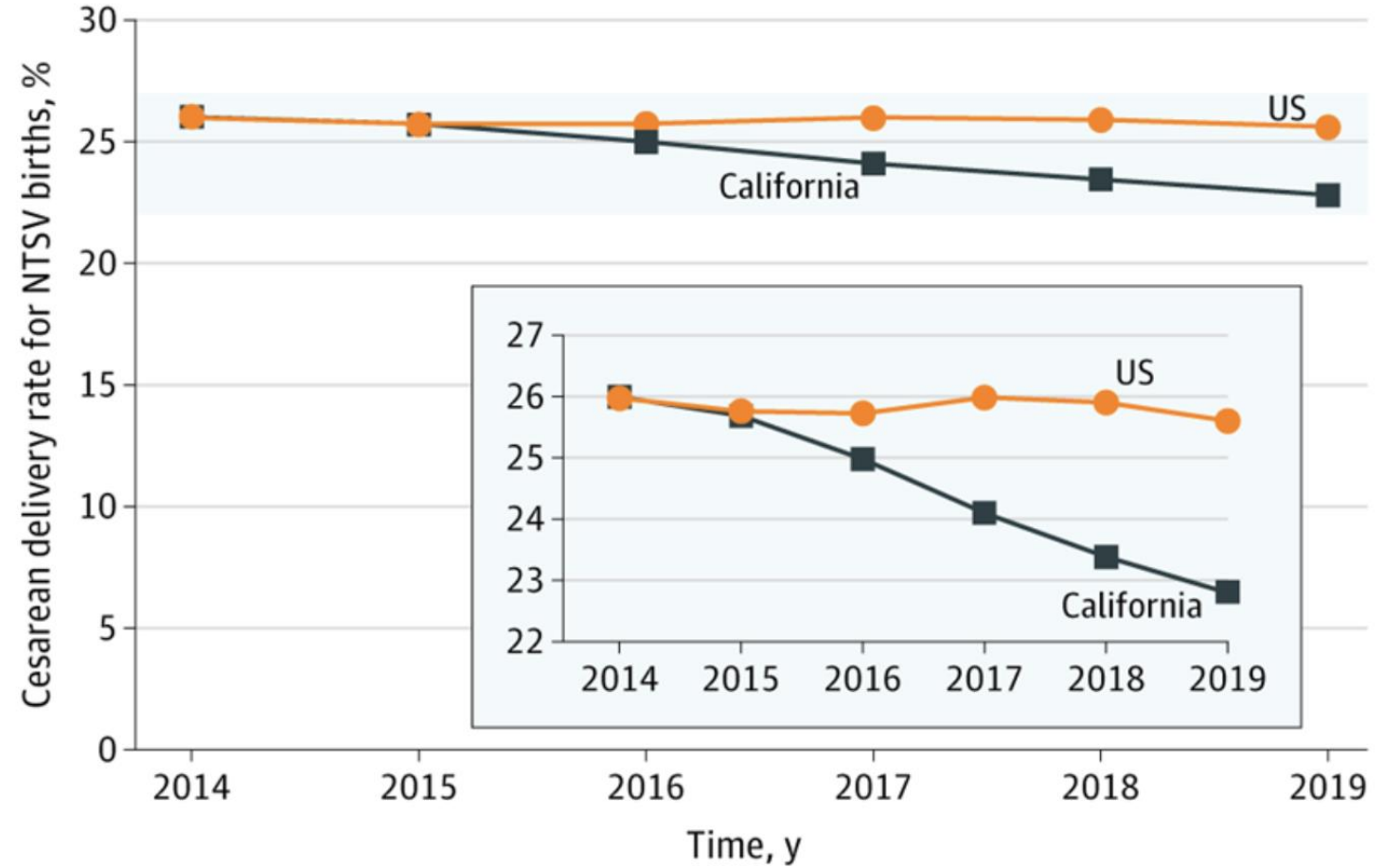


## Toolkit to Support Vaginal Birth and Reduce Primary Cesareans

A Quality Improvement Toolkit  
Addended 2022

# Success of the implementation of the CMQCC Bundle

Figure 2. Rates of Cesarean Delivery for NTSV Births Over Time in the US vs in California



- The bundle included many things with a variety of uptake amongst participating hospitals.

There is no single solution to fix NTSV rates!

**Table 2. Interventions Used by Hospitals Participating in the California Maternal Quality Care Collaborative Supporting Vaginal Birth Collaborative**

| Type of intervention   | Implementation by hospital, No. (%) |
|--|-------------------------------------|
| No. of hospitals   | 91                                  |
| Clinician education  | 90 (99)                             |
| Physician or nurse educational presentations                                 | 90 (98)                             |
| Manual rotation of occiput posterior   | 41 (45)                             |
| Operative vaginal deliveries   | 2 (2)                               |
| Labor support activities   | 82 (90)                             |
| Peanut ball <sup>a</sup>   | 48 (53)                             |
| Doula program  | 30 (33)                             |
| Coping with labor algorithm  | 9 (10)                              |
| Nitrous oxide analgesia  | 4 (4)                               |
| Labor management   | 78 (86)                             |
| Labor dystocia checklist   | 59 (65)                             |
| Active phase huddle  | 41 (45)                             |
| Latent labor management  | 41 (45)                             |
| Second stage management  | 16 (18)                             |
| Electronic medical record order sets   | 22 (24)                             |
| Labor induction  | 48 (53)                             |
| Induction scheduling form  | 31 (34)                             |
| Induction algorithm  | 20 (22)                             |
| Outpatient cervical ripening   | 17 (19)                             |
| Patient education  | 43 (47)                             |
| Prenatal childbirth education  | 7 (8)                               |
| Patient education during triage or labor                                     | 41 (45)                             |
| Patient support after traumatic birth experience                             | 24 (26)                             |
| Labor and delivery staff model   | 12 (13)                             |
| Addition of hospitalists   | 8 (9)                               |
| Addition of midwives   | 4 (4)                               |
| Sharing of unblinded physician-level cesarean delivery rates for NTSV births | 77 (85)                             |

## Readiness for change

- Change will not occur without commitment.
- Unit culture is a critical contributing factor to success in both making any necessary changes and sustaining gains that are made.
- Identify unit champions to help advocate for positive change.

**FIND YOUR  
MULTIDISCIPLINARY  
CHEERLEADERS!**

| Multi-disciplinary Implementation Team  |         |
|---|---------|
| Disciplines & Departments               | Needed? |
| Obstetric Providers                     | YES     |
| Nursing                                 |         |
| Anesthesia                              |         |
| Laboratory                              |         |
| Operating Room                          |         |
| Quality                                 |         |
| IT/EMR                                  |         |
| Others unique to your hospital setting? |         |

# Identify the level of the problem

- Track your units NTSV rates
  - Hospital wide rates
  - Provider specific rates

$$\text{NTSV Rate} = \left( \frac{\text{Number of NTSV Cesarean Deliveries}}{\text{Total Number of NTSV Live Births}} \right) \times 100$$

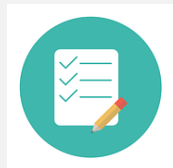
- Review cases of primary cesarean deliveries and compare to ACOG guidelines



Review of rates at already established staff meetings



Via email



Post signs on your labor and delivery unit


**Educate all  
staff of  
current NTSV  
rates and  
goals**

# Encourage Unblinded NTSV provider rates

- 85% of the CMQCC hospitals unblinded rates and it was viewed as favorable.
- Unblinding, paired with peer comparison and education, fosters improved obstetric care, encourages evidence-based practice, and reduces unnecessary, risky, or unjustifiable surgical variations among providers.
- CMQCC offers a month by month method to reveal individual NTSV rates overtime to reduce anxiety.
- Cannot be associated with credentialing or punishment
- Include collection and distribution of balancing measures

| Performance or Outcome Measures  |
|--|
| <b>Nulliparous Term Singleton Vertex (NTSV) Cesarean rate</b>                      |
| <b>Cesarean for Labor Arrest/CPD among NTSV spontaneous labors</b>                 |
| <b>Cesarean among induced NTSV births</b>  |
| Rates calculated using administrative data and chart review to validate inductions |

| Balancing Measures   |
|--|
| Unexpected Newborn Complications (UNC) among NTSV births               |
| 3 <sup>rd</sup> & 4 <sup>th</sup> Degree Lacerations among NTSV births |
| 5 minute APGAR $\leq 5$ among NTSV births (test measure)               |
| Using administrative data  |

The image features a white background with two large teal geometric shapes. On the left, a teal triangle points towards the center. On the right, a teal trapezoid is positioned. The text is centered between these shapes.

Accurate data with  
commitment to data  
collection is key!

What is your units labor  
culture?

# Labor Culture Survey

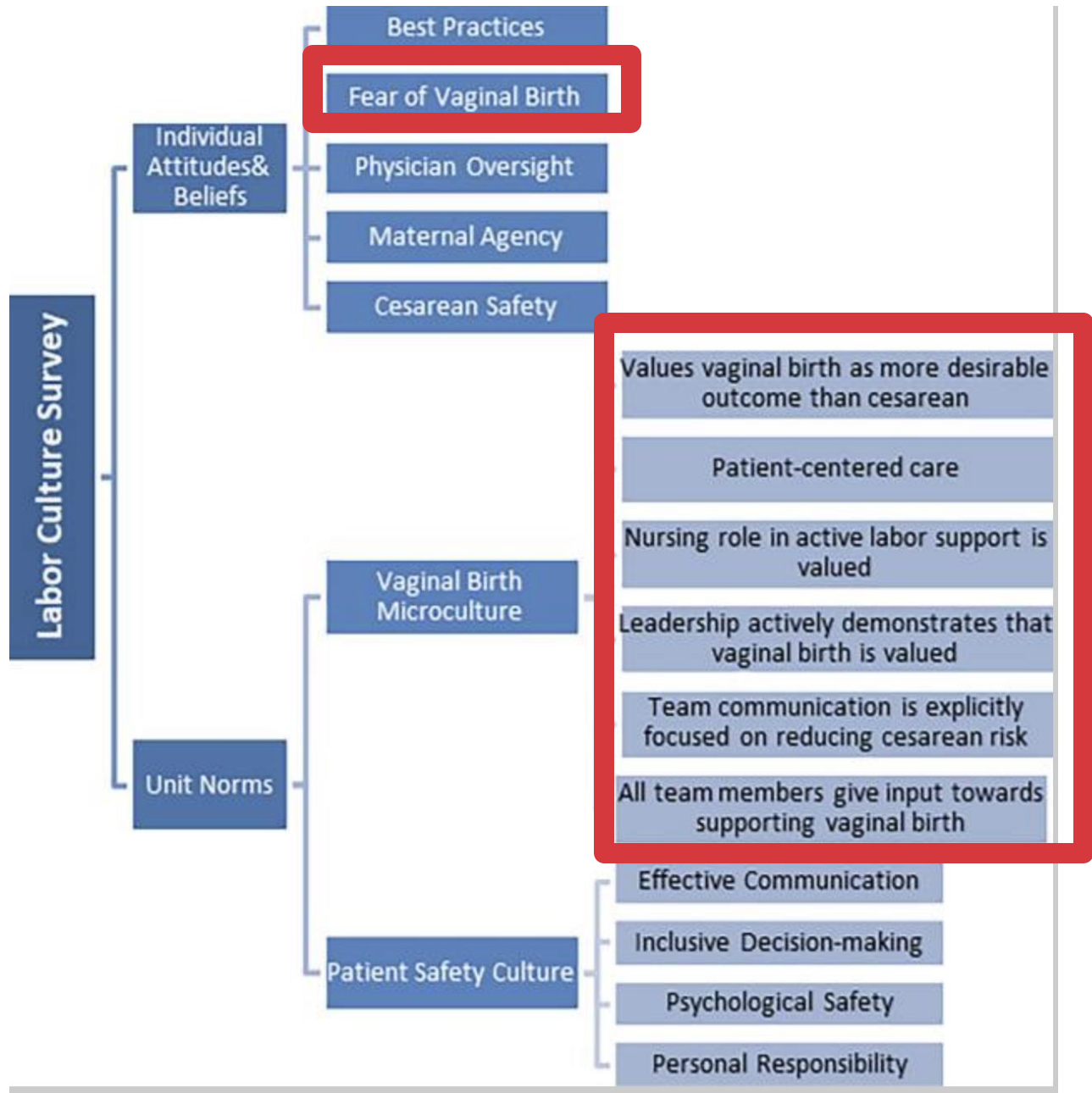


- Dr. Emily White VanGompel is a family medicine physician from the University of Illinois Chicago who has created a validated survey to assess labor culture.
- Key Points:
  - 1) The attitudes, values, beliefs, and collective norms on a unit create a specific culture unique to each unit
  - 2) A labor and delivery unit's culture is measurable, and is strongly associated with its primary cesarean delivery rate
  - 3) A high performing labor and delivery unit culture, (1) values evidence-based low intervention practices, (2) has a strong safety culture, and (3) prioritizes patient voice and patient experience.
- The LCS results can "bring forward voices that are usually not the loudest, but may make up the majority."
- Helps identify "low-hanging fruit" for change.

# Hospitals with greatest improvement in NTSV rates

- Clinicians at 69 hospitals in Michigan took the LCS in 2020 and 2022
- Compared successful to non-successful hospitals
- “Successful hospitals” either achieved the HP2030 goal or reduced their NTSV rate by 5%
- There was no difference in baseline LCS scores

|                     | <b>Unsuccessful</b>  | <b>Successful</b>    |                |
|---------------------|----------------------|----------------------|----------------|
| <b>LCS Subscale</b> | <b>Mean (95% CI)</b> | <b>Mean (95% CI)</b> | <b>P-value</b> |
| Best Practices      | 3.16 (3.11-3.21)     | 3.17 (3.01-3.34)     | 0.82           |
| Fear                | 1.44 (1.40-1.49)     | 1.35 (1.28-1.42)     | <b>0.04</b>    |
| Unit Microculture   | 2.72 (2.67-2.78)     | 2.87 (2.70-3.04)     | <b>0.02</b>    |
| Physician Oversight | 3.10 (3.05-3.15)     | 3.06 (2.93-3.20)     | 0.50           |
| Maternal Agency     | 2.82 (2.75-2.88)     | 2.76 (2.57-2.94)     | 0.55           |
| Cesarean Safety     | 1.86 (1.82-1.91)     | 1.93 (1.81-2.06)     | 0.46           |



How can we  
improve labor  
and delivery  
unit  
microculture?

## 1. Foster teamwork and psychological safety

- Implement structured communication
- Conduct regular safety huddles with equal voices
- Simulation training in effective communication
- Create a “just” culture

How can we  
improve labor  
and delivery  
unit  
microculture?

## 2. Normalize Vaginal Birth

- Improve patient education prior to labor and delivery
- Encourage increased in-room nursing time
- Reduce unnecessary non-evidence based intervention
- Encourage labor support (i.e. pain management, doulas, spinning babies)
- Standardized debrief after difficult deliveries

How can we  
improve labor  
and delivery  
unit  
microculture?

### 3. Implement Evidence Based Clinical Practices

- Standardize care protocols to be consistent with national guidelines
- Education on evidence-based labor guidelines
- Regularly review data and share it to encourage reflection and practice change

## Identify the level of the problem

- Perform some assessment of current unit labor culture
  - Anonymous labor culture survey
  - Open ended small group discussions with facilitators
- Help identify themes and problem areas

## Ideas for small group discussion

- Do we feel our patients are prepared for labor/expectations around induction/labor process?
- Does our unit support vaginal birth? Why or why not?
- Is there a fear of vaginal delivery? Of cesarean?
- How are birth management decisions made on your unit?
  - How much do you feel management decisions are made independently vs. made with equal input from all staff and the patient?
  - Does communication happen frequently on your unit to support vaginal birth?
  - Do all staff feel safe and encouraged to speak up if a patient's chance of having a vaginal birth is negatively affected by management decisions?

## Fear of vaginal birth

# A planned elective cesarean has not been found to be safer than vaginal birth for mom or baby.

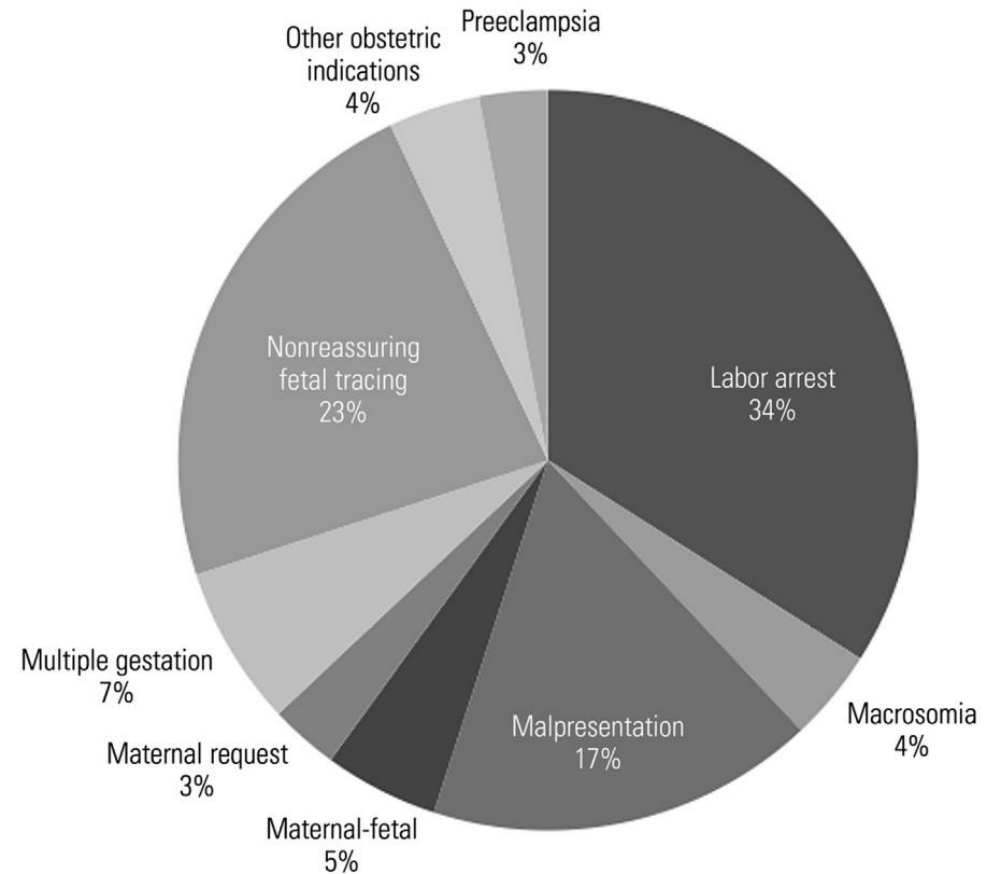
- A Canadian retrospective cohort study of primiparous women with singleton pregnancies that compared women in planned cesarean versus planned vaginal delivery groups showed overall rates of **severe morbidity** for the entire 14-year period were 27.3 and 9.0, respectively, per 1,000 deliveries.
- No clear neonatal benefit. Data showing increased TTN and RDS in elective cesarean.
- There is data for pelvic floor benefit from elective CS but this much be weighed against maternal and neonatal risk



# Current Evidence Based Clinical Practice

Labor arrest is the most common indication for PLTCS

**FIGURE 3**  
**Indications for primary cesarean delivery**



Data from Barber et al.<sup>16</sup>  
ACOG. Safe prevention of primary cesarean delivery. *Am J Obstet Gynecol* 2014.



Structured definitions  
are important!

## Prolonged Latent Phase

*Should not be considered  
an indication for cesarean!*

**AUGMENTATION IS  
REQUIRED.**



*“Looks like we’ll have this one  
by C section.”*

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If maternal and fetal status allow, cesarean deliveries for failed induction of labor in latent phase can be avoided by allowing longer durations of latent phase (up to  $\geq 24$  h) and requiring that oxytocin be administered for at least 12-18 h after membrane rupture before deeming induction failure.

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1B  
Strong recommendation,  
moderate-quality evidence

Failed induction or augmentation of labor

# PATIENCE



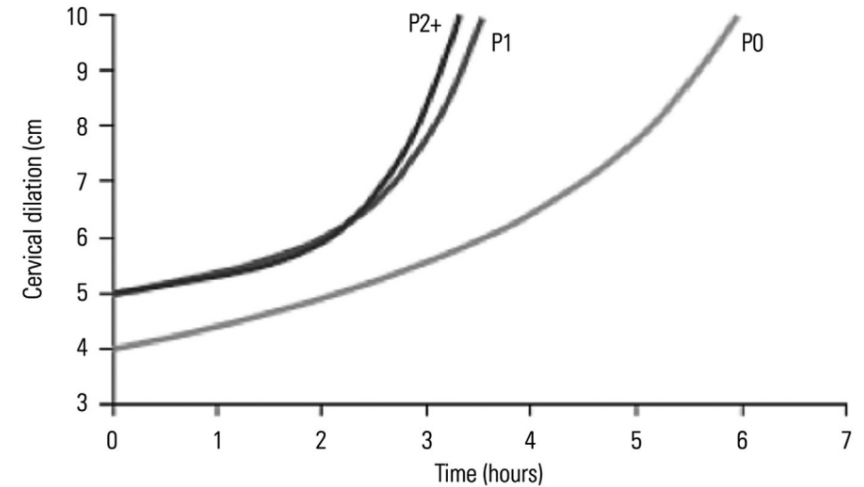
In a cohort of 10,677 nulliparous women undergoing induction, **more than 40% of those whose latent phase lasted 18 hours or more still had vaginal deliveries**. The decision to continue labor beyond 18 hours should be individualized based on clinical characteristics, patient preference, and discussion of risks and benefits.

Failed induction or augmentation of labor

Active labor is defined as  $\geq 6$  cm dilation

FIGURE 4

Average labor curves by parity in singleton term pregnancies with spontaneous onset of labor, vaginal delivery, and normal neonatal outcomes



P0, nulliparous women; P1, women of parity 1; P2+, women of parity  $\geq 2$ .

Modified from Zhang et al.<sup>20</sup>

ACOG. Safe prevention of primary cesarean delivery. *Am J Obstet Gynecol* 2014.

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Cesarean delivery for active-phase arrest in first stage of labor should be reserved for women  $\geq 6$  cm of dilation with ruptured membranes who fail to progress despite 4 h of adequate uterine activity, or at least 6 h of oxytocin administration with inadequate uterine activity and no cervical change.

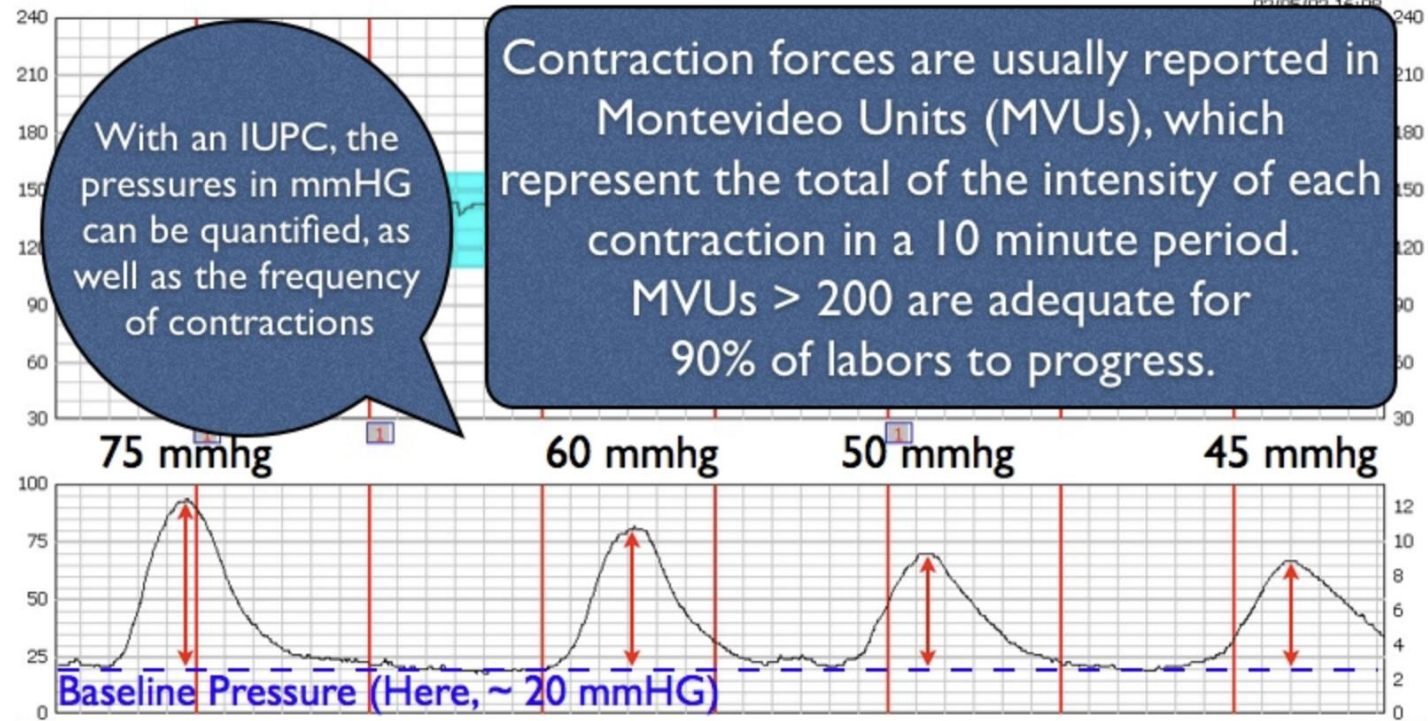
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1B  
Strong recommendation,  
moderate-quality evidence

# Active Phase Arrest

What are adequate contractions?

## Calculating MVUs



$75+60+50+45=230$  MVUs  
(Note that the baseline pressure was subtracted from each reading)

# Second Stage Arrest

---

Before diagnosing arrest of labor in second stage, if maternal and fetal conditions permit, allow for following:

- At least 2 h of pushing in multiparous women (1B)
- At least 3 h of pushing in nulliparous women (1B)

Longer durations may be appropriate on individualized basis (eg, with use of epidural analgesia or with fetal malposition) as long as progress is being documented. (1B)

---

1B

Strong recommendation,  
moderate-quality evidence

- Add 1 hour for an epidural to pushing times.
- It is reasonable to stop prior to these times if no descent is being made despite adequate effort

# Encourage standard definitions and checklists.

Checklists minimize unnecessary variation and help promote health equity!

## CMQCC Labor Dystocia Checklist (ACOG/SMFM Criteria)

### 1. Diagnosis of Dystocia/Arrest Disorder (all 3 should be present)

- Cervix 6 cm or greater
- Membranes ruptured, then
- No cervical change after at least 4 hours of adequate uterine activity (e.g. strong to palpation or MVUs > 200), or at least 6 hours of oxytocin administration with inadequate uterine activity

### 2. Diagnosis of Second Stage Arrest (only one needed)

#### No descent or rotation for:

- At least 4 hours of pushing in nulliparous woman with epidural
- At least 3 hours of pushing in nulliparous woman without epidural
- At least 3 hours of pushing in multiparous woman with epidural
- At least 2 hour of pushing in multiparous woman without epidural

### 3. Diagnosis of Failed Induction

- Bishop score  $\geq 6$  for multiparous women and  $\geq 8$  for nulliparous women, before the start of induction (for non-medically indicated/elective induction of labor only)
- Oxytocin administered for at least 12-18 hours after membrane rupture, without achieving cervical change and regular contractions. \*Note: At least 24 hours of oxytocin administration after membrane rupture is preferable if maternal and fetal statuses permit

# Evidence Based Strategies to Promote Vaginal Delivery

# Oxytocin is your friend!

- Oxytocin

***ACOG recommends either low-dose or high-dose oxytocin strategies as reasonable approaches to the active management of labor to reduce operative deliveries.*** (STRONG RECOMMENDATION, HIGH-QUALITY EVIDENCE)

**Table 3. Low-Dose and High-Dose Oxytocin Infusion Protocols**

| Regimen   | Starting Dose (mU/min) | Incremental Increase (mU/min) | Dosage Interval (min) |
|-----------|------------------------|-------------------------------|-----------------------|
| Low-Dose  | 0.5–2                  | 1–2                           | 15–40                 |
| High-Dose | 4 or higher            | 3–6                           | 15–40                 |

Abbreviations: mU/min, milliunits per minute; min, minutes.

Reprinted from: Myers ER, Sanders GD, Coeytaux RR, McElligott KA, Moorman PG, Hicklin K, et al. Labor dystocia. Comparative effectiveness review No. 226. AHRQ publication no. 29. Agency for Healthcare Research and Quality. 2020. doi: 10.23970/AHRQEPCCER226.

Early AROM  
appears to be  
helpful in most  
populations.

Most recent literature supports the practice of early AROM to decrease labor duration.

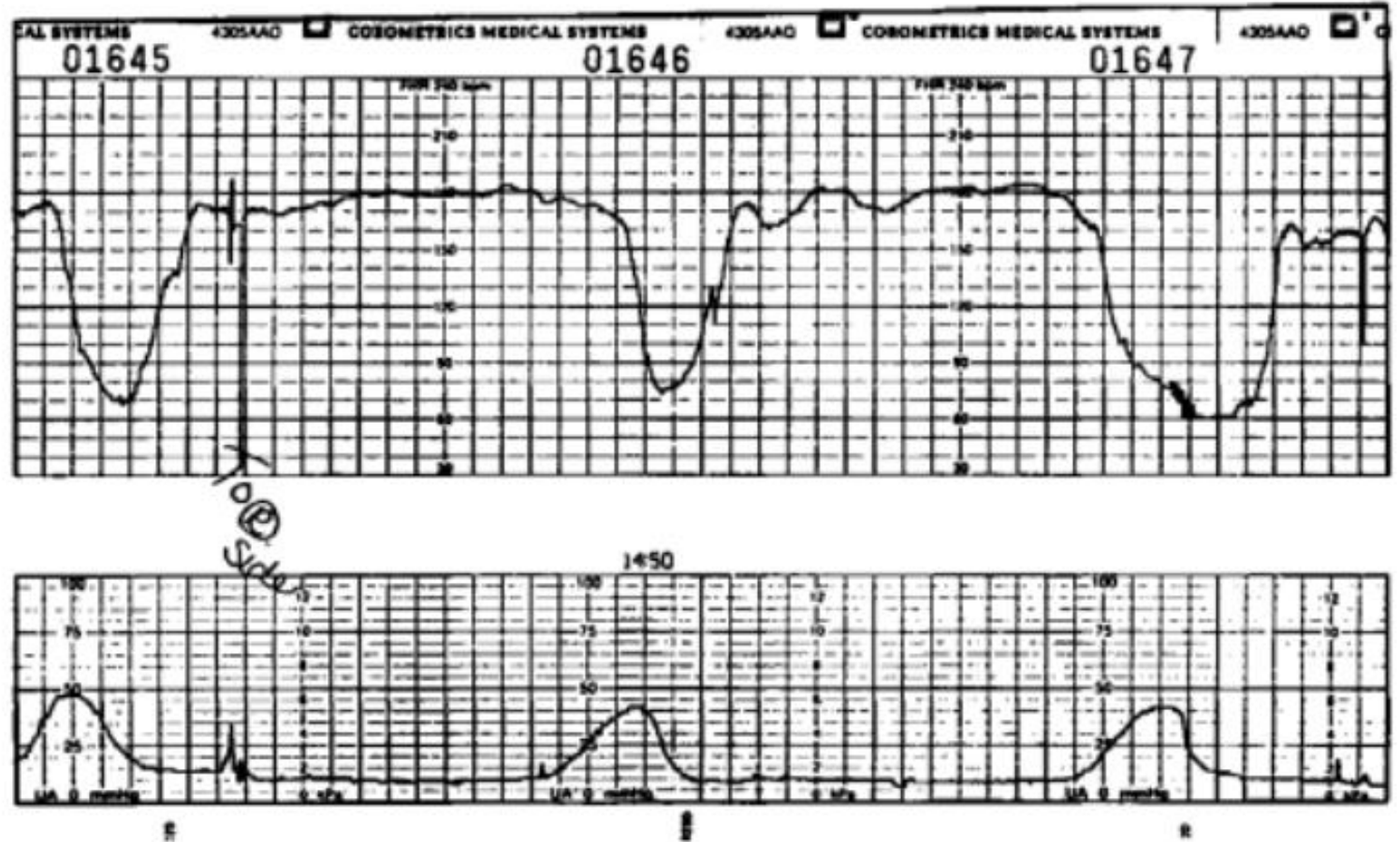
Various definitions: AROM within an hour of CRB removal, AROM at <4 cm, AROM at oxytocin start.

A systematic review including 1273 patients undergoing induction of labor found that early amniotomy had shorter interval from induction to delivery by approximately 5 hours with a similar risk for cesarean delivery.

**ACOG STANCE:**

There is high-quality evidence to recommend early amniotomy as adjunctive to the labor process to decrease time to delivery without increasing the cesarean delivery rate or other maternal or neonatal complications.

Use  
amnioinfusion  
for repetitive  
variables



# Position changes in labor!

- Frequent position changes during labor to enhance maternal comfort and promote optimal fetal positioning can be supported as long as adopted positions allow appropriate maternal and fetal monitoring and treatments and are not contraindicated by maternal medical or obstetric complications.



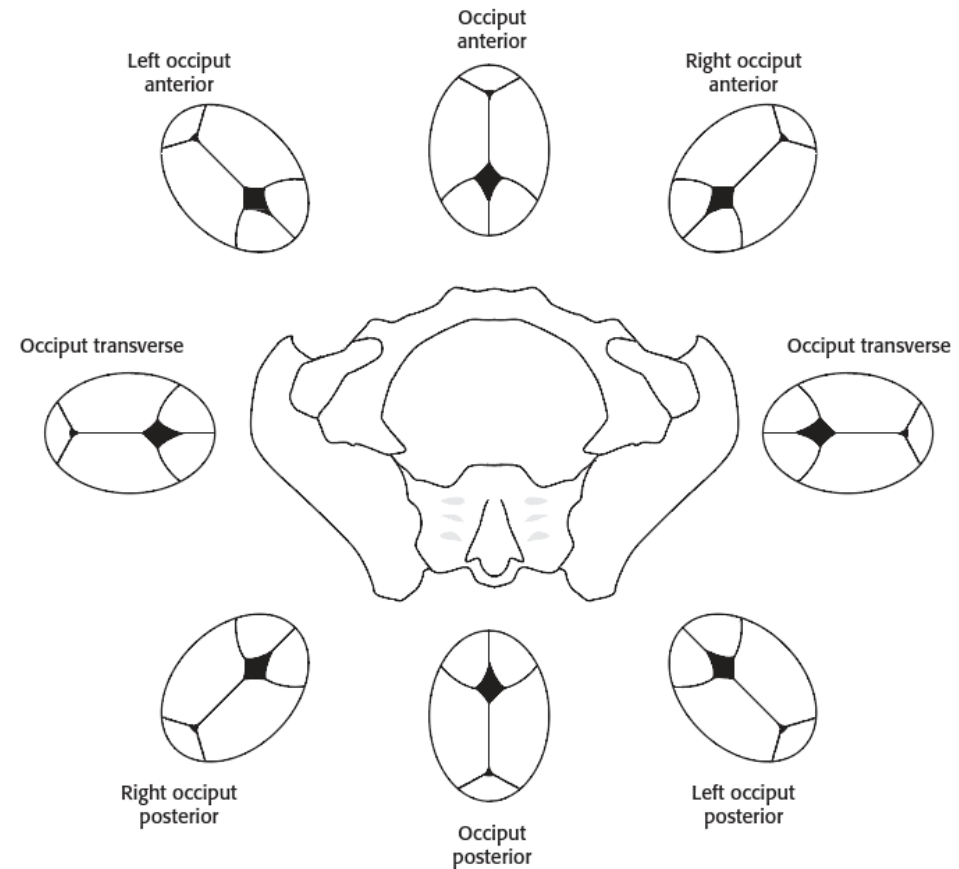
- Consider training in Spinning Babies
  - 2024 3 center RCT showed:
    - Increased nursing confidence with labor support
    - Decreased NTSV rate from 27 to 14%
  - 2025 study in Italy:
    - SB techniques increased the likelihood of OA positioning by 45%
- Peanut ball use
- Upright positioning

## Standardize Review of EFM

- There is large variation in FHR tracings for Category II
- Standardize the way EFM is documented and when to alert providers
- Create an environment where open honest communication is the norm
- Encourage huddles to discuss EFM in labor
- Encourage EFM monitoring courses amongst staff
- Anonymous case reviews for education

# Figure out position prior to pushing!

Feel empowered to determine and communicate position!



# Manual Rotation!

- Use ULTRASOUND To your benefit!
  - Look at the spine, not the eyes
- Manual rotation of the fetal occiput
  - 4 babies need to be rotated to prevent 1 CS
  - Not associated with increased rates of prolapsed cord, birth trauma or neonatal acidemia



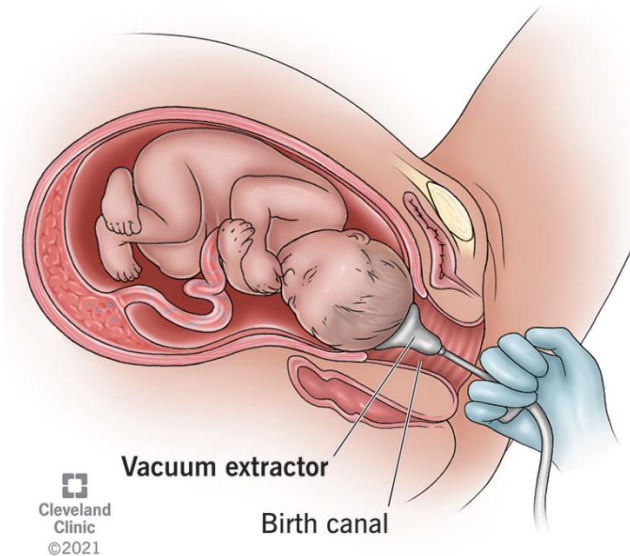
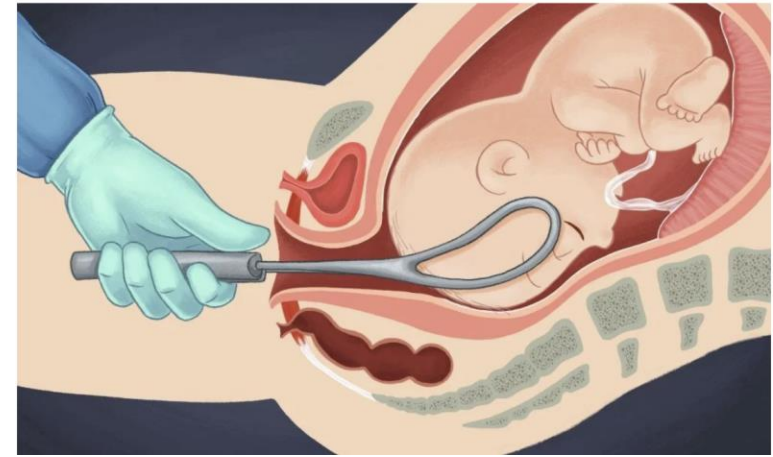
PUSH at 10  
cm!



- The American College of Obstetricians and Gynecologists (ACOG) recommends that pushing commence when complete cervical dilation is achieved.
- JAMA RCT:
  - Delayed vs. immediate pushing
  - No difference in vaginal delivery rates
  - Delayed pushing shortens active pushing time by approximately 9-27 minutes but extends total second stage duration by 32-56 minutes.
  - Significantly higher rates of chorioamnionitis (9.1% vs 6.7%,  $p=0.005$ ) and postpartum hemorrhage (4.0% vs 2.3%,  $p=0.03$ ) with delayed pushing.
- There is no evidence for supporting specific pushing techniques or positions as superior.

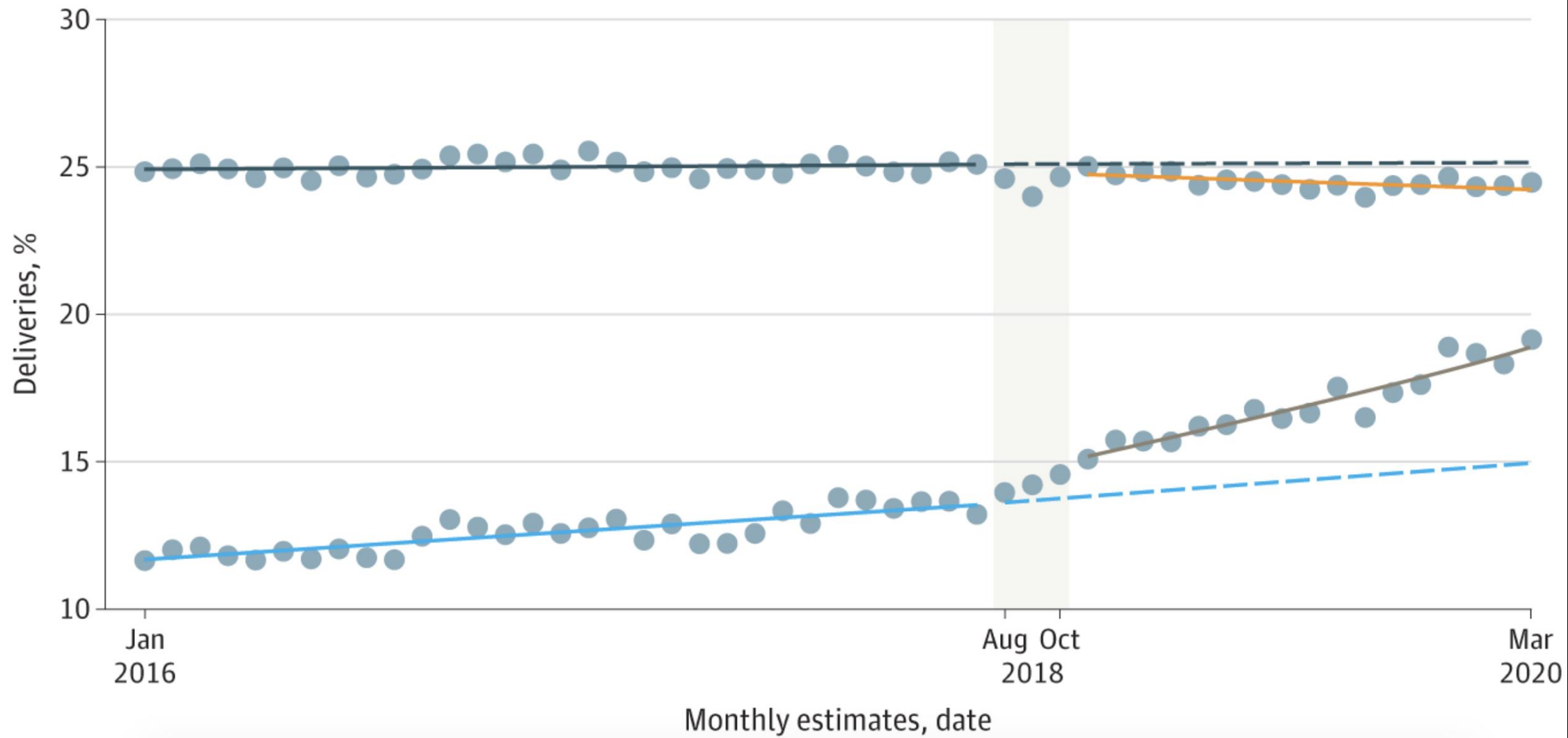
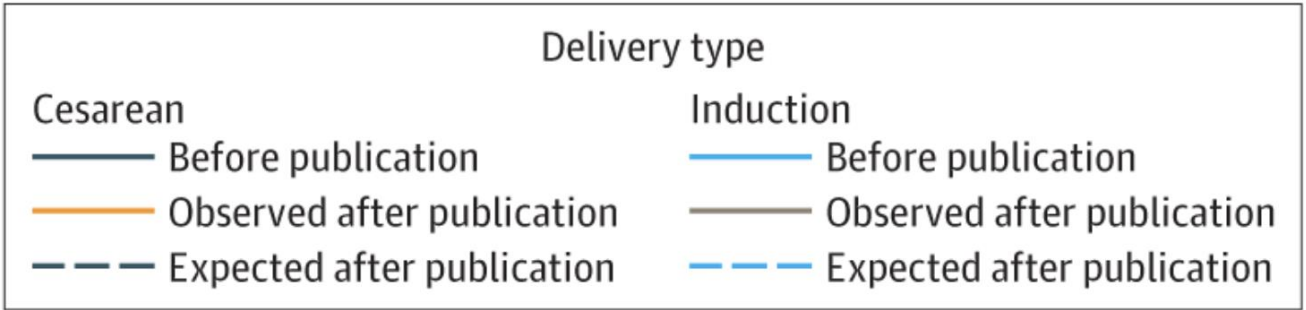
# Train in Operative Vaginal Delivery

- OVD is a safe and acceptable alternative to cesarean delivery
- Fetal risk of operative vaginal delivery is low
  - Intracranial hemorrhage 1 in 650-850
  - Neurologic complications 1 in 220-285
- Ongoing maintenance of, practical skills related to operative delivery is encouraged.
- TAKE A SKILLS COURSE



# Induction of labor is not the enemy.

- We used to counsel people that IOL with an unfavorable cervix would double your risk of cesarean
- ARRIVE Trial (2018)
  - 6100 low risk G1 underwent IOL at 39.0-39.4 vs. expectant management. 63% had unfavorable cervixes on arrival (Bishop <5)
  - **Lower cesarean rate: 18.6% in IOL group v. 22.2% in expectant management (16% relative risk reduction)**
  - **Lower hypertensive disorders: 9.1% vs. 14.1%**
  - **Lower neonatal respiratory support: 3.0% vs. 4.2%**
  - Longer time on LND: 20 hours vs. 14 hours
- Needs to be in the appropriately counseled patient!  
Induction=augmentation.



## Other Key Drivers of Primary Cesarean

- Consultation for external cephalic version should be offered to patients with fetal malpresentation.
  - Highest success at 37 weeks
  - The only absolute contraindication to ECV is a contraindication to vaginal birth
- Macrosomia is (usually) not an indication for cesarean or early-term delivery
  - Ultrasound is imprecise at term
  - >5,000 grams for non-diabetic, 4,500 grams for diabetic
  - Early term delivery has not been shown to decrease the risk of shoulder dystocia or the risk of cesarean section

# Summary



- 1) Create a team of champions!
- 2) Collect data at regular intervals
- 3) Assess labor culture, reveal “low hanging fruit”
- 4) Unblind provider NTSV rates
- 5) Provide regular education/training in evidence based labor interventions (or benefits of non-intervention) for all levels of staff
- 6) Use structured checklists for definitions of failed labor/induction
- 7) Create space for all voices to be heard in labor management
- 8) Monthly non-blaming review of NTSV cases for education and improvement

Questions?

# References

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