Reducing Cesarean Deliveries : Variation to Value

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INOVA HEALTH
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Disclosures

- Speaker for Sera Prognostics

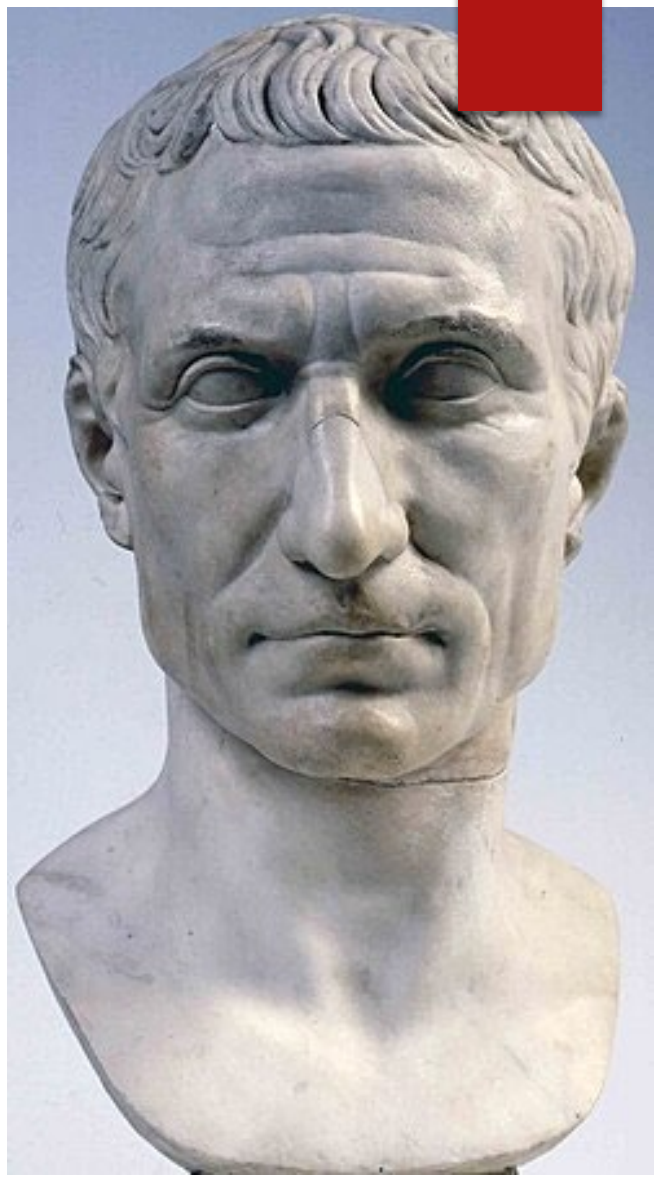
Objectives

- Describe the national cesarean landscape and the drivers of variation
- Use NTSV and Robson-style stratification to identify local opportunity
- Apply evidence-based approaches to induction, labor dystocia, second-stage management, and fetal assessment
- Build a multidisciplinary QI program with balanced safety and experience measures
- Practical implementation plan



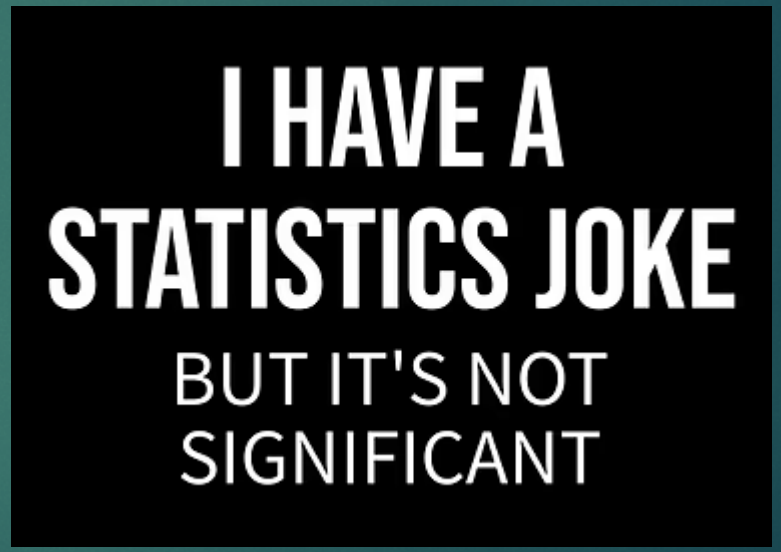
A little history

- "Cesare" laws
- 1889 Paris – 100 % mortality
- Rates < 5 % through 1950s
- Rapid rise in 1970s



What is the “right” rate? (NTSV)

- Healthy People 2030 – 23.6 %
- Below the average? – 25.3 %
- WHO – 15-20 % ish
- Joint Commission < 30 %
- ACOG - ???



Goodhart's Law

- Over 2000 metrics
- Unintended consequences
  - HIE
  - 4th degree
- Trends
- Variations



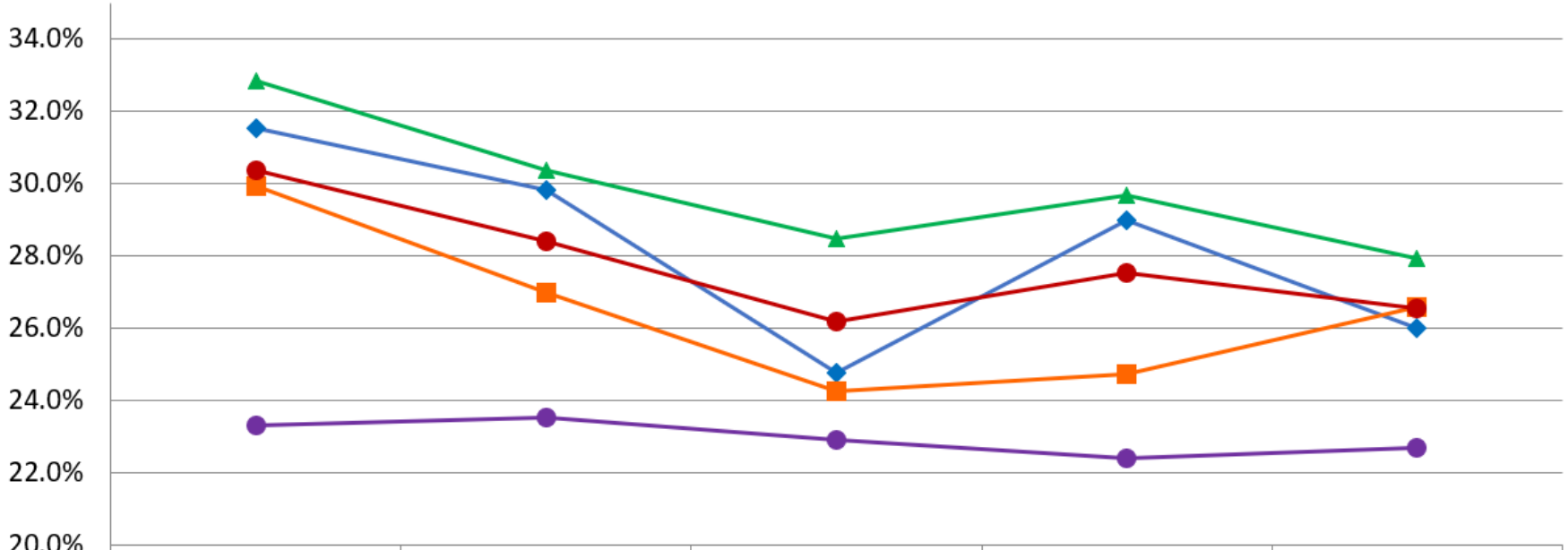
Inova Health

- 4 delivery hospitals
- 20,000 + deliveries
- 11,000 + at Fairfax

- 35 LDRs / 10 Ors
- 200 + OBGs/CNMs



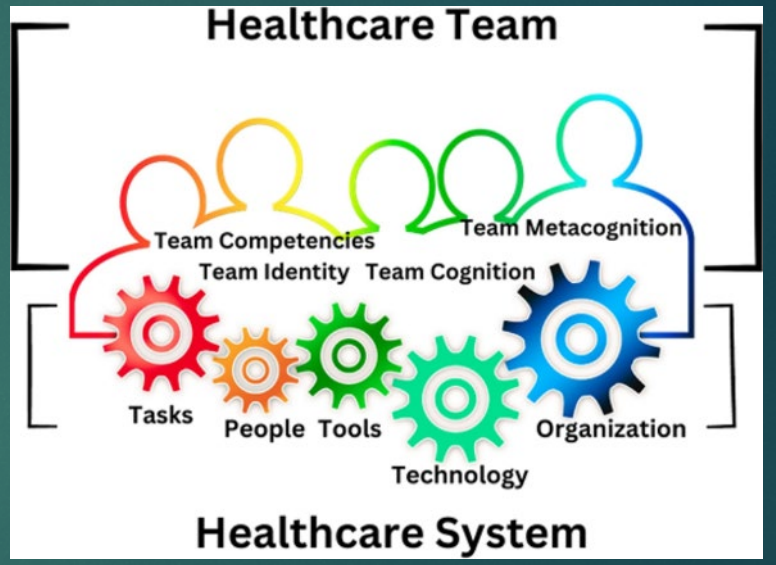
System PC-02 Yearly Trending (EPIC)



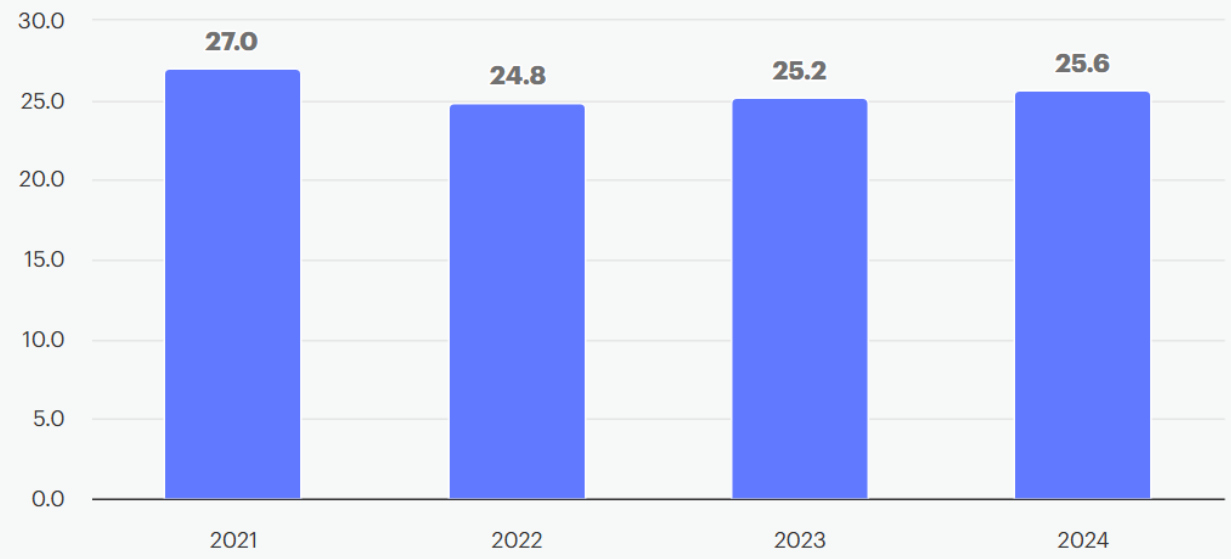
	2022	2023	2024	2025	2026 YTD
IAH	31.5%	29.8%	24.8%	29.0%	26.0%
IFOH	23.3%	23.5%	22.9%	22.4%	22.7%
IWH	32.8%	30.4%	28.5%	29.7%	27.9%
ILH	29.9%	27.0%	24.2%	24.7%	26.6%
System	30.3%	28.4%	26.2%	27.5%	26.5%

Plan Elements

- 24/7 Midwifery service
- Publishing the rates
- Discussions with outliers (> 50 %)
- FHR classes
- A review committee
- EMR labor curves
- Standardization
- Outpatient cervical ripening
- C/S Checklist



Low Risk Cesarean births: South Carolina, 2021-2024



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SC Plan

- Publishing rates (hospitals)
- Inductions
- Payment incentives – "carrots and sticks"
- Perinatal Quality Collaborative
- "Simulation Van"



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Medicaid will change rate S.C. hospitals are paid for C-sections

LAUREN SAUSSER
NOV 4, 2014 UPDATED NOV 2, 2016

No single solution

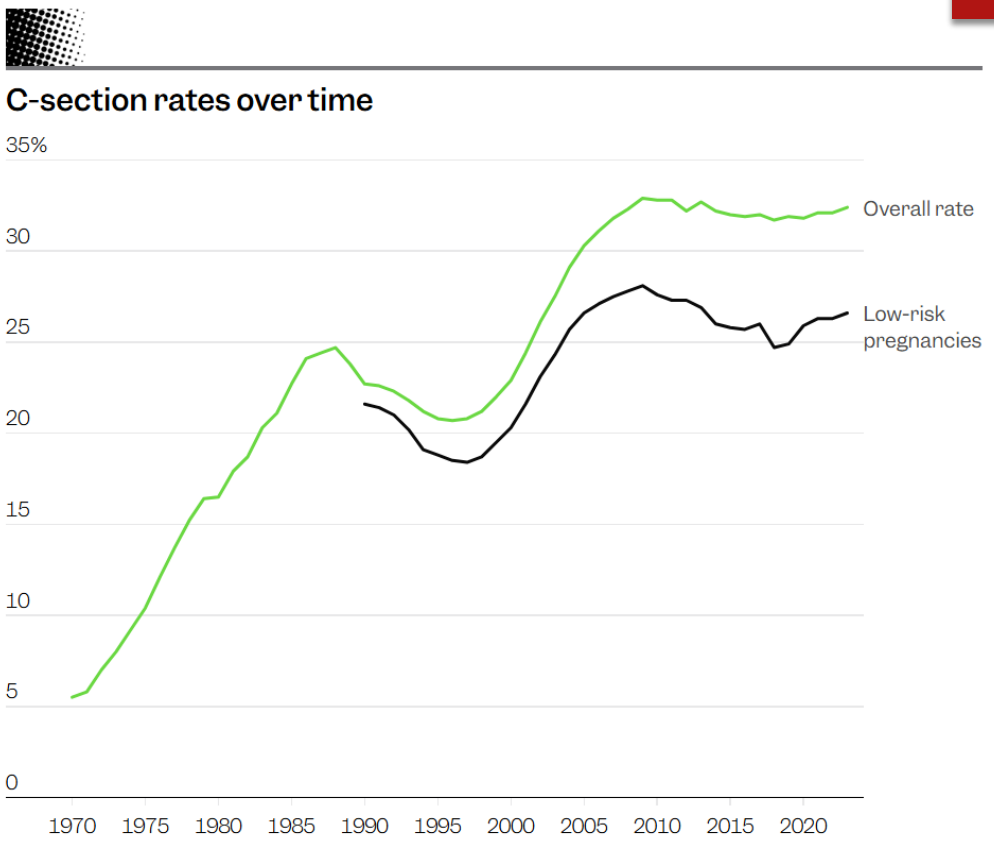
- Basket or Bundle
- Tailored to data, locale
- Consistently applied
- Championed
- Re-evaluated



Current trends

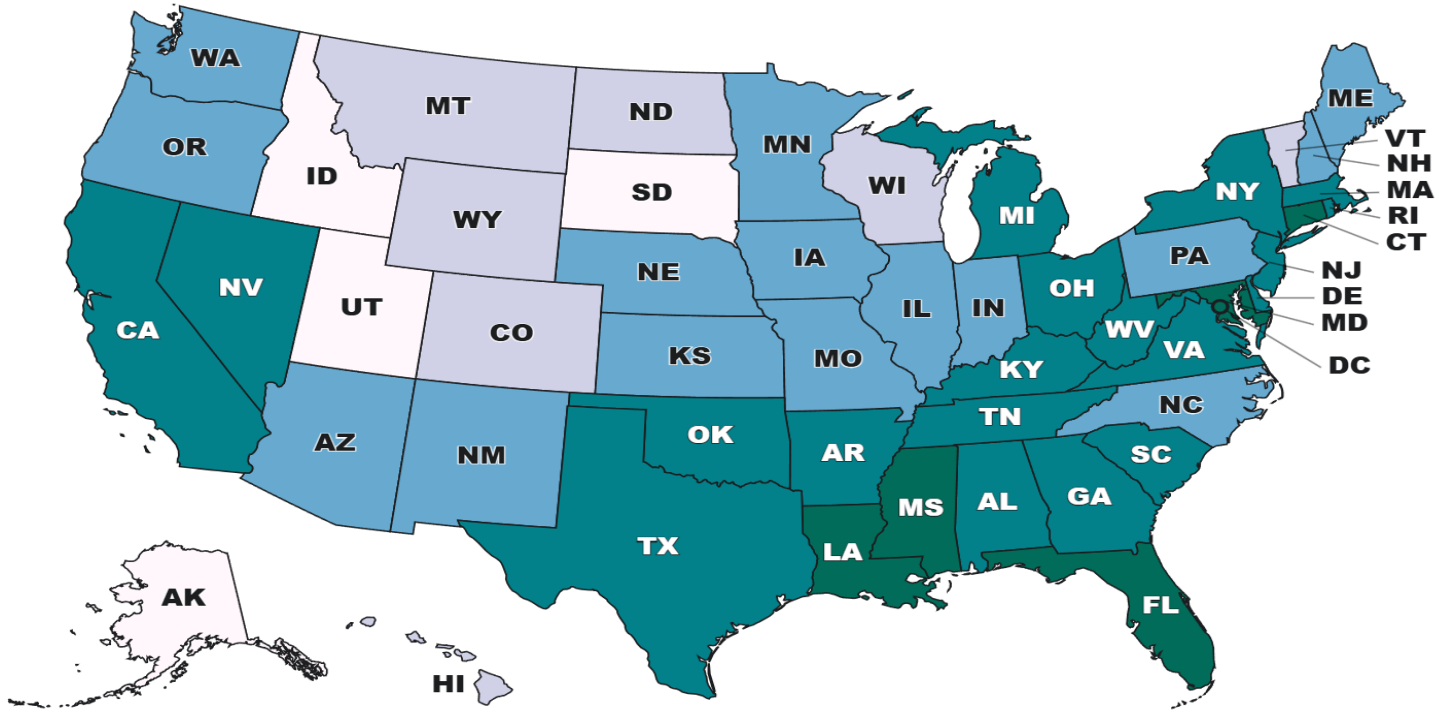
- 2024 cesarean delivery rate: 32.4%
- 2024 low-risk (NTSV) cesarean rate: 26.6%
- 2024 primary cesarean rate: 22.9%

- The rate has remained near its historical peak rather than continuing a sustained decline



Year

2024

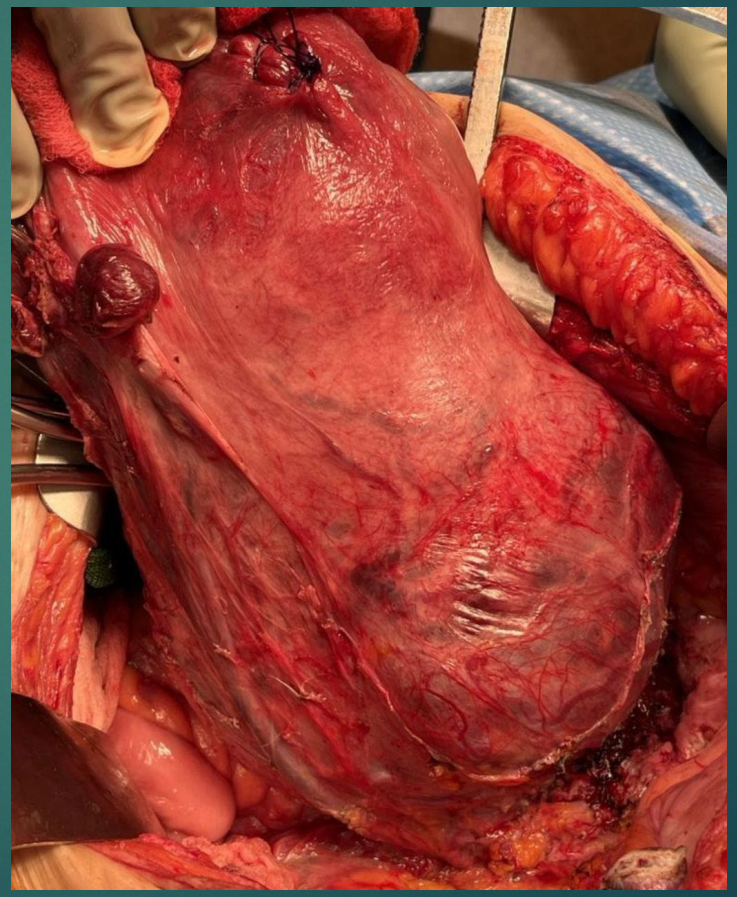


Percent of all live births that were cesarean deliveries

- 21.6 - < 24.98
- 24.98 - < 28.36
- 28.36 - < 31.74
- 31.74 - < 35.12
- 35.12 - < 38.5

Why do we Care?

- Complications
- Costs
- LOS
- Neonatal effects
- Long term effects



ACOG | Clinical
The American College of Obstetricians and Gynecologists

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Committee Statement > Quality-Improvement Strategies for Safe Reduction of Primary Cesarean Birth

Quality-Improvement Strategies for Safe Reduction of Primary Cesarean Birth

Committee Statement | Number 17 | May 2025

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- Abstract
- Summary of Recommendations and Conclusions

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Number 17

This Committee Statement was developed by the American College of Obstetricians and Gynecologists' Quality and Safety Initiatives Delegation in collaboration with Niraj Chavan, MD, Allison A. Eubanks, MD, Arthur Ollendorff, MD, Stephanie Radke, MD, and Paula White, MD.

Read on Obstetrics & Gynecology

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Figures & Tables

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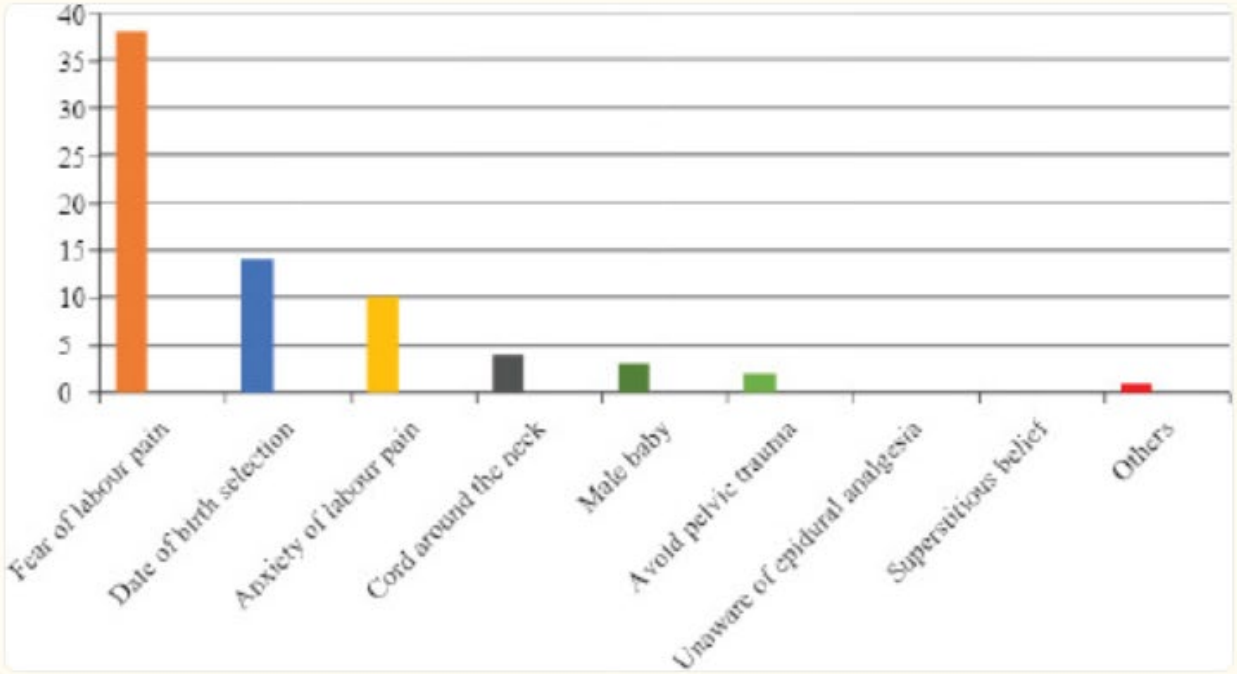
Cesarean on Maternal Request

- CDMR
- Actual rates not known
- Estimated 3-5 %
- Rising



Figure 2. Reasons for requesting a cesarean delivery.



Open in a new tab

JNMA, 2021

Expert Review ajog.org

Cesarean delivery on maternal request: the essential role of professional obligations

Check for updates

Frank A. Chervenak, MD, MMM; Renee Mcleod-Sordjan, DNP, APRN, HEC-C; Susan L. Pollet, JD; Gloria Bachman, MD; Ashley Warman, MS, HEC-C; Amos Grünebaum, MD

TABLE 1

Benefits and risks of vaginal and cesarean deliveries for maternal and neonatal patients (readability: eighth to ninth grade and below)

Benefits of vaginal birth

For moms:

- Faster healing: moms usually recover quicker and can go home sooner.
- Lower chance of surgery problems: no risks from cutting.
- Less chance of infections: no big cuts that could get infected.
- Lower risk of blood clots: moving around soon after birth helps prevent this.
- Easier future pregnancies: no scar tissue in the uterus to worry about.
- Quicker later births: if you have more babies, they often come faster and easier.

For babies:

- Better breathing: going through the birth canal helps clear fluid from baby's lungs.
- Quick bonding: moms can often hold and feed their babies right away.
- Good gut bacteria: babies pick up helpful bacteria during birth.
- Less time in special care: babies are less likely to need extra medical help.
- No surgery risks: there is no chance of accidental cuts during delivery.

Risks of vaginal birth

For moms:

- Tears or cuts: the area between the vagina and anus might tear or need to be cut.
- Pelvic floor problems: muscles that hold pelvic organs in place can get weak.
- Heavy bleeding: sometimes the uterus doesn't squeeze properly after birth.
- Long labor: labor can sometimes last a long time and be very tiring.
- Uterus tearing: this is rare but can happen if you've had a cesarean delivery before.
- Need for tools: sometimes doctors need to use special tools to help the baby out.

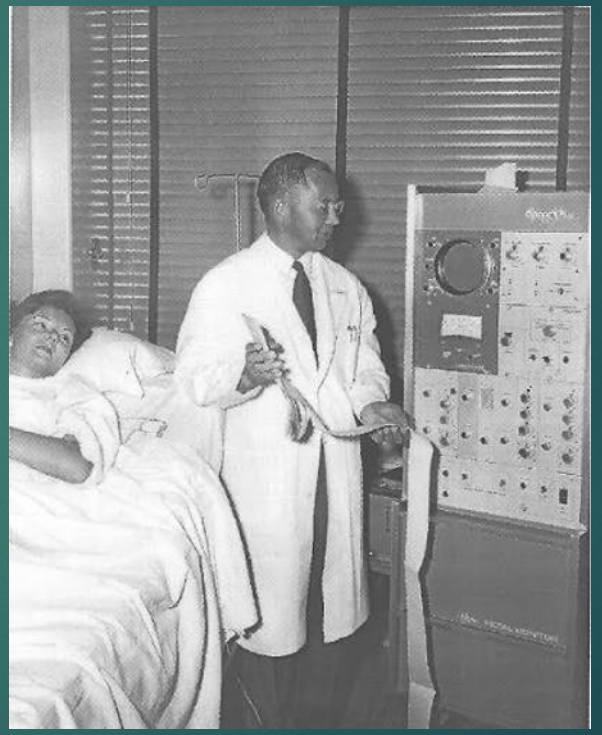
For babies:

- Birth injuries: rarely, babies can get hurt coming through the birth canal.
- Stress during labor: sometimes babies get stressed if labor takes too long.
- Not enough oxygen: in rare cases, babies might not get enough oxygen during birth.
- Injuries from tools: if doctors use tools to help, it might cause bruising.
- Breathing in feces: sometimes babies poop before birth and breathe it in, which can cause problems.

Benefits of cesarean delivery:

Electronic Fetal Monitoring

- Limited technology
- False positives
- Cesareans
- Liability risk
- Cat II



MODERATE (NORMAL) VARIABILITY

	No	Early	Mild VD	Mod VD	Sev VD	Mild LD	Mod LD	Sev LD	Mild PD	Mod PD	Sev PD
Tachy	B	B	B	Y	O	Y	Y	O	Y	Y	O
Normal	G	G	G	B	Y	B	Y	Y	Y	Y	O
Mild Brd	Y	Y	Y	Y	O	Y	Y	O	Y	Y	O
Mod Brd	Y	Y			O		O	O			O
Sev Brd	O	O			O			O			O

MINIMAL VARIABILITY

	No	Early	Mild VD	Mod VD	Sev VD	Mild LD	Mod LD	Sev LD	Mild PD	Mod PD	Sev PD
Tachy	B	Y	Y	O	O	O	O	R	O	O	R
Normal	B	B	Y	O	O	O	O	R	O	O	R
Mild Brd	O	O	R	R	R	R	R	R	R	R	R
Mod Brd	O	O			R		R	R			R
Sev Brd	R	R			R			R			R

ABSENT VARIABILITY

	No	Early	Mild VD	Mod VD	Sev VD	Mild LD	Mod LD	Sev LD	Mild PD	Mod PD	Sev PD
Tachy	R	R	R	R	R	R	R	R	R	R	R
Normal	O	R	R	R	R	R	R	R	R	R	R
Mild Brd	R	R	R	R	R	R	R	R	R	R	R
Mod Brd	R	R			R		R	R			R
Sev Brd	R	R			R			R			R

Sinusoidal	R
Marked Variability	Y

Click to add text

3 vs 5 Tier System

Feature	**3-Tier System (NICHD/ACOG)**	**5-Tier System (Japan/Sanyo et al.)**
Number of Categories	3: I (Normal), II (Indeterminate), III (Abnormal)	5: Green (1) to Red (5), color or numeric scale
Detail/Specificity	Low–moderate: Category II too broad	High: clearer risk stratification
Clinical Interpretation	Variable, often leads to conservative (surgical) response	Encourages more nuanced, physiologic management
Use of Color Coding	No	Yes: visual support for rapid team communication
Risk of Unnecessary Cesarean	High: Category II over-response	Lower: specific actionable categories
Adoption Region	U.S., Canada, Western countries	Japan, some U.S. pilot hospitals
Evidence for Outcome Impact	Limited effect on reducing cesarean or improving outcomes	Early data shows potential to improve **outcomes** and **lower cesarean rates**
Training/Education Requirement	Familiar to most providers	Requires institutional training

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Midwifery

- CNMs
- Integrated Care
- 10-15 % NTSV rates
- Care Model



How do they do it?

- Continuous support
- Attract healthy patients to your system
- Physiologic labor
- Patience



Click to add text

Midwifery Practice - Evidence

Midwifery Practice	Impact	Evidence
Continuous labor support	Reduces cesarean, epidural, and operative vaginal delivery	Hodnett et al., 2013 (Cochrane)
Encouragement of upright and mobile positions	Improves labor progress, fetal descent	Lawrence et al., 2013 (Cochrane)
Individualized care and emotional support	Increases satisfaction, reduces unnecessary intervention	Sandall et al., 2016 (Cochrane)
Delayed admission and active labor confirmation	Prevents early interventions and failed inductions	Neal et al., 2014 (Birth)
Avoidance of routine interventions (e.g., AROM, early epidural)	Supports natural labor patterns	ACOG/SMFM 2014 Consensus

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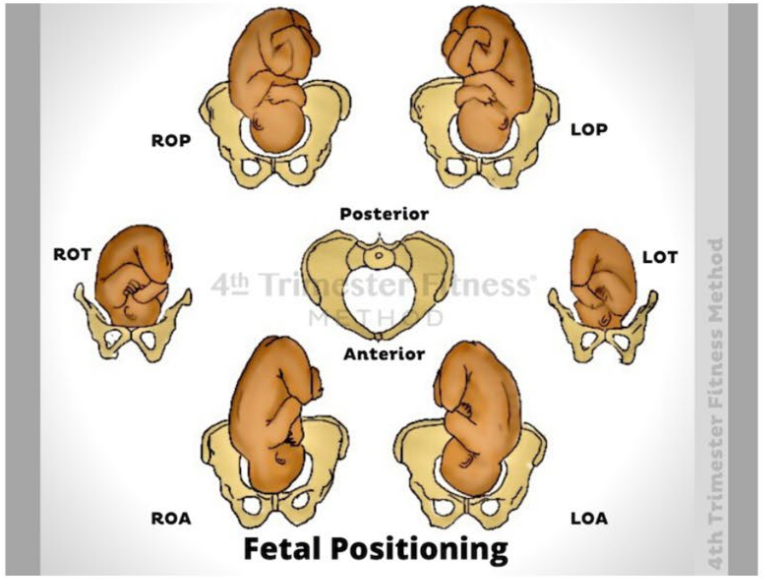
Fetal position

Position Interventions in Labor

- Upright positions (walking, sitting, standing)
- Hands-and-knees for OP
- Side-lying, peanut balls, frequent repositioning (every 30–60 minutes)



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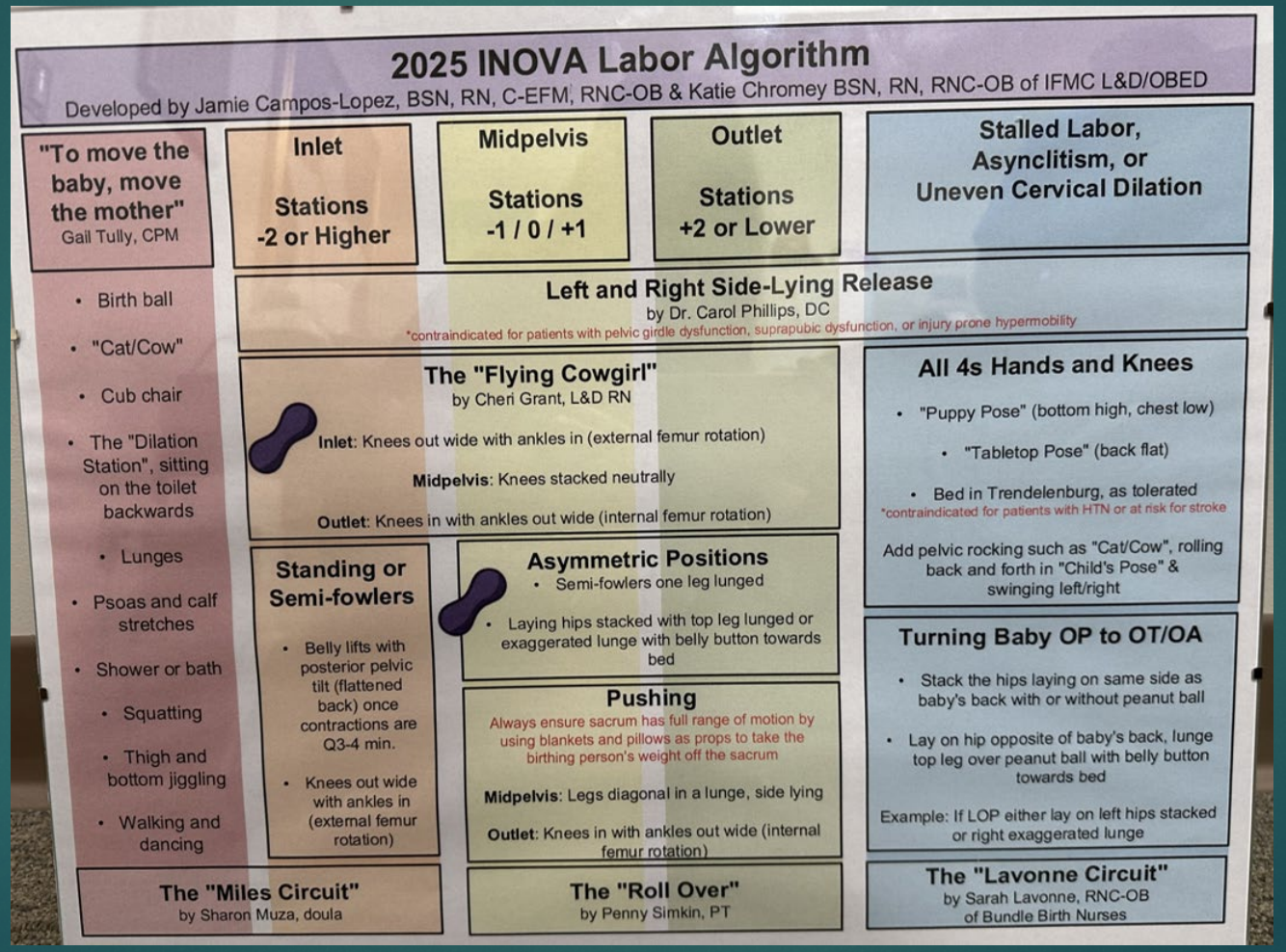
Position interventions



Doulas

- Having a moment
- More coverage available
- Training
- State/state coverage models



Doulas

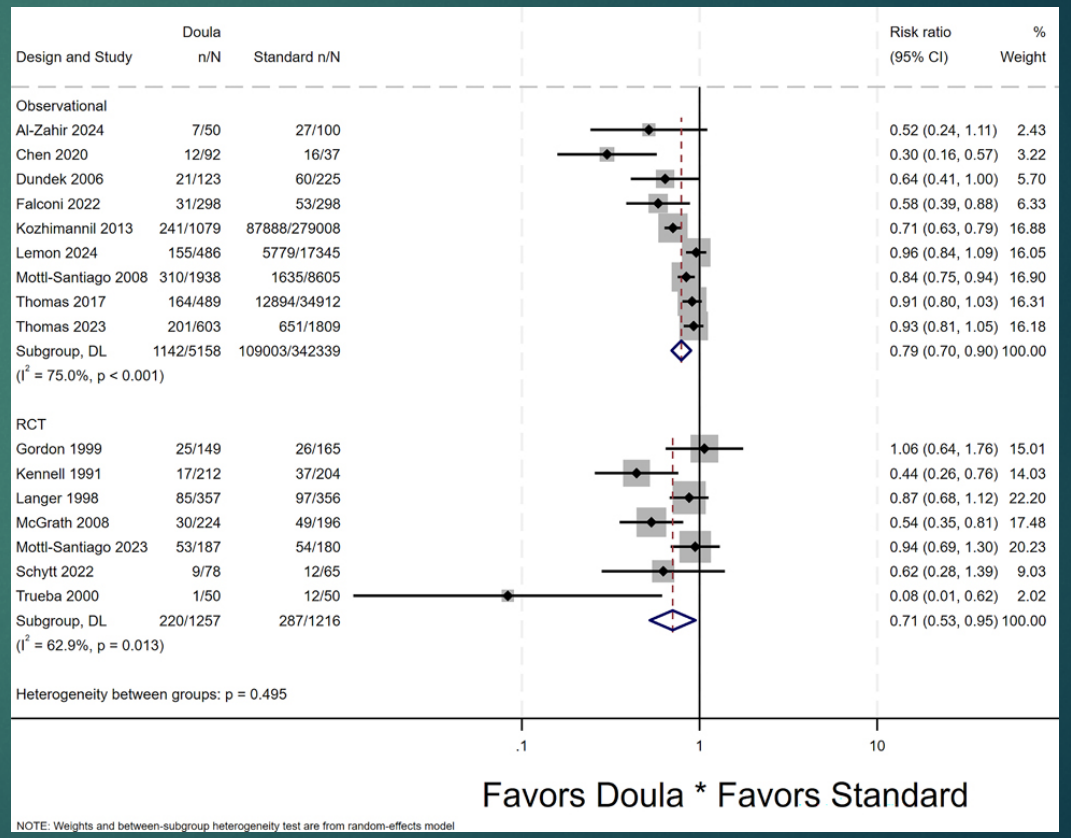
Meta-Analysis > Obstet Gynecol. 2025 May 22;146(1):73-84.
doi: 10.1097/AOG.0000000000005937.

Intrapartum Doula Support and Cesarean Delivery Rates: A Systematic Review and Meta-analysis

Yasmin Dias [1], Nnenna E Achebe, Michelle M Doering, Catalina Montiel, Rachel Paul, Megan Lawlor, Angela Tatum Malloy, Cindy McMillian, Taleah Frazier, Venus Standard, Shaconna Haley, Rachel Urrutia, Jennifer H Tang, Jaime Slaughter-Acey, Antonina Frolova, Nandini Raghuraman, Jeannie C Kelly, Ebony B Carter

Affiliations + expand

PMID: 40403310 PMCID: PMC13220348 DOI: 10.1097/AOG.0000000000005937



Operative Vaginal Delivery

- Numbers continue to decline
- Training issues
- Fear
- 3-5 % of deliveries



Simulation

- Every LD should be engaged
- Emergencies
- OVDs
- Rotations
- Team training

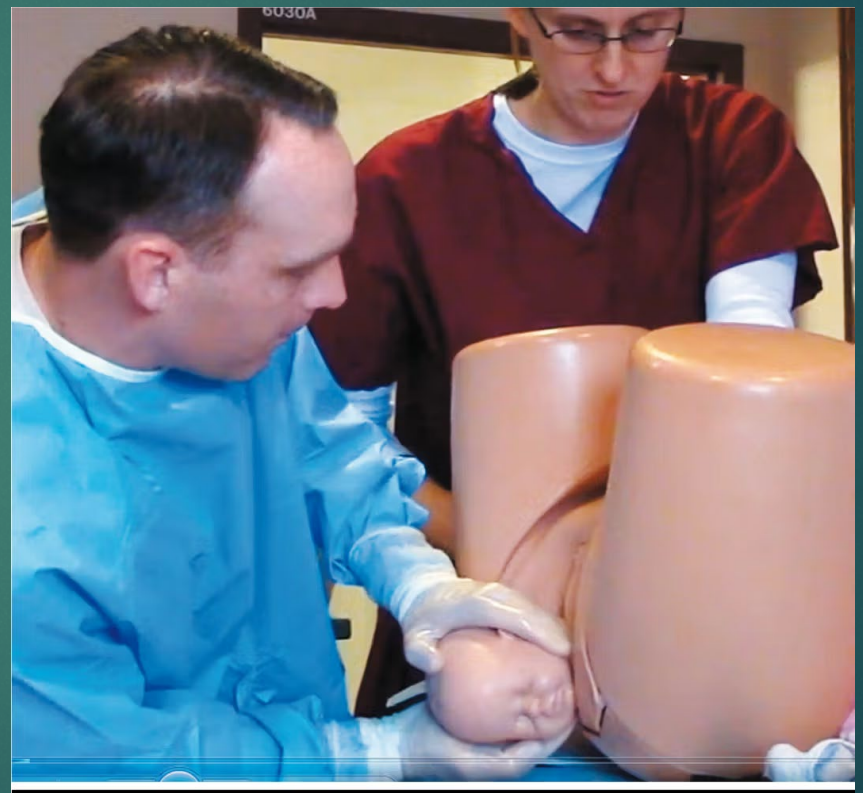


FIGURE 1: Shoulder dystocia simulation. PROMPT Flex Birthing simulator, Limbs & Things.

Standardization

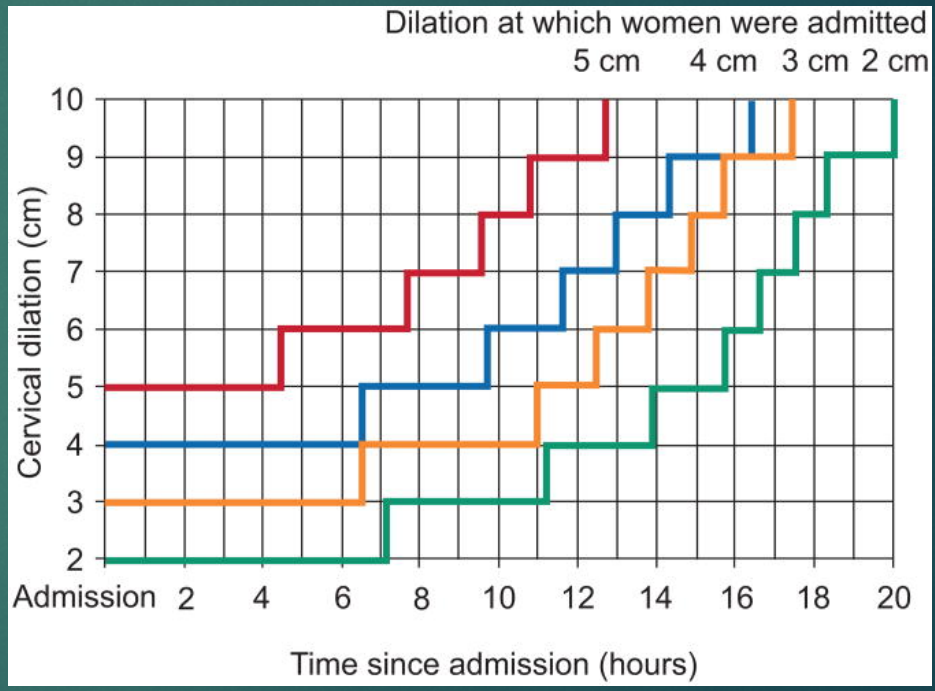
- Labor curves
- Pitocin protocols
- Induction protocols
- Tachysystole management
- Cat II management



Labor curves

- Friedman
- Zhang, 2002
- AI curves (Romero 2025)

- Active labor – 6 cm
- "Failed Induction"



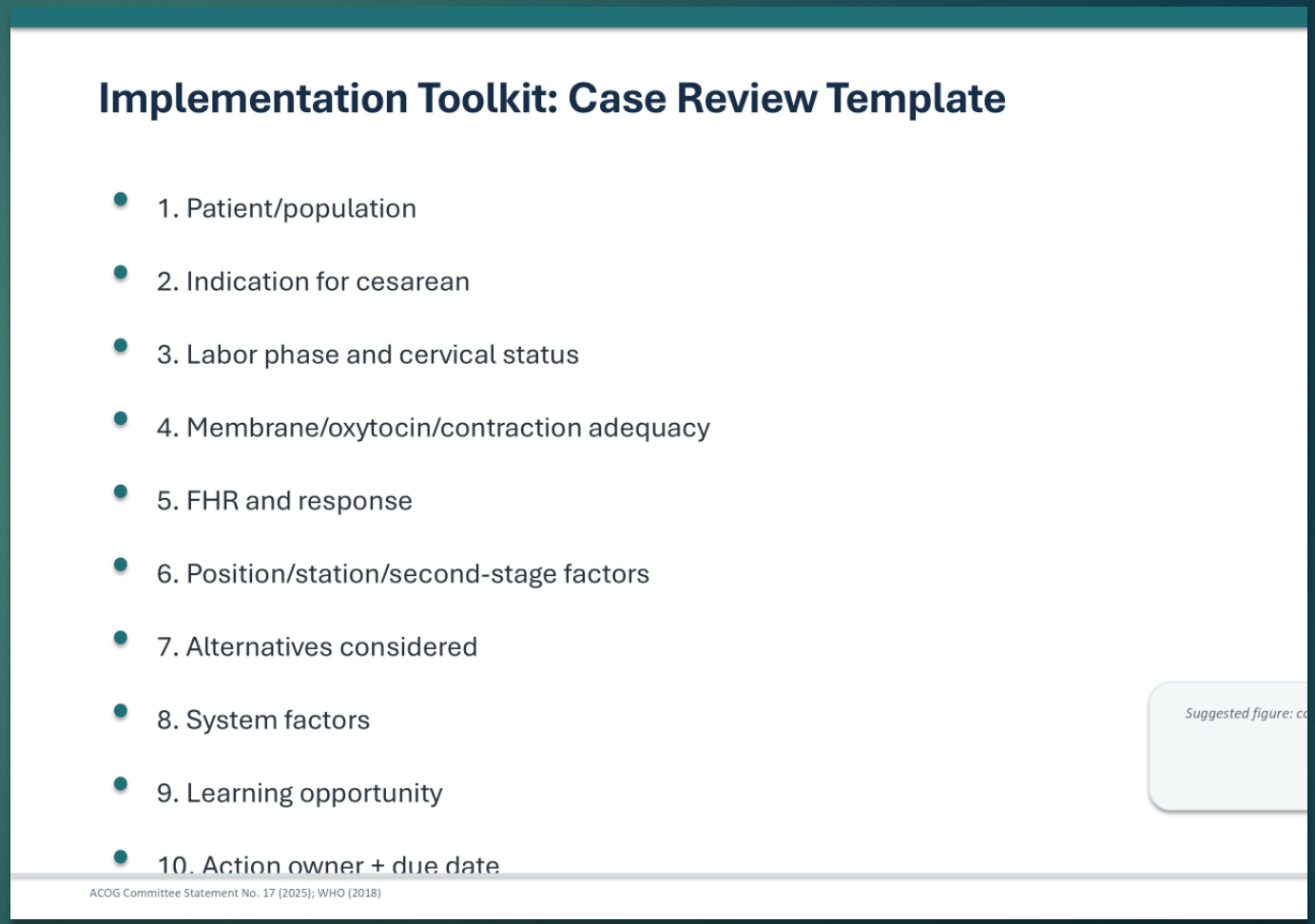
Inductions

- It's complicated
- ARRIVE trial
- Apples and oranges
- Outpatient ripening



Decision Reviews

- Contemporaneous or "Time Out"
- Retrospective
- Fair, firm and consistent



Checklist

Appendix: One-Page Cesarean Deci Checkli

- INDICATION: What is the specific indication?
- LABOR: What phase? What criteria are met?
- AUGMENTATION: ROM? Oxytocin? Contraction adequacy?
- FHR: What was observed and what interventions were attempted?
- SECOND STAGE: Position? Station? Descent/rotation? OVD candidacy
- ALTERNATIVES: What reasonable alternatives exist?
- URGENCY: What is the clinical urgency?
- PATIENT: Has the patient been informed and included?
- LEARNING: Is there a system issue to capture?

ACOG CPG No. 8 (2024); ACOG Committee Statement No. 17 (2025)

Using Data for Improvement

- Dashboards
- Transparency
- Intuitive
- Cross-institutional
- Research





Robson Classification

Robson Report Table with interpretation

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Group	**N CS in group**	**Total N in group**	**Group Size (%)[1]**	**Group CS rate (%)[2]**	**Absolute group contribution to overall CS rate (%)[3]**	**Relative group contribution to overall CS rate (%)[4]**
1	611	2881	27.7	21.2	5.9	16.7
2	656	886	8.5	74.0	6.3	18.0
2a (Induced)	270	500	4.8	54.0	2.6	7.4
2b (Prelabor CS)	386	386	3.7	100.0	3.7	10.6
3	156	3435	33.0	4.5	1.5	4.3
4	199	422	4.1	47.2	1.9	5.4
4a (Induced)	77	300	2.9	25.7	0.7	2.1
4b (Prelabor CS)	122	122	1.2	100.0	1.2	3.3
5	1176	1411	13.6	11.3	32.2	32.2
5.1 (1 CS)	965	1200	11.5	80.4	9.3	26.4
5.2 (> 1 CS)	211	211	2.0	100.0	2.0	5.8
6	158	179	1.7	88.3	1.5	4.3
7	172	197	1.9	87.3	1.7	4.7
8	102	134	1.3	76.1	1.0	2.8
9	39	45	0.4	86.7	0.4	1.1
10	383	818	7.9	46.8	3.7	10.5
Total	**3652**	**10408**	**100%**	**35.1**	**35.1**	**100.0**

1. % = n of women in the group / total N women delivered in the setting x 100
2. % = n of CS in the group / total N of women in the group x 100
3. % = n of CS in the group / total N of women delivered in the setting x 100
4. % = n of CS in the group / total N of CS in the setting x 100

Not classified: 200 cases, 1.9% [(200/ 10408 + 200) * 100]

Definitions used in this setting:

1. Spontaneous labour: on arrival 3 contractions / 10 min with cervical effacement > 50% and dilation > 3 cm, with intact or ruptured membranes.
2. Induction: use of misoprostol, Foley catheter or oxytocin in a woman who does not fulfill the criteria for spontaneous labour

Michigan analysis

ORIGINAL RESEARCH

Check for updates

Hospital Context and Strategies for Cesarean Delivery Quality Improvement

Michelle H. Moniz, Shawna N. Smith, Molly J. Stout, Shelytia Cocroft, Jessi Ems, Jourdan Triebwasser, Alex F. Peahl, Denise Parrish, Stephanie Ludlow, Marisa Wetmore, Megan Danielson, Daniel Almirall, Xilin Chen, Lisa Kane Low

Authors and Affiliations >

Obstetrics & Gynecology Publish Ahead of Print, October 13, 2026. | ***DOI:*** 10.1097/AOG.0000000000006448

PAP SDC

Michigan analysis



Moniz. Cesarean Delivery Rate Quality Improvement. Obstet Gynecol 2026.

Fig. 2. Core and context-dependent strategies for nulliparous, term, singleton, vertex (NTSV) cesarean delivery rate quality improvement. RN, registered nurse; CNM, certified nurse-midwife; CDA, certified doula advocate; QI, quality improvement.

	High-cesarean-rate hospitals												Low-cesarean-rate hospitals				
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Cesarean Rate (7/1/22 to 1/31/23)	39%	38%	37%	37%	36%	32%	31%	31%	30%	28%	28%	28%	25%	25%	24%	23%	23%
Hospital Conditions*																	
Perceptions of Dystocia Criteria	-1	-2	-1	1	1	-2	0	1	-1	0	0	0	2	2	1	1	1
Perceptions of Category II Algorithm	-2	1	-1	-1	-1	-2	-2	-1	-1	0	-1	1	1	1	0	0	1
Regional and National Context	0	-2	1	-2	0	-1	-1	0	0	-2	0	1	0	0	0	0	1
Structural Characteristics	-2	-2	-2	-1	-1	-1	0	-2	1	0	-2	-1	-1	2	2	1	1
Culture	0	0	-2	0	0	-2	-2	-1	1	0	-1	0	1	2	2	2	2
Communications	0	-1	-2	1	0	1	-2	1	0	1	0	1	2	2	1	2	1
Relationships	-1	-2	-1	2	-1	1	0	-1	1	0	0	1	1	2	2	2	2
Organizational leaders	0	-2	1	1	0	0	2	0	0	0	0	1	1	1	2	1	2
Quality initiative leaders	-2	0	-1	-1	-2	-1	0	0	1	2	1	1	1	2	2	2	2
Clinicians	-2	-2	-1	-2	-2	-2	-2	-2	-1	0	-2	0	1	2	2	1	1
Patients	-2	-2	0	2	-1	-1	-2	-2	-1	-1	-1	-1	1	2	2	2	2
Hospital Improvement Processes*																	
Teaming	-2	0	-1	-1	-2	-1	-1	1	-1	-2	1	1	2	2	2	2	1
Planning	-2	-1	-1	-1	-1	-1	-1	1	1	-1	1	-1	1	1	1	1	1
Engaging	-2	-2	-2	-2	-2	-2	-1	-1	-1	-1	1	-1	0	1	2	2	2
Reflecting & Evaluating	-2	-1	1	-1	-1	0	-1	0	0	-1	0	1	1	2	0	2	2
SUMMARY CONTEXTUAL SCORE†	-20	-18	-12	-5	-13	-14	-13	-6	-1	-5	-3	4	14	24	21	21	22

Moniz. Cesarean Delivery Rate Quality Improvement. Obstet Gynecol 2026.

Improvement Process Construct (from CFIR)	Qualitative Data Demonstrating Associations Between Specific QI Strategies* and Hospital Conditions† and Outcomes of QI Efforts
Teaming	**Build a coalition strategy and the clinicians condition:** "It really made a difference to form an OBI committee with space to make it happen. It allowed for more detailed discussion of what needed to happen. Those who attend could be more engaged, and they can help squash the rumor mill on the unit and make it more clear what the QI issues really are." **Secure administrative awareness, buy-in, and needed resources strategy and the QI leaders condition:** "True frontline engagement has been a challenge for us [...] Their office is RVU-based. I talked a lot about that this past year with our uplines. So, this year, they renegotiated contracts to reimburse our champions hourly to come to meetings with me, so they could be more actively involved in leading the work." **Missed opportunity to execute the identify a multidisciplinary champion team strategy:** "We've had a lot of long-tenured people leaving and trouble filling the positions."
Planning	**Conduct consensus discussions and obtain stakeholder feedback about blueprint strategies and the clinicians condition:** "We look at data on the gap in practice. Then we develop guidelines to help everyone manage this. We present the data and the practice guidelines we've developed, and then the frontline staff help us decide how to put the guidelines in place on our unit and improve our numbers. So they understand the problem and have a say in how we fix it." **Missed opportunity to develop a QI blueprint:** "I wouldn't say we ever wrote down a plan."
Engaging	**Provide dynamic, interprofessional training strategy and the communication condition:** "At one point in time, it was physician education, nursing education, and now that we're doing a lot of it together, I think is making a huge difference. We're all talking the same language." **Remind clinicians strategy and the clinicians condition:** "We learned those [dystocia] definitions, but we weren't initially seeing those put into action. Over the past year, we are now looking it up and using it...we have a sheet that spells out the definitions, and that has been helpful...Calling more attention to it has helped us to practice evidence-based medicine." **Relentless communication strategy and clinicians condition:** "For all our initiatives, we have a doc and a nurse champion, and the message is the same, so there is no confusion. It is in a book and there is an attestation that you have read it...and you gotta make things fun. Ask a question about our NTSV initiative, and everyone can answer, and if they get it right you can, maybe, hand them a movie ticket...The entire hospital staff goes on [hospital's] website and sees that these are the people who are doing the work to improve our unit, and everyone wants to be a part of that." **Missed opportunity to relentlessly communicate:** "I don't think we've been very good at communicating to staff the import. We just thought we had to report data to OBI, like, "Here's another thing Blue Cross is making us do, more paperwork." We need to get people to buy into the need for this and selling it from that perspective versus this is just something we have to do."
Reflecting and Evaluating	**Audit and feedback strategy and the culture and clinicians conditions:** "It has been eye-opening to give people individual data. It has caused some pause and reflection. Some have been surprised and asked to look at specific cases for self-reflection. I think a lot are thankful and happy to receive that information." **Facilitate the relay of clinical data to the clinicians strategy and clinicians and patients conditions:** "Standards are there for a lot of things. It is not a choice. We have to adopt those things because we want to do what is best for our patient, and when new data becomes available, we have to change to do the best care we can for our patients. [ACOG/SMFM dystocia criteria] was a new change, but they were held accountable to it. Charts were audited, and they were asked questions. Holding people accountable helped to push adoption." **Evaluate the QI effort strategy and clinicians condition:** "[Data abstractor] shared the OBI data to help us understand the why behind what we are doing. It helps to understand the why behind things, and helps staff be more receptive. When we share the data, we are telling them, 'Your work is meaningful, this is why it is important, and this is what has happened to outcomes as a result of your hard work.' It helps people adapt to those change and want to adopt what we are doing" **Missed opportunity to audit and provide feedback:** "We haven't figured out a way to relay that information so that it doesn't feel punitive or aggressive. We haven't individually identified or contacted or emailed an individual provider."

CFIR, Consolidated Framework for Implementation Research; QI, quality improvement; OBI, obstetrics initiative; RVU, relative value unit; NTSV, nulliparous, term, singleton, vertex; ACOG, American College of Obstetricians & Gynecologists; SMFM, Society for Maternal-Fetal Medicine.

* Strategies from ERIC (Expert Recommendations for Implementing Change) compilation.

† Conditions are highly influential constructs in the CFIR's Innovation, Outer Setting, Inner Setting, and Individuals domains.

Summary – Hospital level

- Practical roadmap
- Psychological Safety
- Transparency
- Standardization
- Data analysis
- Reviews/De-briefing
- Leadership

Summary – State Level

- Payment models
  - Medicaid
  - Value based care
- Workforce
- Tort trends
- Bundles

Summary

- How do we ensure every cesarean is necessary, timely, evidence-based, and safe?
- Trends, not artificial goals
- Look at the variation and target those
- It's hard, it will never be finished