Safely Reducing Primary Cesarean Birth

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Today’s Discussion:

- What are the drivers for the rise and variation in Primary CS?
- NTSV (Nulliparous, Term Singleton, Vertex) as the focus for CS Quality Improvement
- Importance of L&D culture, Labor practices, and use of Data and the California Maternal Data Center to drive change
- Multi-strategy approach to address CS rates
- Public projects to support this initiative
Cesarean Births Have Risen by Over 50% in the Last 15 years

US 2013 = 32.7%
CA 2013 = 33.1%

NOTE: The total cesarean delivery rate is the percentage of all live births by cesarean delivery.
Why has Cesarean Birth Reduction been so hard?

- **Direct challenge** to Physician autonomy
- Very complex, many factors, need to be able to focus on areas with real preventability
- Need for **professional society leadership**
- **Timing**: prior attempts were often “Voices in the wilderness”; “3rd rail of OB QI”; “Enter at your own risk…”
- **Risk**: “Never got sued for doing a Cesarean”
What are the Indications for Cesarean Section?

<table>
<thead>
<tr>
<th>CS Indication</th>
<th>Proportion of Overall CS Rate</th>
<th>Proportion of Primary CS Rate</th>
<th>CS Rate for this Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeat (prior)</td>
<td>30-35%</td>
<td></td>
<td>90+%</td>
</tr>
<tr>
<td>“Abnormal Labor” (CPD/FTP)</td>
<td>25-30%</td>
<td>35-45%</td>
<td>variable</td>
</tr>
<tr>
<td>“Fetal Distress”</td>
<td>10-15%</td>
<td>15-20%</td>
<td>variable</td>
</tr>
<tr>
<td>Breech/Malpres.</td>
<td>10%</td>
<td>15-20%</td>
<td>98%</td>
</tr>
<tr>
<td>Multiple Gestation</td>
<td>5-9%</td>
<td>10-15%</td>
<td>60-80%</td>
</tr>
<tr>
<td>Other: Placenta Previa, Herpes, etc</td>
<td>~5%</td>
<td>~10-15%</td>
<td>90%</td>
</tr>
</tbody>
</table>
### What Indications Have Driven the RISE in CS?

<table>
<thead>
<tr>
<th>Cesarean Indication</th>
<th>Percent of the Increase in Primary Cesarean Rate Attributable to this Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yale (2003 v. 2009) (Total: 26% to 36.5%) Focus: all primary Cesareans</td>
</tr>
<tr>
<td></td>
<td>Kaiser So. Cal. (1991 v. 2008) (Primary: 12.5% to 20%) Focus: all primary singleton Cesareans</td>
</tr>
<tr>
<td>Labor complications (CPD/FTP)</td>
<td>28%</td>
</tr>
<tr>
<td></td>
<td>~38%</td>
</tr>
<tr>
<td>Fetal Intolerance of Labor</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>~24%</td>
</tr>
<tr>
<td>Breech/Malpresentation</td>
<td>&lt;1%</td>
</tr>
<tr>
<td></td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Multiple Gestation</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>Not available</td>
</tr>
<tr>
<td>Various Obstetric and Medical Conditions (Placenta Abnormalities, Hypertension, Herpes, etc.)</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>20% (Did not separate preeclampsia from other complications)</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>10%</td>
</tr>
<tr>
<td>“Elective” (defined variously)</td>
<td>8% (Scheduled without “medical indication”)</td>
</tr>
<tr>
<td></td>
<td>18% (Those “without a charted indication”)</td>
</tr>
</tbody>
</table>
Importance of the First Birth

- If you have a CS in the first labor, over 90% of ALL your subsequent births will be by Cesarean Section
- If you have a vaginal birth in the first labor, over 90% of ALL your subsequent births will be vaginal

*A Classic Example of “Path Dependency”*

How do we focus QI activity on preventing First-birth (Primary) Cesarean sections?
Nulliparous, Term, Singleton, Vertex (NTSV) Cesarean Section Rate: Performance Measure

- Risk Stratified ("standard population")
- Widely Adopted Nationally
  - DHHS: Healthy Person 2010 and 2020
  - NQF endorsed, Joint Commission Perinatal Core Measure (PC-02), LeapFrog, CMS
- Further risk adjustment adds little
- >15 years experience
NTSV Cesarean Section Rate: Strengths

- Simple concept
- Focuses on the main source of variation
- Focuses on the first birth, and therefore her entire reproductive future
- Focuses on labor management
- Risk-stratified, no further risk-adjustment needed

But—need a source of parity and gestational age

Often done with Vital Records
Cesarean Delivery Rates Vary Tenfold Among US Hospitals; Reducing Variation May Address Quality And Cost Issues

ABSTRACT Cesarean delivery is the most commonly performed surgical procedure in the United States, and cesarean rates are increasing. Working with 2009 data from 593 US hospitals nationwide, we found that cesarean rates varied tenfold across hospitals, from 7.1 percent to 69.9 percent. Even for women with lower-risk pregnancies, in which more limited variation might be expected, cesarean rates varied fifteenfold, from 2.4 percent to 36.5 percent. Thus, vast differences in practice patterns are likely to be driving the costly overuse of cesarean delivery in many US hospitals. Because Medicaid pays for nearly half of US births, government efforts to decrease variation are warranted. We focus on four promising directions for reducing these variations, including better coordinating maternity care, collecting and measuring more data, tying Medicaid payment to quality improvement, and enhancing patient-centered decision making through public reporting.
Large Variation of Total Cesarean Rate Among 251 California Hospitals: 2013

Range: 15.0—71.4%
Median: 32.5%
Mean: 32.8%

But wait, you ask, my hospital only takes care of high risk patients!!
Extreme Variation of NTSV CS Rate Among 251 California Hospitals: 2013

Range: 10.0—75.8%
Median: 27.0%
Mean: 27.7%

National Target = 23.9%

36% of CA hospitals meet national target

Risk Adjustment did not reduce the variation

Large Variation = Improvement Opportunity
New National Guidelines for Defining Labor Abnormalities and Management Options
Consortium on Safe Labor
Defining An Alternative to Friedman’s Labor Curve

• 19 hospitals across the US with EHRs that contained detailed labor & delivery data and neonatal outcomes
• 228,668 deliveries (87% in 2005-7)
• 62,415 spontaneous labor NTSV births with normal outcomes
• Focus on redefining normal labor

Finding: Multips had a clear inflexion point at 6cm, nullips less clear
The New Partogram

The 95th percentiles of cumulative duration of labor by cervical dilation at admission (NTSV in spont labor)
### Table 3. Recommendations for the Safe Prevention of the Primary Cesarean Delivery

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First stage of labor</strong></td>
<td></td>
</tr>
<tr>
<td>A prolonged latent phase (e.g., greater than 20 hours in nulliparous women and greater than 14 hours in multiparous women) should not be an indication for cesarean delivery.</td>
<td>Strong recommendation</td>
</tr>
<tr>
<td>Slow but progressive labor in the first stage of labor should not be an indication for cesarean delivery.</td>
<td>Strong recommendation</td>
</tr>
</tbody>
</table>

**Cervical dilation of 6 cm should be considered the threshold for the active phase of most women in labor. Thus, before 6 cm of dilation is achieved, standards of active phase progress should not be applied.**

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

Intrapartum management of category II fetal heart rate tracings: towards standardization of care

Steven L. Clark, MD; Michael P. Nagcotte, MD; Thomas J. Garite, MD; Roger K. Freeman, MD; David A. Miller, MD; Kathleen R. Simpson, RN, PhD; Michael A. Belfort, MD, PhD; Gary A. Dildy, MD; Julian T. Parer, MD; Richard I. Berkowitz, MD; Mary D’Alton, MD; Dwight J. Rouse, MD; Larry C. Gilstrap, MD; Anthony M. Vintzileos, MD; J. Peter van Dorsten, MD; Frank H. Boehm, MD; Lisa A. Miller, CNM, JD; Gary D. V. Hankins, MD
Algorithm for management of category II fetal heart rate tracings

Moderate variability or accelerations

Significant decelerations with ≥50% of contractions for 1 hour⁹  
Significant decelerations with ≥50% of contractions for 30 minutes⁹

Latent Phase

Active Phase

Second Stage

Observe for 1 hour

Cesarean

Normal labor progress

Observe

Cesarean or OVD

Persistent pattern

Operative vaginal delivery

That have not resolved with appropriate conservative corrective measures, which may include supplemental oxygen, maternal position changes, intravenous fluid administration, correction of hypotension, reduction or discontinuation of uterine stimulation, administration of uterine relaxant, amnioninfusion, and/or changes in second stage breathing and pushing techniques.

Significant decelerations are defined as any of the following:

- **Variable decelerations** lasting longer than 60 seconds and reaching a nadir more than 60 bpm below baseline.
- **Variable decelerations** lasting longer than 60 seconds and reaching a nadir less than 60 bpm regardless of the baseline.
- Any **late decelerations** of any depth.
- Any **prolonged deceleration**, as defined by the NICHD. Due to the broad heterogeneity inherent in this definition, identification of a prolonged deceleration should prompt discontinuation of the algorithm until the deceleration is resolved.

Primary CS QI Pathways
Which is the driver in my hospital??

- Latent phase admission
- Nullip (first birth) labor induction
  - Esp. with unfavorable cervix
- Dystocia/Failure to progress
  - Arrest or protraction disorder
- Non-reassuring Fetal Status
  - Oxytocin/misoprostol associated tachysytole
- 2nd Stage (failure of descent)
- Predicted macrosomia
- Patient choice
Measure Analysis:
Identify Drivers of the CS Rate (Step 1)

What Drives Our Primary CS Rate?

<table>
<thead>
<tr>
<th>Category</th>
<th>NTSV</th>
<th>MTSV</th>
<th>Preterm/Multiples/Breech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demo Hospital</td>
<td>16.2%</td>
<td>2.6%</td>
<td>7.3%</td>
</tr>
<tr>
<td>All Community Nurseries</td>
<td>10.9%</td>
<td>2.9%</td>
<td>6.8%</td>
</tr>
<tr>
<td>CA Statewide</td>
<td>10.7%</td>
<td>2.9%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Primary CS Rate Divided into 3 Major Components</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NTSV: Nulliparous (first-birth), Term, Singleton, Vertex presentation
MTSV: Multiparous (second or more-birth), Term, Singleton, Vertex presentation

Screen Shot from the CMQCC Maternal Data Center
Measure Analysis:
Identify Drivers of the CS Rate (Step 2)

What Drives Our Nulliparous Term Singleton Vertex (NTSV) CS Rate?

<table>
<thead>
<tr>
<th></th>
<th>Demo Hospital</th>
<th>All Community Nurseries</th>
<th>CA Statewide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous Labor</td>
<td>20.8%</td>
<td>14.1%</td>
<td>14.2%</td>
</tr>
<tr>
<td>Induced Labor</td>
<td>7.3%</td>
<td>7.3%</td>
<td>7.3%</td>
</tr>
<tr>
<td>No Labor</td>
<td>6%</td>
<td>4.9%</td>
<td>4.6%</td>
</tr>
</tbody>
</table>

NTSV CS Rate Divided into 3 Major Components:

- Spontaneous Labor
- Induced Labor
- No Labor

Screen Shot from the CMQCC Maternal Data Center
ACOG/SMFM Criteria for Dystocia: CMQCC Checklist

1. Diagnosis of Dystocia/Arrest Disorder
   (All 3 should be present)
   - Cervix 6 cm or greater
   - Membranes ruptured, then
   - No change X 4 hrs with Adequate Uterine activity (or 6hrs with oxytocin)

2. Diagnosis of Failed Induction before 6 cm dilation
   (both should be present)
   - Bishop Score ≥ 6 cm before elective induction
   - Oxytocin used for a minimum of 12 hrs after membrane rupture

3. Diagnosis of Failed Induction after 6 cm dilation
   (see criteria 1)
Take the “Test” in Your Hospital…

- Identify 20 cases of CS in the first stage of labor performed for Labor Dystocia/Failure To Progress/Arest of Dilation
- Review using the Check List

How many will fail to meet the 3 criteria?
## Provider-Level Cesarean Rates

<table>
<thead>
<tr>
<th>Provider</th>
<th>Total Deliveries</th>
<th>NTSV Cesarean Section</th>
<th>Total CS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rate</td>
<td>D</td>
</tr>
<tr>
<td>Oct 2012 - Sep 2013 Statewide</td>
<td></td>
<td>27.6%</td>
<td>163090</td>
</tr>
<tr>
<td>Sample Medical Center</td>
<td>5844</td>
<td>32.2%</td>
<td>2369</td>
</tr>
<tr>
<td>G5xxxx</td>
<td>52</td>
<td>13.6%</td>
<td>22</td>
</tr>
<tr>
<td>G6xxxx</td>
<td>47</td>
<td>36.8%</td>
<td>19</td>
</tr>
<tr>
<td>G7xxxx</td>
<td>68</td>
<td>20.8%</td>
<td>24</td>
</tr>
<tr>
<td>G8xxxx</td>
<td>60</td>
<td>15.4%</td>
<td>26</td>
</tr>
<tr>
<td>A8xxxx</td>
<td>190</td>
<td>42.7%</td>
<td>75</td>
</tr>
<tr>
<td>A6xxxx</td>
<td>52</td>
<td>35.0%</td>
<td>20</td>
</tr>
<tr>
<td>A5xxxx</td>
<td>2</td>
<td>No Cases</td>
<td>0</td>
</tr>
<tr>
<td>A4xxxx</td>
<td>114</td>
<td>35.3%</td>
<td>51</td>
</tr>
<tr>
<td>A8xxxx</td>
<td>214</td>
<td>18.3%</td>
<td>82</td>
</tr>
<tr>
<td>A9xxxx</td>
<td>481</td>
<td>36.2%</td>
<td>163</td>
</tr>
</tbody>
</table>

Screen Shot from the CMQCC Maternal Data Center

Note the two busiest providers had widely different rates
Measuring Adherence to Labor Management Guidelines

Case Reviews of NTSV CS—Do we follow the Labor Guidelines?

<table>
<thead>
<tr>
<th>Category</th>
<th>Guidelines Not Met</th>
<th>Guidelines Met</th>
<th>Overall 59.1% Met Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor Abnormalities (44 cases)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Dilation &lt;6cm, Spontaneous</td>
<td>2</td>
<td>N/A (0.0%)</td>
<td></td>
</tr>
<tr>
<td>Labor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Dilation &lt;6cm, Induced</td>
<td>1</td>
<td>10 (90.9%)</td>
<td></td>
</tr>
<tr>
<td>Active Phase (≥6cm)</td>
<td>12</td>
<td>10 (45.5%)</td>
<td></td>
</tr>
<tr>
<td>Second Stage (10cm/Complete)</td>
<td>3</td>
<td>6 (66.7%)</td>
<td></td>
</tr>
</tbody>
</table>

- Other Labor Management Bundles
  - Discouraging Early Labor Admissions
  - Labor Inductions

Screen Shot from the CMQCC Maternal Data Center
Large Variation of NTSV CS Rate Among 251 California Hospitals: 2013

Range: 10.0—75.8%
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Mean: 27.7%

National Target = 23.9%

36% of CA hospitals meet national target

Large Variation = Improvement Opportunity

3 Pilot Hospitals for Interventions
This is the same “Orange County” as depicted in the popular television show. This is the hospital where most of these mothers deliver…

Not the easiest population to start with…
CMQCC Data-Driven QI: NTSV CS

Pilot Hospital: PBGH / RWJ CS Collaborative

- National Target for NTSV CS = 23.9%
- QI Project Started: Jan 16

NTSV CS Rate

- 2011: 32.9%
- 2012: 33.6%
- 2013: 31.2%
- Jan-14: 31.8%
- Feb-14: 31.8%
- Mar-14: 28.3%
- Apr-14: 24.3%
- May-14: 25.0%
- Jun-14: 23.4%

Transforming Maternity Care
Control Chart Showing Change in Centerline (new mean after intervention)

C-Section Rate: Low Risk-NTSV (PC-02)

Measure
- Hospital Trend
- Control Chart
- Definition
- Measure Analysis

Comparisons
- Peer
- NICU Level
- By Payer
- By Provider
- By Practice Group

Screen Shot from the CMQCC Maternal Data Center
What Drivers of the NTSV CS Rate Changed?

Baseline time period (2012)

Last 12 month time period (Mar/2014--Feb/2015)

Collateral Benefit
# Low-risk First-birth (NTSV) Cesarean Reduction Project

<table>
<thead>
<tr>
<th>Period</th>
<th>Hoag Hospital</th>
<th>Miller Childrens/Long Beach Memorial</th>
<th>Saddleback Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline 2011-13 mean</td>
<td>32.60%</td>
<td>31.20%</td>
<td>27.20%</td>
</tr>
<tr>
<td>Post QI mean (last quarter)</td>
<td>24.70%</td>
<td>24.30%</td>
<td>21.90%</td>
</tr>
<tr>
<td>Percent Reduction</td>
<td>24.20%</td>
<td>22.10%</td>
<td>19.50%</td>
</tr>
</tbody>
</table>
Any Downsides?

- Balancing measures are very important
- More vaginal births: Any increase in 3rd or 4th degree lacerations?
  - Zero change from the prior 4 year baseline
- Most important measure is Healthy Babies
  - NQF measure “Healthy Term Newborns” (#0716) recently reconfigured as “Unexpected Newborn Complications”
  - Asks whether term babies without preexisting conditions had any major complications during birth or neonatal period
No Change in Baby Outcomes: Rate of Unexpected Newborn Complications

Remains significantly below State mean
4 Key Strategies for Reducing Primary Cesarean Sections

- Establish the view that “Cesarean Section rates are important” among employers, purchasers and health plans
- Provide rapid-cycle data with standard measures for all facilities and providers
- Promote public and patient engagement
- Change the culture on L&D to better support labor and vaginal birth
Multiple Leverage Points are much more effective than one or two alone
Thank You!

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