Prevention of Primary Cesarean Delivery- Current Recommendations and Future Directions

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Nebraska Methodist Hospital and Perinatal Center
Omaha, NE
Disclosures

• None
Objectives

• Discuss ACOG’s and SMFM’s Safe Prevention of the Primary Cesarean Delivery and NICHD’s Consortium on Safe Labor

• Review definitions of common indications for cesarean delivery

• Describe research opportunities to assess compliance to current consensus recommendations
Introduction

Preventing the First Cesarean Delivery

Summary of a 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

Catherine Y. Spong, MD, Vincenzo Berghella, MD, Katharine D. Wenstrom, MD, Brian M. Mercer, MD, and George R. Saade, MD
Introduction

• February 2012 in Dallas, Texas
• Workshop convened with:
  – Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)
  – Society for Maternal-Fetal Medicine (SMFM)
  – American College of Obstetricians and Gynecologists (ACOG)
Objective

• Workshop
  – Reviewed available information on maternal and fetal factors, labor management and induction, and nonmedical factors that may lead to the first cesarean delivery.
  – Identified modifiable and non-modifiable indications for first cesarean delivery
Table 2. Selected Potentially Modifiable Obstetric Indications for First Cesarean Delivery

<table>
<thead>
<tr>
<th>Indication</th>
<th>Diagnostic Accuracy*</th>
<th>Effect on Prevention of First Cesarean Delivery†</th>
<th>Preventive Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failed induction</td>
<td>Limited</td>
<td>Large</td>
<td>See Table 5 and Figure 1</td>
</tr>
<tr>
<td>Arrest of labor</td>
<td>Limited</td>
<td>Large</td>
<td>See Table 5 and Figure 3</td>
</tr>
<tr>
<td>Multiple gestation</td>
<td>High</td>
<td>Small</td>
<td>Prevent multiple gestations: encourage single embryo transfer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Safe trial of labor: training for vaginal twin delivery, simulation for cephalic version, or breech extraction of second twin</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>High</td>
<td>Small</td>
<td>Education: preeclampsia is not an indication for cesarean delivery</td>
</tr>
<tr>
<td>Prior shoulder dystocia</td>
<td>Limited</td>
<td>Small</td>
<td>Improved documentation as to prior shoulder dystocia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Education regarding risk of recurrence based on estimated fetal weight</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Prior shoulder dystocia is not an absolute indication for cesarean delivery</td>
</tr>
<tr>
<td>Prior myomectomy</td>
<td>Limited</td>
<td>Small</td>
<td>Improved documentation of prior myomectomy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Education regarding impact of myomectomy on delivery</td>
</tr>
<tr>
<td>Prior third-degree or fourth-degree laceration, prior breakdown of repair, fistula</td>
<td>High</td>
<td>Small</td>
<td>Education: not an absolute indication for cesarean delivery</td>
</tr>
<tr>
<td>Marginal and low-lying placentation</td>
<td>High</td>
<td>Small</td>
<td>Education: limited ability to predict recurrence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Education: attempt at vaginal delivery acceptable as long as placenta is 1 cm or more from internal os³⁸</td>
</tr>
</tbody>
</table>

* Diagnostic criteria accuracy: how readily and accurately cases can be diagnosed. For example, the ability to diagnose multiple gestations is high, whereas the ability to identify all cases of shoulder dystocia is limited as a result of subjectivity of the definition.

† Effect on prevention of first cesarean delivery: large means that modification of indication (e.g., arrest of labor) could lead to a large decrease in cesarean deliveries. Small means that modification of indication (e.g., prior shoulder dystocia) could lead to a small decrease in cesarean deliveries.
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<td>Small</td>
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Table 5. Definitions of Failed Induction and Arrest Disorders

<table>
<thead>
<tr>
<th>Failed induction of labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure to generate regular (e.g., every 3 min) contractions and cervical change after at least 24 h of oxytocin administration, with artificial membrane rupture if feasible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>First-stage arrest</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 cm or greater dilation* with membrane rupture and no cervical change for</td>
</tr>
<tr>
<td>4 h or more of adequate contractions (e.g., &gt;200 Montevideo units) or</td>
</tr>
<tr>
<td>6 h or more if contractions inadequate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second-stage arrest</th>
</tr>
</thead>
<tbody>
<tr>
<td>No progress (descent or rotation) for</td>
</tr>
<tr>
<td>4 h or more in nulliparous women with an epidural</td>
</tr>
<tr>
<td>3 h or more in nulliparous women without an epidural</td>
</tr>
<tr>
<td>3 h or more in multiparous women with an epidural</td>
</tr>
<tr>
<td>2 h or more in multiparous women without an epidural</td>
</tr>
</tbody>
</table>

* Since women may still be in latent labor, additional time and interventions may be needed in order to diagnose an arrest of active labor before 6 cm dilatation (see Figure 1 for suggested management).
Box 1. Quality Measures to Track and Provide Feedback for Each Obstetrician–Gynecologist Physician*  
- Rate of nonmedically indicated cesarean delivery  
- Rate of nonmedically indicated induction  
- Rate of labor arrest or failed induction diagnosed without meeting accepted criteria  
- Rate of cesarean deliveries for nonreassuring fetal heart rate by *Eunice Kennedy Shriver* National Institute of Child Health and Human Development category  

*For singleton gestation, vertex presentation, at 37 0/7 to 41 6/7 weeks of gestation.
ACOG/SMFM Consensus

ACOG/SMFM Obstetric Care Consensus

Safe prevention of the primary cesarean delivery

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

The information reflects emerging clinical and scientific advances as of the date issued, is subject to change, and should not be construed as dictating an exclusive course of treatment or procedure. Variations in practice may be warranted based on the needs of the individual patient, resources, and limitations unique to the institution or type of practice.

MARCH 2014 American Journal of Obstetrics & Gynecology
Guideline Objective

• To create guidelines for obstetric practice which should safely lead to lower rates of primary cesarean delivery through:
  – updated guidance on labor management
  – fetal heart rate monitoring
  – other inpatient and outpatient management decisions
Background

Rates of vaginal birth after cesarean (VBAC rate), total cesarean deliveries (CD rate), and primary cesarean deliveries (Primary CD)
Background
Background

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Total CS</th>
<th>Total Births</th>
<th>CS Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alegent Health-Borga Mercy Medical Center</td>
<td>1198</td>
<td>3409</td>
<td>35.1%</td>
</tr>
<tr>
<td>Alegent Health-Lakeside Hospital</td>
<td>303</td>
<td>1003</td>
<td>30.1%</td>
</tr>
<tr>
<td>Alegent Health-Midlands Hospital</td>
<td>28</td>
<td>140</td>
<td>20.0%</td>
</tr>
<tr>
<td>Antelope Memorial Hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beatrice Community Hospital &amp; Health Center</td>
<td>54</td>
<td>195</td>
<td>27.1%</td>
</tr>
<tr>
<td>Bellevue Medical Center</td>
<td>86</td>
<td>755</td>
<td>11.4%</td>
</tr>
<tr>
<td>BryanLGH Medical Center</td>
<td>917</td>
<td>2713</td>
<td>33.7%</td>
</tr>
<tr>
<td>Chadron Community Hospital &amp; Health Services</td>
<td>26</td>
<td>118</td>
<td>22.0%</td>
</tr>
<tr>
<td>Cherry County Hospital</td>
<td>21</td>
<td>84</td>
<td>25.0%</td>
</tr>
<tr>
<td>Columbus Community Hospital</td>
<td>181</td>
<td>560</td>
<td>32.3%</td>
</tr>
<tr>
<td>Cozad Community Hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faith Regional Health Services</td>
<td>157</td>
<td>886</td>
<td>17.7%</td>
</tr>
<tr>
<td>Fremont Area Medical Center</td>
<td>84</td>
<td>344</td>
<td>24.4%</td>
</tr>
<tr>
<td>Gothenburg Memorial Hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Great Plains Regional Medical Center</td>
<td>116</td>
<td>514</td>
<td>22.6%</td>
</tr>
<tr>
<td>Jefferson Community Health Center</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johnson County Hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mary Lanning Memorial Hospital</td>
<td>210</td>
<td>729</td>
<td>28.8%</td>
</tr>
<tr>
<td>Memorial Community Health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nebraska Methodist Hospital</td>
<td>1287</td>
<td>3857</td>
<td>32.8%</td>
</tr>
<tr>
<td>Providence Medical Center</td>
<td>15</td>
<td>51</td>
<td>29.4%</td>
</tr>
<tr>
<td>Regional West Medical Center</td>
<td>108</td>
<td>783</td>
<td>21.4%</td>
</tr>
<tr>
<td>St. Elizabeth Regional Medical Center</td>
<td>523</td>
<td>1827</td>
<td>28.6%</td>
</tr>
<tr>
<td>St. Francis Medical Center</td>
<td>251</td>
<td>952</td>
<td>26.4%</td>
</tr>
<tr>
<td>St. Mary's Community Hospital</td>
<td>39</td>
<td>115</td>
<td>33.9%</td>
</tr>
<tr>
<td>Thayer County Health Services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Nebraska Medical Center</td>
<td>288</td>
<td>1804</td>
<td>21.2%</td>
</tr>
<tr>
<td>Tri County Hospital</td>
<td>47</td>
<td>169</td>
<td>27.8%</td>
</tr>
<tr>
<td>Tri Valley Health System</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Background

## TABLE 1

<table>
<thead>
<tr>
<th>Risk</th>
<th>Vaginal delivery</th>
<th>Cesarean delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maternal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall severe morbidity and mortality&lt;sup&gt;4&lt;/sup&gt;</td>
<td>8.6%</td>
<td>9.2%&lt;sup&gt;6&lt;/sup&gt;</td>
</tr>
<tr>
<td>Maternal mortality&lt;sup&gt;8&lt;/sup&gt;</td>
<td>3.6:100,000</td>
<td>13.3:100,000</td>
</tr>
<tr>
<td>Amniotic fluid embolism&lt;sup&gt;6&lt;/sup&gt;</td>
<td>3.3-7.7:100,000</td>
<td>15.8:100,000</td>
</tr>
<tr>
<td>Third- or fourth-degree perineal laceration&lt;sup&gt;1,7&lt;/sup&gt;</td>
<td>1.0-3.0%</td>
<td>NA (scheduled delivery)</td>
</tr>
<tr>
<td>Placental abnormalities&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Increased with prior cesarean vs vaginal delivery, and risk continues to increase with each subsequent cesarean delivery</td>
<td></td>
</tr>
<tr>
<td>Urinary incontinence&lt;sup&gt;6&lt;/sup&gt;</td>
<td>No difference between cesarean and vaginal delivery at 2 y</td>
<td></td>
</tr>
<tr>
<td>Postpartum depression&lt;sup&gt;1,7&lt;/sup&gt;</td>
<td>No difference between cesarean and vaginal delivery</td>
<td></td>
</tr>
<tr>
<td><strong>Neonatal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laceration&lt;sup&gt;5&lt;/sup&gt;</td>
<td>NA</td>
<td>1.0-2.0%</td>
</tr>
<tr>
<td>Respiratory morbidity&lt;sup&gt;2&lt;/sup&gt;</td>
<td>&lt;1.0%</td>
<td>1.0-4.0% (without labor)</td>
</tr>
<tr>
<td>Shoulder dystocia</td>
<td>1.0-2.0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

NA, not available.

<sup>4</sup> Defined as ≥1 of following: death; postpartum bleeding; genital tract injury; wound disruption, wound infection, or both; systemic infection; <sup>5</sup> Defined as any 1 of following: death; hemorrhage requiring hysterectomy or transfusion; uterine rupture; anesthetic complications; shock; cardiac arrest; acute renal failure; assisted ventilation; various thromboembolic event; major infection; in-hospital wound disruption, wound hematoma, or both. Data from Lu et al.<sup>6</sup> Data from Denoux-Theraux C et al.<sup>1</sup>; Data from Alteheir et al.<sup>1</sup>; Data from Silver et al.<sup>1</sup>.

Background

• Consortium on Safe Labor
  – >220,000 deliveries
  – 19 hospitals in US
  – 2002 to 2008
• Previous uterine scar was primary indication for over half of all CD
• 83% of women with a uterine scar are delivered via CD

Background- Cesarean Indications

- Labor arrest: 34%
- Nonreassuring fetal tracing: 23%
- Malpresentation: 17%
- Macrosomia: 4%
- Maternal Request: 3%
- Maternal-Fetal: 5%
- Multiple Gestation: 7%
- Preeclampsia: 3%
- Other obstetric indications: 4%

Percent
Background

Percent

- Labor arrest: 34%
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- Percent: 4%
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- Percent:
Question

• What is the appropriate definition of abnormally progressing first-stage of labor?
But First...

- What is the First stage of Labor?
First stage of Labor

• Latent phase- maternal perception of regular contractions
  – >20 hours nulliparous, >14 hours multiparous

• Active phase- point at which rate of cervical dilation significantly increases
  – >1.2 cm/h nulliparous, >1.5 cm/h multiparous
Clinical Management Recommendations- 1

• Prolonged latent phase (greater than 20 hours in nulliparous women and greater than 14 hours in multiparous women) should NOT be an indication for cesarean delivery

• Grade recommendation = 1 B
  – Strong recommendation
  – Moderate quality evidence
# Clinical Management Recommendations

<table>
<thead>
<tr>
<th>Grade of Recommendation</th>
<th>Clarity of Risk and Benefit</th>
<th>Quality of Supporting Evidence</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A. Strong recommendation, high quality evidence</td>
<td>Benefits clearly outweigh risk and burdens, or vice versa.</td>
<td>Consistent evidence from well performed randomized controlled trials or overwhelming evidence of some other form. Further research is unlikely to change confidence in the estimate of benefit and risk.</td>
<td>Strong recommendations, can apply to most patients in most circumstances without reservation. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.</td>
</tr>
<tr>
<td>1B. Strong recommendation, moderate quality evidence</td>
<td>Benefits clearly outweigh risk and burdens, or vice versa.</td>
<td>Evidence from randomized controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an impact on confidence in the estimate of benefit and risk and may change the estimate.</td>
<td>Strong recommendation, and applies to most patients. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.</td>
</tr>
<tr>
<td>1C. Strong recommendation, low quality evidence</td>
<td>Benefits appear to outweigh risk and burdens, or vice versa.</td>
<td>Evidence from observational studies, unsystematic clinical experience, or from randomized controlled trials with serious flaws. Any estimate of effect is uncertain.</td>
<td>Strong recommendation, and applies to most patients. Some of the evidence base supporting the recommendation is, however, of low quality.</td>
</tr>
<tr>
<td>2A. Weak recommendation</td>
<td>Benefits closely</td>
<td>Consistent evidence from well-performed</td>
<td>Weak recommendation; best action may differ</td>
</tr>
</tbody>
</table>
Clinical Management Recommendations- 2

• Slow but progressive labor in the first stage of labor rarely should be an indication for cesarean delivery.

• Grade recommendation = 1 B
  – Strong recommendation
  – Moderate quality evidence
Clinical Management Recommendations- 3

• If fetal and maternal status is reassuring:
  – cervical dilation of 6 cm should be considered the threshold for the active phase in most laboring women
  – before 6 cm of dilation is achieved, standards of active phase progress should not be applied.

• Grade recommendation = 1 B
  – Strong recommendation
  – Moderate quality evidence
Clinical Management
Recommendations- 4

• 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.

• Grade recommendation = 1 B
  – Strong recommendation
  – Moderate quality evidence
Question

• How should abnormally progressing first-stage labor be managed?
First stage of labor PEARLS

• Most women with prolonged latent phase will enter active management on their own.

• If contractions cease, one of the following will likely get them into the active stage:
  – Amniotomy
  – Oxytocin

• Active phase arrest
  – ≥6 cm with ruptured membranes with no progress in 4 hours OR
  – At least 6 hours of oxytocin with inadequate uterine activity and no cervical change
Question

• What is the appropriate definition of abnormal second-stage labor?
But first...

• What is the second stage of labor?
Second stage of Labor

• Starts at full dilation
• Ends with delivery of neonate
• With epidural
  – 3 hours nulliparous, 2 hours multiparous
• Without epidural
  – 2 hours nulliparous, 1 hour multiparous
Clinical Management Recommendations- 5

• A specific absolute maximum length of the second stage of labor above which all women should be delivered operatively has not been identified.

• Grade recommendation = 1 C
  – Strong recommendation
  – Low quality evidence
Clinical Management Recommendations- 6

• Before diagnosing arrest of labor in the second stage, if the maternal and fetal conditions permit, allow for the following:
  – At least 2 hours of pushing in multiparous women (1B)
  – At least 3 hours of pushing in nulliparous women (1B)
  – Longer durations may be appropriate on an individualized basis
    • use of epidural analgesia
    • fetal malposition
    • as long as progress is being documented. (1B)

• Grade recommendation = 1 B
  • Strong recommendation
  • Moderate quality evidence
Clinical Management Recommendations- 7

• Operative vaginal delivery in the second stage of labor should be considered:
  – Safe
  – Acceptable alternative to cesarean delivery
• Training in, and ongoing maintenance of, practical skills related to operative vaginal delivery should be encouraged.

• Grade recommendation = 1 B
  • Strong recommendation
  • Moderate quality evidence
• Manual rotation of the fetal occiput in the setting of fetal malposition is a reasonable intervention to consider before moving to operative vaginal delivery or cesarean delivery.

• It is important to assess the fetal position throughout the second stage of labor.

• Grade recommendation = 1 B
  • Strong recommendation
  • Moderate quality evidence
Background

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- Malpresentation: 17%
- Maternal-Fetal: 5%
- Maternal Request: 3%
- Multiple Gestation: 7%
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- Other obstetric indications: 4%
- Preeclampsia: 3%
- Percent: 100%
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- Maternal-Fetal: 5%
- Maternal Request: 3%
- Multiple Gestation: 7%
- Nonreassuring fetal tracing: 23%
- Other obstetric indications: 4%
- Preeclampsia: 3%
- Percent: 3%
- Macrosomia: 4%
- Malpresentation: 17%
Question

• Which fetal heart tracings deserve interventions and what are these interventions?
But first...

- What are the Categories of Fetal heart rate tracings?
Categories of Fetal heart tracing

• Category I
• Category II
• Category III
Categories of Fetal heart tracing

• Category I
  – 110-160 Baseline HR
  – Moderate baseline FHR variability
  – Absent late or variable decelerations
  – Present or Absent early decelerations or accelerations
Categories of Fetal heart tracing

• Category III
  – Absent baseline FHR variability AND any of the following:
    • Recurrent late decelerations
    • Recurrent variable decelerations
    • Bradycardia
    • Sinusoidal pattern
Categories of Fetal heart tracing

• Category II
  – Everything that is not Category I or Category III
  – (Literally, almost everything!!)

• ACOG Practice Bulletin #116, Reaffirmed 2013
Clinical Management Recommendations- 9

• Amnioinfusion for repetitive variable fetal heart rate decelerations may safely reduce the rate of cesarean delivery.
  – 250-500mL bolus, then 60-180mL/hr saline infusion

• Grade recommendation = 1 A
  • Strong recommendation
  • High quality evidence
Clinical Management Recommendations - 10

• Scalp stimulation assesses fetal acid-base status when abnormal or indeterminate fetal heart patterns (eg, minimal variability) are present
  – FHR acceleration associated with normal UA pH

• Grade recommendation = 1 C
  • Strong recommendation
  • Low quality evidence
Question

- What are alternative management strategies for other indications and risks for primary CD?
Other indication for CD

• Fetal Malpresentation
• Maternal Weight Gain
• Twin Gestation
• Suspected Fetal Macrosomia
• Failed Induction of Labor
Clinical Management Recommendations - Malpresentation

- Fetal presentation should be assessed and documented beginning at 36 0/7 weeks of gestation to allow for external cephalic version (ECV) to be offered.

- Grade recommendation = 1 C
  - Strong recommendation
  - Low quality evidence
Clinical Management Recommendations- Weight Gain

• Women should be counseled about the IOM maternal weight guidelines in an attempt to avoid excessive weight gain

• Grade recommendation = 1 B
  • Strong recommendation
  • Moderate quality evidence
### TABLE 1 NEW RECOMMENDATIONS FOR TOTAL AND RATE OF WEIGHT GAIN DURING PREGNANCY, BY PREPREGNANCY BMI

<table>
<thead>
<tr>
<th>Prepregnancy BMI</th>
<th>$\text{BMI}^*$ (kg/m$^2$) (WHO)</th>
<th>Total Weight Gain Range (lbs)</th>
<th>Rates of Weight Gain* 2nd and 3rd Trimester (Mean Range in lbs/wk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
<td>28–40</td>
<td>1 (1–1.3)</td>
</tr>
<tr>
<td>Normal weight</td>
<td>18.5–24.9</td>
<td>25–35</td>
<td>1 (0.8–1)</td>
</tr>
<tr>
<td>Overweight</td>
<td>25.0–29.9</td>
<td>15–25</td>
<td>0.6 (0.5–0.7)</td>
</tr>
<tr>
<td>Obese (includes all classes)</td>
<td>$\geq$30.0</td>
<td>11–20</td>
<td>0.5 (0.4–0.6)</td>
</tr>
</tbody>
</table>

*To calculate BMI go to [www.nhlbisupport.com/bmi/](http://www.nhlbisupport.com/bmi/)

*Calculations assume a 0.5–2 kg (1.1–4.4 lbs) weight gain in the first trimester (based on Siega-Riz et al., 1994; Abrams et al., 1995; Carmichael et al., 1997)*

*IOM Guidelines*
Clinical Management Recommendations - Twins

- Perinatal outcomes for twin gestations in which the first twin is in cephalic presentation are not improved by cesarean delivery. Thus, women with either cephalic/cephalic-presenting twins or cephalic/noncephalic presenting twins should be counseled to attempt vaginal delivery.

- Grade recommendation = 1 B
  - Strong recommendation
  - Moderate quality evidence
Clinical Management Recommendations - Macrosomia

• Cesarean to avoid potential birth trauma should be limited to estimated fetal weights of:
  – 5000gm in women without diabetes
  – 4500gm in women with diabetes.

• Prevalence of these birthweights is rare and patients should be counselled that estimates of fetal weight, particularly in late gestation, are imprecise.

• Grade recommendation = 1 C
  • Strong recommendation
  • Low quality evidence
Clinical Management Recommendations - Induction of Labor

- Cervical ripening methods should be used when labor is induced in women with an unfavorable cervix

- Grade recommendation = 1 B
  - Strong recommendation
  - Moderate quality evidence
Clinical Management Recommendations - Induction of Labor

• Cesarean deliveries for failed induction of labor in the latent phase can be avoided by:
  – allowing longer durations of the latent phase (up to 24 hours or longer)
  – requiring that oxytocin be administered for at least 12-18 hours after membrane rupture before deeming the induction a failure.

• Grade recommendation = 1 B
  • Strong recommendation
  • Moderate quality evidence
<table>
<thead>
<tr>
<th>Grade of Recommendation</th>
<th>Clarity of Risk and Benefit</th>
<th>Quality of Supporting Evidence</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A. Strong recommendation, high quality evidence</td>
<td>Benefits clearly outweigh risk and burdens, or vice versa.</td>
<td>Consistent evidence from well performed randomized controlled trials or overwhelming evidence of some other form. Further research is unlikely to change confidence in the estimate of benefit and risk.</td>
<td>Strong recommendations, can apply to most patients in most circumstances without reservation. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.</td>
</tr>
<tr>
<td>1B. Strong recommendation, moderate quality evidence</td>
<td>Benefits clearly outweigh risk and burdens, or vice versa.</td>
<td>Evidence from randomized controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an impact on confidence in the estimate of benefit and risk and may change the estimate.</td>
<td>Strong recommendation, and applies to most patients. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.</td>
</tr>
<tr>
<td>1C. Strong recommendation, low quality evidence</td>
<td>Benefits appear to outweigh risk and burdens, or vice versa.</td>
<td>Evidence from observational studies, unsystematic clinical experience, or from randomized controlled trials with serious flaws. Any estimate of effect is uncertain.</td>
<td>Strong recommendation, and applies to most patients. Some of the evidence base supporting the recommendation is, however, of low quality.</td>
</tr>
<tr>
<td>2A. Weak recommendation, closely</td>
<td>Benefits closely</td>
<td>Consistent evidence from well-performed</td>
<td>Weak recommendation; best action may differ</td>
</tr>
</tbody>
</table>
QUESTIONS??
Research question:
Given these recommendations, how are we doing?

• **Title of Study:** Evaluation of the Clinical Use of Recommendations for Prevention of Primary Cesarean Delivery

• **Principal Investigator:** Joshua D. Dahlke MD

• **Secondary Investigators:**
  – Brendan D. Connealy MD (MWH)
  – Nathan R. Bertoldo MD, MPH (UNMC)
  – Kirstin R. Sholes MD (UNMC)
  – Elizabeth Lyden (UNMC)
  – Ann L. Anderson-Berry MD (UNMC)
  – Peggy A. Brown (UNMC)
  – Ramzy Nakad MD (UNMC)
  – John Cote MD (CHI)
Research question: How are we doing?

• Retrospective Cohort

• Goal
  – 1) To determine if there is a difference in compliance with the Consensus Guideline definitions with regard to the indications for primary cesarean.
  – 2) To evaluate whether the primary cesarean delivery rate has decreased since publication of the Consensus Guideline.
Research question: How are we doing?

• Inclusion criteria:
  – Nulliparous
  – Live
  – Singleton
  – Vertex
  – ≥37 0/7 weeks
  – Primary CD

• April 1, 2013 to March 31, 2014 (Pre-consensus guidelines) and April 1, 2014 to March 31, 2015 (Post-consensus guidelines) at the following institutions:
  – University of Nebraska Medical Center (UNMC)
  – Methodist Women’s Hospital (MWH)
  – CHI Health Creighton University Medical Center (CUMC)
  – CHI Health Bergan Mercy Hospital (BMH)
  – CHI Health Lakeside Hospital (LH)
Research question: How are we doing?

• **Primary outcome**
  
• To determine if there is a difference in compliance to consensus guideline definitions for the following cesarean delivery indications: 1) arrest disorders (failed induction, arrest of dilation, arrest of descent) and 2) suspected macrosomia in two time periods (Pre-consensus vs Post-consensus)

• **Hypothesis:** There will be improved compliance between pre- and post- consensus time periods with regard to recommendations for primary prevention of cesarean.
Research question: How are we doing?

• **Secondary outcome 1**

• To determine if there is a difference in primary cesarean delivery rate in two time periods (Pre-consensus vs Post-consensus).

• **Hypothesis:** There will be no difference in primary cesarean delivery rate between pre- and post- consensus time period.
Research question: How are we doing?

• Sample size calculation
  – 300 pre-consensus women and 300 post-consensus allows us to detect the specified differences in both primary and secondary outcomes with 90% power and a significance level of 0.05
Future Directions

• Report and publish data from current study
• Prospective interventional study
• Expansion of participating hospitals outside Omaha metro
Box 1. Quality Measures to Track and Provide Feedback for Each Obstetrician–Gynecologist Physician*

- Rate of nonmedically indicated cesarean delivery
- Rate of nonmedically indicated induction
- Rate of labor arrest or failed induction diagnosed without meeting accepted criteria
- Rate of cesarean deliveries for nonreassuring fetal heart rate by *Eunice Kennedy Shriver National Institute of Child Health and Human Development* category

*For singleton gestation, vertex presentation, at 37 0/7 to 41 6/7 weeks of gestation.
Future Directions

• Your Ideas???
Is there a model going forward?
Is there a model going forward?

• YES!!
Is there a model going forward?

Choosing Wisely®
An initiative of the ABIM Foundation

The American College of Obstetricians and Gynecologists

Five Things Physicians and Patients Should Question

Don’t schedule elective, non-medically indicated inductions of labor or Cesarean deliveries before 39 weeks 0 days gestational age.

Delivery prior to 39 weeks 0 days has been shown to be associated with an increased risk of learning disabilities and a potential increase in morbidity and mortality. There are clear medical indications for delivery prior to 39 weeks 0 days based on maternal and/or fetal conditions. A mature fetal lung test, in the absence of appropriate clinical criteria, is not an indication for delivery.
Question

• What conditions in pregnancy are considered medically indicated and what are considered non-medically indicated (elective)?
But First...

- Definitions
- Preterm
  - Early Preterm: <34 0/7 weeks
  - Late Preterm: 34 0/7 to 36 6/7 weeks
- Term
  - Early Term: 37 0/7 to 38 6/7 weeks
  - Full Term: 39 0/7 to 40 6/7 weeks
  - Late Term: 41 0/7 to 41 6/7 weeks
  - Post Term: 42 0/7 and beyond
But First...

• Definitions

• Preterm
  – Early Preterm: <34 0/7 weeks
  – Late Preterm: 34 0/7 to 36 6/7 weeks

• Term
  – Early Term: 37 0/7 to 38 6/7 weeks
  – Full Term: 39 0/7 to 40 6/7 weeks
  – Late Term: 41 0/7 to 41 6/7 weeks
  – Post Term: 42 0/7 and beyond
Another Workshop!

• *Eunice Kennedy Shriver* National Institute of Child Health and Human Development Workshop

• Society for Maternal-Fetal Medicine

• Evidence-based guidance on maternal and fetal conditions in which late-preterm or early-term delivery may be indicated
Another Workshop!
Spong et al, 2011

• Placenta/Uterine
  – Previa
  – Accreta, increta, percreta
  – Prior classical uterine incision
  – Prior myomectomy
Spong et al, 2011

• Fetal
  – Fetal growth restriction
  – Multiple gestation
  – Congenital malformations
  – Abnormalities of amniotic fluid
Spong et al, 2011

• Maternal
  – Hypertensive disorders
  – Diabetes (pre-existing or gestational)

• Other
  – Prior unexplained stillbirth
  – Spontaneous preterm birth
Table 1. Guidance Regarding Timing of Delivery When Conditions Complicate Pregnancy at or After 34 Weeks of Gestation

<table>
<thead>
<tr>
<th>Condition</th>
<th>Gestational Age at Delivery</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placental and uterine issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placenta previa</td>
<td>36–37 wk</td>
<td>B</td>
</tr>
<tr>
<td>Suspected placenta accreta, increta, or percreta</td>
<td>34–35 wk</td>
<td>B</td>
</tr>
<tr>
<td>with placenta previa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior classical caesarean (upper segment</td>
<td>36–37 wk</td>
<td>B</td>
</tr>
<tr>
<td>uterine incision)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior myomectomy necessitating cesarean delivery</td>
<td>37–38 wk (may require earlier delivery, similar</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>to prior classical cesarean, in situations with</td>
<td></td>
</tr>
<tr>
<td></td>
<td>more extensive or complicated myomectomy</td>
<td></td>
</tr>
<tr>
<td>Fetal issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fetal growth restriction–singleton</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>33–39 wk</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>• Otherwise uncomplicated, no concurrent findings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>34–37 wk</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>• Concurrent conditions (oligohydramnios, abnormal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doppler studies, maximal risk factors, co-morbidity)</td>
<td></td>
</tr>
<tr>
<td>Expeditions delivery regardless of gestational age:</td>
<td>Persistent abnormal fetal surveillance suggesting</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>imminent fetal jeopardy</td>
<td></td>
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<tr>
<td>Fetal growth restriction–twin gestation</td>
<td></td>
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<tr>
<td></td>
<td>36–37 wk</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>• Dichorionic-diamniotic twins with isolated fetal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>growth restriction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>32–34 wk</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>• Monochorionic-diamniotic twins with isolated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>fetal growth restriction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Concurrent conditions (oligohydramnios, abnormal</td>
<td></td>
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<tr>
<td></td>
<td>Doppler studies, maximal risk factors, co-morbidity)</td>
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</tr>
<tr>
<td>Expeditions delivery regardless of gestational age:</td>
<td>Persistent abnormal fetal surveillance suggesting</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>imminent fetal jeopardy</td>
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<tr>
<td>Fetal congenital malformations</td>
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<tr>
<td></td>
<td>34–39 wk</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>• Suspected worsening of fetal organ damage</td>
<td></td>
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<tr>
<td></td>
<td>• Potential for fetal intracranial hemorrhage (eg,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• vein of Galen aneurysm, neonatal alloimmune</td>
<td></td>
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<tr>
<td></td>
<td>• thrombocytopenia)</td>
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<tr>
<td></td>
<td>• When delivery prior to a premest (eg, EFW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• procedure)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Previous fetal intervention</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Concurrent maternal disease (eg, preeclampsia,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• chronic hypertension)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Potential for adverse maternal effect from fetal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>condition</td>
<td></td>
</tr>
<tr>
<td>Expeditions delivery regardless of gestational age:</td>
<td>When intervention is expected to be beneficial</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>• Fetal complications develop (abnormal fetal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>surveillance, reduced hydrostatic pressure,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• maternal complications develop (mirror syndrome)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Potential for adverse maternal effect from fetal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>condition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>38 wk</td>
<td>B</td>
</tr>
<tr>
<td>Multiple gestations: dichorionic-diamniotic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>34–37 wk</td>
<td>B</td>
</tr>
<tr>
<td>Multiple gestations: monochorionic-diamniotic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>34–37 wk</td>
<td>B</td>
</tr>
<tr>
<td>Multiple gestations: dichorionic-diamniotic with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>single fetal death</td>
<td>if occurs at or after 34 wk, consider delivery</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>(recommendation limited to pregnancies at or after</td>
<td></td>
</tr>
<tr>
<td></td>
<td>34 wk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>if occurs before 34 wk, individualize based on</td>
<td></td>
</tr>
<tr>
<td></td>
<td>concurrent maternal or fetal conditions</td>
<td></td>
</tr>
</tbody>
</table>
(continued)
Table 1. Guidance Regarding Timing of Delivery When Conditions Complicate Pregnancy at or After 34 Weeks of Gestation (continued)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Gestational Age* at Delivery</th>
<th>Grade of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple gestations: monochorionic-monoamniotic*</td>
<td>32–34 wk</td>
<td>B</td>
</tr>
<tr>
<td>Multiple gestations: Monochorionic-monoamniotic with single fetal death*</td>
<td>Consider delivery; individualized according to gestational age and concurrent complications</td>
<td>B</td>
</tr>
<tr>
<td>Oligohydramnios—isolated and persistent*</td>
<td>36–37 wk</td>
<td>B</td>
</tr>
<tr>
<td>Maternal issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic hypertension—no medications*</td>
<td>38–39 wk</td>
<td>B</td>
</tr>
<tr>
<td>Chronic hypertension—controlled on medication*</td>
<td>37–39 wk</td>
<td>B</td>
</tr>
<tr>
<td>Chronic hypertension—difficult to control (requiring frequent medication adjustments)</td>
<td>36–37 wk</td>
<td>B</td>
</tr>
<tr>
<td>Gestational hypertension*</td>
<td>37–38 wk</td>
<td>B</td>
</tr>
<tr>
<td>Preeclampsia—severe*</td>
<td>At diagnosis (recommendation limited to pregnancies at or after 34 wk)</td>
<td>C</td>
</tr>
<tr>
<td>Preeclampsia—mild*</td>
<td>37 wk</td>
<td>B</td>
</tr>
<tr>
<td>Diabetes—pregestational well controlled*</td>
<td>LPTB or ETB not recommended</td>
<td>B</td>
</tr>
<tr>
<td>Diabetes—pregestational with vascular disease*</td>
<td>37–39 wk</td>
<td>B</td>
</tr>
<tr>
<td>Diabetes—pregestational, poorly controlled*</td>
<td>34–39 wk (individualized to situation)</td>
<td>B</td>
</tr>
<tr>
<td>Diabetes—gestational well controlled on diet*</td>
<td>LPTB or ETB not recommended</td>
<td>B</td>
</tr>
<tr>
<td>Diabetes—gestational well controlled on medication*</td>
<td>LPTB or ETB not recommended</td>
<td>B</td>
</tr>
<tr>
<td>Diabetes—gestational poorly controlled on medication*</td>
<td>34–39 wk (individualized to situation)</td>
<td>B</td>
</tr>
<tr>
<td>Obstetric issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior stillbirth-unexplained*</td>
<td>LPTB or ETB not recommended</td>
<td>B</td>
</tr>
<tr>
<td>Spontaneous preterm birth: preterm premature rupture of membranes*</td>
<td>34 wk (recommendation limited to pregnancies at or after 34 wk)</td>
<td>B</td>
</tr>
<tr>
<td>Spontaneous preterm birth: active preterm labor*</td>
<td>Delivery if progressive labor or additional maternal or fetal indication</td>
<td>B</td>
</tr>
</tbody>
</table>
For your “Elective” consideration...

Current Commentary

Use and Misuse of the Term “Elective” in Obstetrics

Vincenzo Berghella, MD, Sean C. Blackwell, MD, Susan M. Ramin, MD, Baha M. Sibai, MD, and George R. Saade, MD
For your “Elective” consideration...

• Providers should remove the term ‘Elective’ from description of procedure
  – This presumes a decision is made without consideration of medical risks or benefits

• Very few decisions are made in this manner
  – If there is a medical indication, state it clearly
  – If there is *not* a medical indication, state it clearly
    • (e.g. induction at term, maternal request for logistic indications)
Question

• Is there evidence that maternal and neonatal outcomes improve by delivery after 39 0/7?
Question

• Is there evidence that maternal and neonatal outcomes improve by delivery after 39 0/7?

• YES
Maternal and neonatal outcomes by labor onset type and gestational age

Jennifer L. Bailit, MD, MPH; Kimberly D. Gregory, MD, MPH; Uma M. Reddy, MD, MPH; Victor H. Gonzalez-Quintero, MD, MPH; Judith U. Hibbard, MD; Mildred M. Ramirez, MD; D. Ware Branch, MD; Ronald Burkman, MD; Shoshana Haberman, MD, PhD; Christos G. Hatjis, MD; Matthew K. Hoffman, MD, MPH; Michelle Komiarek, MD; Helain J. Landy, MD; Lee A. Learman, MD, PhD; James Troendle, PhD; Paul Van Veldhuisen, PhD; Isabelle Wilkins, MD; Liping Sun, MD, MS; Jun Zhang, PhD, MD
The “39 week rule”

- Secondary Analysis of Consortium of Safe Labor
  - 115,500 deliveries
  - Maternal and fetal outcomes by onset type (spontaneous or induced) and gestational age
- Findings: If delivery at or after 39 0/7 weeks
  - NICU admissions decreased
  - Ventilator use decreased
  - Sepsis decreased
  - 3x decrease in hysterectomy in women who underwent medically indicated induction compared to non-medically indicated
The “39 week rule”

• Despite evidence up to 15% of all deliveries occur by non-medically indicated induction of labor before 39 weeks

• Tita et al
  – 37,000 Cesarean deliveries at 19 institutions
  – 36% of scheduled repeat cesareans occurred prior to 39 0/7 weeks

• Now a national Joint Commission perinatal quality benchmark
Question

• Are there examples of successful implementation of institutional or state-wide programs that have reduced non-medically indicated induction of labor or Cesarean delivery prior to 39 0/7 weeks and improved maternal or neonatal outcomes?
Question

• Are there examples of successful implementation of institutional or state-wide programs that have reduced non-medically indicated induction of labor or Cesarean delivery prior to 39 0/7 weeks and improved maternal or neonatal outcomes?

• YES
Clark et al, 2010

• >17,000 deliveries in 14 states
• Compared three possible programs for implementation
  – Hospital implemented ‘hard stop’
  – Provider peer-reviewed ‘soft stop’
  – Provider education only
Clark et al, 2010

• Reduced non-medically indicated delivery before 39 weeks from 9.6% to 4.3%
• 16% reduction in NICU admissions
• No difference in stillbirths
• ‘Hard stop’ policy most effective in reducing outcomes of interest
Ohio Perinatal Quality Consortium

- Implemented similar ‘hard stop’ program at 20 regional hospitals
- Scheduled births between 36 and 38 6/7 weeks decreased from 25% to <5% within 1 year
Ohio Perinatal Quality Consortium

• Keys to success:
  – Promote ultrasound confirmation of GA <20 weeks
  – Birth form to document dating criteria, specific indications for scheduled birth, documentation of risks/benefits
  – Improved obstetric-pediatric communication with monthly statistics reports to physicians, nurses, administrators
  – Promote a culture of safety
### Recommendations to Reduce Non-Medically Indicated Scheduled Delivery Prior to 39 weeks

1) Promote ultrasound confirmation of gestational age prior to 20 weeks among providers, hospital personnel, and pregnant women

2) Adopt ACOG scheduled birth criteria:
   - a) Confirm gestational age with excellent dating criteria
   - b) Avoid scheduling induction of labor or Cesarean delivery prior to 39 weeks without clear medical indication
   - c) Adopt Scheduled Birth Form
     - i) Note whether dating criteria is optimal (confirmed or set by <20 week ultrasound) or not optimal (all others)
     - ii) Document specific indication for scheduled birth
     - iii) Document discussion of risks and benefits of scheduled birth

3) Improve Obstetric-Pediatric communication
   - a) Monthly statistics reports to physician, nurses, and administrators

4) Promote culture of safety
   - a) Discussions at department and quality meetings.
## Summary

**Recommendations to Reduce Primary Cesarean Delivery**

1. Promote ultrasound confirmation of gestational age prior to 20 weeks among providers, hospital personnel, and pregnant women.

2. Adopt ACOG scheduled birth criteria:
   - a) Confirm gestational age with excellent dating criteria
   - b) Avoid scheduling induction of labor or Cesarean delivery prior to 39 weeks without clear medical indication
   - c) Adopt Scheduled Birth Form
     - i) Note whether dating criteria is optimal (confirmed or set by <20 week ultrasound) or not optimal (all others)
     - ii) Document specific indication for scheduled birth
     - iii) Document discussion of risks and benefits of scheduled birth

3. Improve Obstetric-Pediatric communication
   - a) Monthly statistics reports to physician, nurses, and administrators

4. Promote culture of safety
   - a) Discussions at department and quality meetings.
Questions??