MIDWIFERY WORKS
inspire . build . grow
FT. LAUDERDALE, FL
OCTOBER 11-14, 2018
Calculating the Financial Impact of Cesarean Birth Reduction in your Practice

Susan DeJoy, CNM PhD FACNM
Baystate Medical Center Division of Midwifery
Springfield MA

October 13, 2018
Susan DeJoy, CNM, PhD, received Bachelor of Science degrees from SUNY Geneseo and SUNY Downstate in biology and nursing, a Master of Science in Nursing with a concentration in midwifery from the University of Pennsylvania, and a doctorate in Epidemiology and Biostatistics at the University of Massachusetts School of Public Health and Health Sciences.

Dr. DeJoy has been a practicing certified nurse midwife since 1982, and at Baystate Medical Center in Springfield MA since 1986. She developed the Baystate Midwifery Education Program in 1991, and served as its Director until 1996. She was Chief of the Division of Midwifery and Community Health at Baystate Medical Center until January 2017, developing a full scope midwifery practice, a midwifery triage program, and a collaborative clinical teaching program for residents and medical students. She is an Assistant Professor in the University of Massachusetts Medical School and is on faculty at the Baystate Midwifery Education Program and the Tufts University School of Medicine. Dr. DeJoy was inducted into ACNM Fellowship in 1997. She leads the Reducing Primary Cesareans Quality Project at Baystate.
Title: Calculating the financial impact of cesarean birth reduction in your practice

Abstract: Demonstrating the financial impact of lower cesarean birth rates is a powerful tool for supporting midwifery practice and physiologic birth. We will present an Excel template, pre-populated with formulas, which can be used by any practice or birth service to calculate dollars saved when NTSV cesarean rates are reduced. Included are hospital side costs and provider side income for both mom and baby. The Excel spreadsheet will be shared for use by all participants.
LEARNING OBJECTIVES

1. Define components of estimating cost of cesarean and vaginal births, and where to find this information.
2. Identify fiscal partners who can provide financial data needed for the calculations.
3. Discuss concepts of charge, payment, cost, and gross collection rate.
4. Outline formula for calculating number of primary and repeat cesareans prevented when cesarean birth rate is reduced.
5. Discuss how to present these results for maximum impact.
THIS EDUCATIONAL ACTIVITY OFFERS 0.1 OF CE CREDITS,
PLEASE COMPLETE THE SESSION EVALUATION
Calculating the Financial Impact of Cesarean Birth Reduction in your Practice

Susan DeJoy, CNM PhD FACNM
Baystate Medical Center Division of Midwifery
Springfield MA

October 13, 2018
Acknowledgements

• Jan Mayforth, CPA, Sr. Director, Clinical Financial Planning & Decision Support, Baystate Health
• Matt Bohl, MPH, Senior Decision Support Analyst, Clinical Financial Planning & Decision Support, Baystate Health
• Kathleen Mahoney, MD, MBA, Medical Director, Medical Management, Division of Healthcare Quality, Baystate Health
• The entire Baystate Reducing Primary Cesareans Team
Baystate Medical Center
Springfield, MA 01199

- 716 Bed Tertiary Care Referral Center
- Flagship of Baystate Health, Inc.
- Admissions/year: 42,000
- Annual Surgical volume: 29,000
- UMass Medical School - Baystate
- Member CoTH 9 Residency Programs, 290 Residents & Fellows
- 1,200 Member Medical Staff, 500 Faculty Physicians and Advanced Practitioners
- Level 1 Trauma Center
- IHI Mentor Hospital
- Magnet Facility
- Over 4,000 deliveries per year
Why is Financial Impact Important?

Money
Profit
Fiscal Efficiency
Quality
Concepts and Components of a Financial Impact Analysis
1. Charge, Payment, Cost

• Charge
  – What a hospital/provider charges for a service or service bundle

• Payment
  – What the hospital/provider actually gets paid for the service(s) rendered
  – Highly variable – contracts, discounts, insurer

• Cost
  – The *actual cost* of delivering the service
Example - Steak

Charge = Sticker Price = $12

Cost to produce = $8.50

Payment:
1. Mon & Thurs, 0800-1037 = $14.95; other hrs = $13.79
2. Third Tues q month = $7.95
3. Other Tues = $9.10
4. Weds, over 65 = $11.50; 55-65 = $11.48; 25-45 = $10.49; no payment if <25yo
5. Fri, registered Democrats = $9.79; registered Republicans = $10.42;
   Independents cannot purchase on Fridays.
6. And 49 more rules...
2. How Hospitals Figure Out Costs of Care

- Decision Support Software
  - McKesson Performance Analytics
- All service items for a patient stay get assigned a cost, *based on real cost*
- All service items are assigned to a Clinical Cost Group
  - Labor & Delivery, Nursing, Pharmacy, Supply, Surgery, Anesthesia
- Provider costs not included – not usually hospital supported
3. Develop Cost Report

• Resource Consumption Profile (RCP)
  • Examines patient utilization and cost of clinical services
  • For any predefined patient population
    • Ex: childbirth, hip replacement, pneumonia
  • By MS-DRG
    • Medicare Severity Diagnosis Related Groups
    • Classify all hospital cases

• Total Cost includes **all costs** associated with the service, from **clinical costs** (nursing, supplies, pharmacy) to the **overhead costs** (medical records, facilities, finance, administrative).
The Question

What is the **total** cost savings when a patient has a routine vaginal delivery instead of a primary cesarean section?
Preparing the Analysis
1. Define the Population

- NullipTermSingletonVertex patients only
- Mothers: as defined by MS-DRG
  - Vaginal Deliveries
    - 774 = Vaginal Delivery w/complicating diagnosis
    - 775 = Vaginal Delivery w/o complicating diagnosis
    - 767 = Vaginal Delivery w/sterilization &/or D&C
    - 768 = Vaginal Delivery w/other OR procedure &/or D&C
  - Cesarean Section: with service item for ‘primary c/section’ on the bill
    - 765 = Cesarean Section with CC &/or MCC
    - 766 = Cesarean Section w/o CC &/or MCC
• Babies – matched to their mother
• Providers:
  – Obstetrical/midwifery privileges
  – Bill for deliveries – CPT codes
    • 59510 - routine ob care with cesarean delivery, global
    • 59410 – routine ob care with vaginal delivery, global
    • May look at others for non-global, limited PNC, various complications of deliveries
• Timeframe – needed to get a representative sample
  – Depends on delivery volume
  – We used 6 months
2. Exclusions

- Types of patients whose cost of care would not be included in the analysis
  - Multiple births
    - Both the mother and the babies
  - Length of Stay (LOS) Outliers
    - Outliers were greater than 3 standard deviations from the mean LOS of each group
    - Both the mother and the baby were excluded
  - Baby Exclusions
    - MS-DRG 790 Extreme Immaturity or Respiratory Distress Syndrome were excluded
4. Estimating Professional Income

• What a provider gets paid for a delivery
• Complicated:
  – Usually bundled with antepartum and postpartum
  – Different payments by different insurers
  – Different payments by different insurance products
  – Different payments by provider type
  – May not have access to this for community practices
Performing the Cost Savings Analysis
1. Develop a Resource Consumption Profile (RCP) for the DRG Groups

- RCPs include *hospital* costs of:
  - Anesthesia
  - Diagnostics
  - Labor & delivery bundle
  - Nursing
  - Pharmacy
  - Supplies/surgery/other

- The DRG Groups:
  - Primary C-section Mothers
  - Vaginal delivery Mothers
  - Primary C-section Babies
  - Vaginal delivery Babies
Remember...

- The RCPs are used to compare the average *Total Cost* of care between clinical groups.
- Captures the difference in Total Cost between:
  - Vaginal deliveries and Vaginally delivered babies.
  - Primary Cesarean deliveries and Primacy Cesarean delivered babies.
2. Determine Cases

• Pull all cases with MS-DRGs in timeframe
• Determine mean length of stay (ALOS)
• Exclude cases where LOS is 3 standard deviations greater than mean
Details and Results of Cost Savings Analysis
### Vaginal Deliveries vs. Primary C-sections: FY17 Q2

***Deliveries of babies in DRG 790 & LOS outliers (greater than 3 standard deviations from the mean) are excluded

<table>
<thead>
<tr>
<th>DRG Distribution for the Mothers Included in the Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vaginal Deliveries</strong></td>
</tr>
<tr>
<td>W/ COMPLICATION</td>
</tr>
<tr>
<td>W/O COMPLICATION</td>
</tr>
<tr>
<td>W STERILIZATION &amp;/OR D&amp;C</td>
</tr>
<tr>
<td>W O.R. PROC EXCEPT STERIL &amp;/OR D&amp;C</td>
</tr>
<tr>
<td>Exclusions</td>
</tr>
<tr>
<td>ALOS</td>
</tr>
<tr>
<td><strong>Primary C-sections</strong></td>
</tr>
<tr>
<td>W/ COMPLICATION</td>
</tr>
<tr>
<td>W/O COMPLICATION</td>
</tr>
<tr>
<td>W STERILIZATION &amp;/OR D&amp;C</td>
</tr>
<tr>
<td>W O.R. PROC EXCEPT STERIL &amp;/OR D&amp;C</td>
</tr>
<tr>
<td>Exclusions</td>
</tr>
<tr>
<td>ALOS</td>
</tr>
</tbody>
</table>

#### Hospital Cost

<table>
<thead>
<tr>
<th>Cost Groups</th>
<th>Cases</th>
<th>Average Total Cost</th>
<th>Cases</th>
<th>Average Total Cost</th>
<th>Average Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANESTHESIA</td>
<td>850</td>
<td>$98.85</td>
<td>267</td>
<td>$134.47</td>
<td>$36</td>
</tr>
<tr>
<td>DIAGNOSTICS</td>
<td>1052</td>
<td>$99.91</td>
<td>270</td>
<td>$284.87</td>
<td>$185</td>
</tr>
<tr>
<td>LABOR &amp; DELIVERY</td>
<td>1142</td>
<td>$2,953.67</td>
<td>270</td>
<td>$626.85</td>
<td>($2,327)</td>
</tr>
<tr>
<td>NURSING</td>
<td>1142</td>
<td>$2,461.74</td>
<td>270</td>
<td>$4,197.38</td>
<td>$1,736</td>
</tr>
<tr>
<td>PHARMACY</td>
<td>1140</td>
<td>$223.13</td>
<td>270</td>
<td>$492.59</td>
<td>$269</td>
</tr>
<tr>
<td>SUPPLY</td>
<td>1138</td>
<td>$61.40</td>
<td>270</td>
<td>$176.53</td>
<td>$115</td>
</tr>
<tr>
<td>SURGERY</td>
<td>44</td>
<td>$125.86</td>
<td>270</td>
<td>$3,617.10</td>
<td>$3,491</td>
</tr>
<tr>
<td>ALL OTHER</td>
<td>531</td>
<td>$104.63</td>
<td>107</td>
<td>$137.28</td>
<td>$33</td>
</tr>
<tr>
<td>Totals/Averages</td>
<td>1142</td>
<td>$6,140</td>
<td>270</td>
<td>$9,667</td>
<td>$3,527</td>
</tr>
</tbody>
</table>
**Babies born via Vaginal Delivery vs. Primary C-section: FY17 Q2**

***Babies in DRG 790 & LOS outliers (greater than 3 standard deviations from the mean) are excluded***

<table>
<thead>
<tr>
<th>DRG Description</th>
<th>Vaginal Deliveries</th>
<th>Primary C-sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Died/Transferred to Acute Care Facility</td>
<td>789 8</td>
<td>789 1</td>
</tr>
<tr>
<td>Prematurity W/ Major</td>
<td>791 24</td>
<td>791 13</td>
</tr>
<tr>
<td>Prematurity W/O Major</td>
<td>792 26</td>
<td>792 17</td>
</tr>
<tr>
<td>Full Term Neonate W/ Major</td>
<td>793 82</td>
<td>793 45</td>
</tr>
<tr>
<td>Neonate W/ Other Significant</td>
<td>794 293</td>
<td>794 86</td>
</tr>
<tr>
<td>Normal Newborn</td>
<td>795 693</td>
<td>795 106</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Vaginal Deliveries</th>
<th>Primary C-sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALOS</td>
<td>2.38</td>
<td>4.52</td>
</tr>
<tr>
<td>Exclusions</td>
<td>53</td>
<td>37</td>
</tr>
</tbody>
</table>

**Hospital Cost**

<table>
<thead>
<tr>
<th>Cost Groups</th>
<th>Cases</th>
<th>Average Total Cost</th>
<th>Cost Groups</th>
<th>Cases</th>
<th>Average Total Cost</th>
<th>Average Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostics</td>
<td>1119</td>
<td>$228.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing</td>
<td>1123</td>
<td>$2,593.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacy</td>
<td>1116</td>
<td>$40.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Other</td>
<td>387</td>
<td>$177.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals/Averages</td>
<td>1123</td>
<td>$3,039</td>
<td>267</td>
<td></td>
<td>$6,025</td>
<td>$2,985</td>
</tr>
</tbody>
</table>

Babies in DRG 790 & LOS outliers (greater than 3 standard deviations from the mean) are excluded.
### Vaginal Deliveries vs. Primary C-sections: FY17 Q2

<table>
<thead>
<tr>
<th></th>
<th>Vaginal Deliveries</th>
<th>Primary C-sections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cases</td>
<td>Average</td>
</tr>
<tr>
<td>Professional (B-side)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Actual Collection</strong></td>
<td>946</td>
<td>$1,894</td>
</tr>
</tbody>
</table>

### Babies born via Vaginal Delivery vs. Primary C-section: FY17 Q2

***Babies in DRG 790 & LOS outliers (greater than 3 standard deviations from the mean) are excluded***

<table>
<thead>
<tr>
<th></th>
<th>Vaginal Deliveries</th>
<th>Primary C-sections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cases</td>
<td>Average Charges</td>
</tr>
<tr>
<td>Professional Charges</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Charges</strong></td>
<td>660</td>
<td>$938</td>
</tr>
<tr>
<td><strong>Gross Collection Ratio</strong></td>
<td>0.4379</td>
<td>0.4379</td>
</tr>
<tr>
<td><strong>Estimated Collection</strong></td>
<td>$411</td>
<td>$706</td>
</tr>
</tbody>
</table>
The savings associated with one mother-baby pair being a vaginal delivery instead of primary c-section:

### MOTHER

<table>
<thead>
<tr>
<th></th>
<th>Avg Cost</th>
<th>Reduction</th>
<th>Total Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOSPITAL (Total Cost)</td>
<td>$3,527</td>
<td>1</td>
<td>$3,527</td>
</tr>
<tr>
<td>PROFESSIONAL (Collection)</td>
<td>$228</td>
<td>1</td>
<td>$228</td>
</tr>
<tr>
<td><strong>MOTHER TOTAL</strong></td>
<td>$3,299</td>
<td></td>
<td>$3,299</td>
</tr>
</tbody>
</table>

### BABY

<table>
<thead>
<tr>
<th></th>
<th>Avg Cost</th>
<th>Reduction</th>
<th>Total Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOSPITAL (Total Cost)</td>
<td>$2,985</td>
<td>1</td>
<td>$2,985</td>
</tr>
<tr>
<td>PROFESSIONAL (Collection)</td>
<td>$295</td>
<td>1</td>
<td>$295</td>
</tr>
<tr>
<td><strong>BABY TOTAL</strong></td>
<td>$2,690</td>
<td></td>
<td>$2,690</td>
</tr>
</tbody>
</table>

### TOTAL

<table>
<thead>
<tr>
<th></th>
<th>Avg Cost</th>
<th>Reduction</th>
<th>Total Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOSPITAL (Total Cost)</td>
<td>$6,513</td>
<td>1</td>
<td>$6,513</td>
</tr>
<tr>
<td>PROFESSIONAL (Collection)</td>
<td>$523</td>
<td>1</td>
<td>$523</td>
</tr>
<tr>
<td><strong>GRAND TOTAL</strong></td>
<td>$5,990</td>
<td></td>
<td>$5,990</td>
</tr>
</tbody>
</table>
Total Impact of Reduction of Primary Cesareans in First Year (2016)
NTSV C/Sec Rate ↓14%
(31.1% to 26.7%)

<table>
<thead>
<tr>
<th></th>
<th>AVG COST</th>
<th># REDUCED</th>
<th>TOTAL SAVINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTHER</td>
<td>3,299</td>
<td>69</td>
<td>$227,656</td>
</tr>
<tr>
<td>BABY</td>
<td>2,690</td>
<td>69</td>
<td>$185,633</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5,990</td>
<td>69</td>
<td>$413,289</td>
</tr>
</tbody>
</table>
Summary of BMC Initial Results

• BMC NTSV Cesarean section rate
  • 2015 = 31.1%
  • 2016 = 26.7%

• 14% decrease amounted to 69 cesarean sections converted to vaginal deliveries

• $462,000 in cost savings
Further Cost Savings Analysis

• What is downstream effect of preventing additional c/sections when primary c/section is not done?
  – Calculate risk of a primary c/sec in a multipara
  – Calculate possibility of VBAC
  – BMC example:
    • 95% x 69 = 66 potential repeat c/secs
    • VBAC rate = 7%: 7% x 66 = 5 vaginal deliveries
    • So, prevented 61 repeat c/sections
    • Additional cost savings $409,188
How Can YOU Do This?

• Get a 3-4 people team
  – Financial analyst; clinical decision support
  – Health Care Quality
  – YOU!
  – Nursing, physician colleague

• Use our processes, spreadsheets
  – Don’t reinvent the wheel

• Run your own numbers
• Publicize and promote the results
  – Grand Rounds, Quality Rounds
  – Dept mtgs, nursing mtgs
  – Post on L&D
  – Hospital publications and websites
  – Submit for awards
Questions?

susan.dejoy@baystatehealth.org

matthew.bohl@baystatehealth.org
References

The Cost of Nurse-Midwifery Care: Use of Interventions, Resources, and Associated Costs in the Hospital Setting.
Altman MR, Murphy SM, Fitzgerald CE, Andersen HF, Daratha KB.

Cost-effectiveness of a trial of labor after previous cesarean.
Chung A, Macario A, El-Sayed YY, Riley ET, Duncan B, Druzin ML.

An economic analysis of trial of labor after cesarean delivery.
Friedman AM, Ananth CV, Chen L, D'Alton ME, Wright JD.

Cesarean Delivery Rates and Costs of Childbirth in a State Medicaid Program After Implementation of a Blended Payment Policy.
Kozhimannil KB, Graves AJ, Ecklund AM, Shah N, Aggarwal R, Snowden JM.

Variation in the cost of 5 common operations in the United States.

The cost-effectiveness of a trial of labor accrues with multiple subsequent vaginal deliveries.
Wymer KM, Shih YC, Plunkett BA.

Quality Improvement Initiatives Lead to Reduction in Nulliparous Term Singleton Vertex Cesarean Delivery Rate.
Vadnais MA, Hacker MR, Shah NT, Jordan J, Modest AM, Siegel M, Golen TH.

Potential Medicaid cost savings from maternity care based at a freestanding birth center.
Howell E, Palmer A, Benatar S, Garrett B.
References

Cost-Effectiveness Analysis of Latent versus Active Labor Hospital Admission for Medically Low-Risk, Term Women.

Modeling the Cost-Effectiveness of Doula Care Associated with Reductions in Preterm Birth and Cesarean Delivery.

Lifetime cost-effectiveness of trial of labor after cesarean in the United States.

Decision analysis and cost-effectiveness analysis for comparative effectiveness research--a primer.

A perinatal care quality and safety initiative: are there financial rewards for improved quality?