Using California Maternity Data to Drive Quality Improvement

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Mission: Improving care for moms and newborns

California Perinatal Quality Care Collaborative (CPQCC)
- Expertise in data capture from hospitals
- Established Neonatal Database in 1996
- Data use agreements in place with 130 hospitals with NICUs
- Model of working with state agencies to provide data of value

California Maternal Quality Care Collaborative (CMQCC)
- Expertise in maternal data analysis
- Developer of maternal QI toolkits
- Host of collaborative learning communities
- Established Maternal Data Data Center in 2011

CMQCC: Transforming Maternity Care
CMQCC Key Partner/Stakeholders

State Agencies:
- MCAH, Dept Public Health
- OSHPD Healthcare Information Division
- Office of Vital Records (OVR)
- Regional Perinatal Programs of California (RPPC)
- DHCS, Medi-Cal

Public and Consumer Groups
- California Hospital Accountability and Reporting Taskforce (CHART)
- California HealthCare Foundation
- Kaiser Family Foundation
- March of Dimes (MOD)

Professional groups
- American College of Obstetrics and Gynecology (ACOG)
- Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN)
- American College of Nurse Midwives (ACNM),
- American Academy of Family Physicians (AAFP)

Key Medical and Nursing Leaders
- Universities and Hospital Systems
- Kaisers, Sutter, Sharp, Dignity, Scripps, Providence, Public hospitals,

CMQCC: Transforming Maternity Care
CMQCC Key Partner/Stakeholders (con’t)

Hospital Associations:
- California Hospital Association / HQI
- Regional Hospital Associations

Payers
- Aetna
- Anthem Blue Cross
- Blue Shield
- Cigna
- Health Net

Purchasers
- CALPERS (State and local government employees and retirees)
- Medi-Cal (for managed care plans)
- Pacific Business Group on Health/ Silicon Valley Employers Forum
- Cover California (ACA entity)
Data ↔ Action

- Data-Driven Quality Improvement
- BOTH performance and safety projects

Data Sources:
- Maternal Mortality Case reviews
- Linked: Vital Records / Hospital Discharge Diagnosis Data
  (CMQCC Maternal Data Center)
CMQCC Toolkits and Collaboratives

- Maternal Mortality and Morbidity
  - Hemorrhage
  - Preeclampsia
  - CV Disease*
  - DVT Prevention*

- National Quality Measures
  - Preventing Early Elective Delivery (MOD National)
  - Antenatal Steroids
  - First Birth Cesarean Delivery*

*Currently under development
Maternal Mortality Rate, California and United States; 1999-2008

Lancet May 2014: US is ranked #47 in world

SOURCE: State of California, Department of Public Health, California Birth and Death Statistical Master Files, 1999-2010. Maternal mortality for California (deaths ≤ 42 days postpartum) was calculated using ICD-10 cause of death classification (codes A34, O00-O95,O98-O99) for 1999-2010. United States data and HP2020 Objective were calculated using the same methods. U.S. maternal mortality rates are published by the National Center for Health Statistics (NCHS) through 2007 only. Rates for 2008-2010 were calculated using NCHS Final Birth Data (denominator) and CDC Wonder Online Database for maternal deaths (numerator). Accessed at http://wonder.cdc.gov/ucd-icd10.html on Apr 17, 2013 8:00:39 PM. Produced by California Department of Public Health, Center for Family Health, Maternal, Child and Adolescent Health Division, April, 2013.
THE CALIFORNIA PREGNANCY-ASSOCIATED MORTALITY REVIEW (CA-PAMR)

Report from 2001-2003
Maternal Death Reviews

This project was supported by the federal Title V MCH block grant from the California Department of Public Health; Center for Family Health; Maternal, Child and Adolescent Health Division.
### CA-PAMR Pregnancy-Related Deaths (2002-2004)
#### Chance to Alter Outcome by Cause of Death

<table>
<thead>
<tr>
<th>Clinical Cause of Death</th>
<th>Strong/Good (%)</th>
<th>Some (%)</th>
<th>None (%)</th>
<th>Total N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obstetric hemorrhage</td>
<td>69</td>
<td>25</td>
<td>6</td>
<td>16 (11)</td>
</tr>
<tr>
<td>Deep vein thrombosis/pulmonary embolism</td>
<td>53</td>
<td>40</td>
<td>7</td>
<td>15 (10)</td>
</tr>
<tr>
<td>Sepsis/infection</td>
<td>50</td>
<td>40</td>
<td>10</td>
<td>10 (7)</td>
</tr>
<tr>
<td>Preeclampsia/eclampsia</td>
<td>50</td>
<td>50</td>
<td>0</td>
<td>24* (17)</td>
</tr>
<tr>
<td>Cardiomyopathy and other cardiovascular causes</td>
<td>25</td>
<td>61</td>
<td>14</td>
<td>28* (19)</td>
</tr>
<tr>
<td>Cerebral vascular accident</td>
<td>22</td>
<td>0</td>
<td>78</td>
<td>9 (6)</td>
</tr>
<tr>
<td>Amniotic Fluid Embolism</td>
<td>0</td>
<td>87</td>
<td>13</td>
<td>15 (10)</td>
</tr>
<tr>
<td>All other causes of death</td>
<td>46</td>
<td>46</td>
<td>8</td>
<td>26 (18)</td>
</tr>
<tr>
<td><strong>Total (%)</strong></td>
<td><strong>40</strong></td>
<td><strong>48</strong></td>
<td><strong>13</strong></td>
<td><strong>143</strong>*</td>
</tr>
</tbody>
</table>

*CMQCC Technical Report on CA-PAMR Findings 2002-2004; submitted to CA MCAH, August 2011*  
*2 Cases had insufficient data to determine chance to alter outcome.*
### Maternal Mortality and Severe Morbidity

Approximate distributions, compiled from multiple studies

<table>
<thead>
<tr>
<th>Cause</th>
<th>Mortality (1-2 per 10,000)</th>
<th>ICU Admit (1-2 per 1,000)</th>
<th>Severe Morbid (1-2 per 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTE and AFE</td>
<td>15%</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>Infection</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>15%</td>
<td>30%</td>
<td>45%</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>15%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Cardiac Disease</td>
<td>25%</td>
<td>20%</td>
<td>10%</td>
</tr>
</tbody>
</table>
Reduce Maternal Mortality and SMM (CA-PAMR)

- Hemorrhage Taskforce (2009)
- Multi-hospital QI Collaborative(s) (2010-11)
  Test the “tools” and implementation strategies
- State-wide Implementation (2013-2014)
- Preeclampsia Taskforce (2012)
- Preeclampsia QI Toolkit (2013)
- Multi-hospital QI Collaborative (2013)
- Cardiovascular Detailed Case Analysis (2013)
- Cardiovascular QI Toolkit (2014)
Maternal Mortality Rate, California and United States; 1999-2010

SOURCE: State of California, Department of Public Health, California Birth and Death Statistical Master Files, 1999-2010. Maternal mortality for California (deaths ≤ 42 days postpartum) was calculated using ICD-10 cause of death classification (codes A34, O00-O95, O98-O99) for 1999-2010. United States data and HP2020 Objective were calculated using the same methods. U.S. maternal mortality rates are published by the National Center for Health Statistics (NCHS) through 2007 only. Rates for 2008-2010 were calculated using NCHS Final Birth Data (denominator) and CDC Wonder Online Database for maternal deaths (numerator). Accessed at http://wonder.cdc.gov/ucd-icd10.html on Apr 17, 2013 8:00:39 PM. Produced by California Department of Public Health, Center for Family Health, Maternal, Child and Adolescent Health Division, April, 2013.
Severe Maternal Morbidity (SMM)

- Mortality is difficult to measure and uncommon (<1/10,000)
- Working with HRSA MCH-B and CDC to test ways to define and measure SMM
- SMM Collaborative to examine the CDC metric using ICD9 codes, and others using blood bank data, ICU admission, LOS
- The Maternal Data Center is at the center
The CMQCC Maternal Data Center (CMDC)

Data ↔ Action
What is the CMDC?
Low-burden/High-value

A **Rapid-Cycle** one-stop shop to support hospitals’ obstetric quality improvement initiatives and service line management

- Overall hospital obstetric performance measures (>40)
- Benchmarking statistics—to compare your hospital to regional, state, and like-hospital peers
- Facilitating reporting to Leapfrog, HEN, and CMS IQR
- Provider-level statistics—to assess variation within a hospital

**CMQCC:** Transforming Maternity Care
CMQCC Maternal Data Center

PDD--Discharge Diagnosis File (ICD9 codes)

Birth Certificate File (Clinical Data)

CMQCC Data Center

Q MONTH: Upload electronic files for ALL CA births
Automatically Link Birth Data to PDD file (Deterministic+ Probabilistic)

CHART REVIEW (If needed)
<39wk EED
Antenatal Steroids
Process measures

Limited manual data entry for these measures

REPORTS
Benchmarks against other hospitals
Sub-measure reports

Mantra: “If you use it, they will improve it”
Sample Hospital

Measures

Period: Q1 2014

Hospital Clinical Performance Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective Delivery &lt;39 Weeks (PC-01)</td>
<td>3.3%</td>
</tr>
<tr>
<td>Cesarean Section Rate—Nullip, Term, Singleton, Vertex (PC-02)</td>
<td>25.7%</td>
</tr>
<tr>
<td>Vaginal Birth After Cesarean (VBAC) Rate, Uncomplicated (AHRQ IQI 22)</td>
<td>16.2%</td>
</tr>
<tr>
<td>Total Cesarean Section Rate</td>
<td>29.2%</td>
</tr>
<tr>
<td>Primary Cesarean Section</td>
<td>20.8%</td>
</tr>
<tr>
<td>Failed Induction</td>
<td>24.5%</td>
</tr>
</tbody>
</table>

View all 31 Hospital Clinical Performance Measures

Provider Performance Measures

<table>
<thead>
<tr>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cesarean Births</td>
</tr>
<tr>
<td>Elective Deliveries</td>
</tr>
<tr>
<td>Vaginal Births</td>
</tr>
</tbody>
</table>

Hospital Data Quality Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing / Inconsistent Delivery Method</td>
<td>2.7%</td>
</tr>
<tr>
<td>Missing / Inconsistent V27 (Outcome of Delivery)</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Data Submission Trends

View all 12 Hospital Data Quality Measures
To submit data files or identify cases requiring chart review, click “Data Entry Status” button above.

Hospital Statistics
- Demographic Statistics
- Delivery Statistics
- Maternal Comorbidity Statistics
- Baby/Prematurity Statistics
- Utilization Statistics
- CCS Report

View Delivery Logbook
- First you must authenticate using 2-factor authentication
Data ↔ Action

- Reducing Early Elective Delivery
- Reducing Primary CS—First birth, Low Risk or NTSV CS
- Taskforce → Toolkit → Collaborative

The Data Center is designed to report measures by region, payer, purchaser, hospital, medical group and provider
Total CS Rate Among 251 California Hospitals 2011-2012
(Source: CMQCC--California Maternal Data Center combining primary data from OSHPD and Vital Records)

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

Extreme Hospital Level Variation!
Low-Risk First-Birth (Nuliparous Term Singleton Vertex) CS Rate
(endorsed by NQF, TJC PC-02, CMS, HP2020)
Among 249 California Hospitals: 2011-2012
(Source: CMQCC--California Maternal Data Center combining primary data from OSHPD and Vital Records)

Range: 10.0—75.8%
Median: 27.0%
Mean: 27.7%
National Target = 23.9%

36% of CA hospitals meet national target

July 24, 2013
Transforming Maternity Care

Beyond Reporting Rates
(Numerator/Denominator)

- Automated Measure analysis using nested sub-measures to guide and focus your QI journey
- Drill-down to the patient level with Case Review Worksheets to understand quality improvement opportunities—for both clinical quality and data quality
- Trend analyses of both measures and sub-measures
CMDC receives birth certificate data approximately 45 days after the end of each month. This means the data for April 2014 will be available around June 15th 2014.

Rate of Cesarean Section among women with no prior Cesarean.
See full definition.

Primary Cesarean Section Rate

Jul 2012 – Jun 2013 California: 21.0%
3 Major Drivers of the Primary CS Rate

Sample Hospital 1

All Intermediate Nurseries (Jul 2012 – Jun 2013)
16.4% NTSV, 2.4% MTSV, 6% Preterm/Multiples/Breech
11.4% NTSV, 5.7% MTSV, 20% Preterm/Multiples/Breech
11.5% NTSV, 3.2% MTSV, 6.3% Preterm/Multiples/Breech
24.8% Statewide (Jul 2012 – Jun 2013)

Sample Hospital 2

All Community Nurseries (Jul 2012 – Jun 2013)
13.6% NTSV, 1.5% MTSV, 6.8% Preterm/Multiples/Breech
11.5% NTSV, 3.2% MTSV, 6.6% Preterm/Multiples/Breech
11.5% NTSV, 3.2% MTSV, 6.3% Preterm/Multiples/Breech
21.9% Statewide (Jul 2012 – Jun 2013)
Comparison Rates for the 3 Major NTSV Drivers

Sample Hospital 1

**Spontaneous Labor**

- FTP / CPD: 15.2% (Sample Hospital 1), 15.3% (All Intermediate), 22.9% (Statewide (Jul 2020))
- Fetal Distress: 5.7% (Sample Hospital 1), 5% (All Intermediate), 5.3% (Statewide (Jul 2020))

Proportion of the NTSV Spontaneous Labor population that had a CS for the specific indication

**Induced Labor**

- FTP / CPD: 25.8% (Sample Hospital 1), 24.6% (All Intermediate), 23.8% (Statewide (Jul 2020))
- Fetal Distress: 10.8% (Sample Hospital 1), 7.4% (All Intermediate), 7.2% (Statewide (Jul 2020))
- Other: 2.2% (Sample Hospital 1), 4.4% (All Intermediate), 4.5% (Statewide (Jul 2020))

Proportion of the NTSV Induced population that had a CS for the specific indication
Comparison Rates for the 3 Major NTSV Drivers

### Sample Hospital 2

#### Spontaneous Labor

- **FTP / CPD**
  - Sample Hospital: 15.3%
  - All Community: 15.2%
  - Statewide (Jul 2): 17.1%
- **Fetal Distress**
  - Sample Hospital: 4.1%
  - All Community: 5.5%
  - Statewide (Jul 2): 5.3%

Proportion of the *NTSV Spontaneous Labor population* that had a CS for the specific indication.

#### Induced Labor

- **FTP / CPD**
  - Sample Hospital: 23.4%
  - All Community: 23.8%
  - Statewide (Jul 2): 36.1%
- **Fetal Distress**
  - Sample Hospital: 6.6%
  - All Community: 7.4%
  - Statewide (Jul 2): 7.2%
- **Other**
  - Sample Hospital: 0.5%
  - All Community: 4.7%
  - Statewide (Jul 2): 4.5%

Proportion of the *NTSV Induced population* that had a CS for the specific indication.
Comparison Rates for the 3 Major NTSV Drivers

Sample Hospital 2

Failed Induction: Measure Analysis

Period: Apr 2013 - Mar 2014 (12 months)

By Parity

Failed Induction: Overall
- Sample Hospital 2: 26.8%
- All Regional Nurseries: 20.2%
- Statewide: 21.1%

Failed Induction: Nullip
- Sample Hospital 2: 43.1%
- All Regional Nurseries: 30.8%
- Statewide: 34.2%

Failed Induction: Multip
- Sample Hospital 2: 7.1%
- All Regional Nurseries: 8.3%
- Statewide: 7.9%
<table>
<thead>
<tr>
<th>Provider</th>
<th>Total Deliveries</th>
<th>Total CS Rate</th>
<th>Primary Cesarean Section Rate</th>
<th>NTSV Cesarean Section Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Hospital 2</td>
<td>5804</td>
<td>36.0% (2090/5804)</td>
<td>23.7% (1110/4687)</td>
<td>31.9% (662/2074)</td>
</tr>
<tr>
<td>A10:</td>
<td>90</td>
<td>36.7% (33/90)</td>
<td>30.7% (23/75)</td>
<td>31.3% (10/32)</td>
</tr>
<tr>
<td>20A:</td>
<td>88</td>
<td>27.3% (24/88)</td>
<td>20.0% (16/80)</td>
<td>26.8% (11/41)</td>
</tr>
<tr>
<td>A47:</td>
<td>87</td>
<td>40.2% (35/87)</td>
<td>27.9% (19/68)</td>
<td>46.4% (13/28)</td>
</tr>
<tr>
<td>A41:</td>
<td>85</td>
<td>38.8% (33/85)</td>
<td>19.7% (12/61)</td>
<td>24.0% (6/25)</td>
</tr>
<tr>
<td>A35:</td>
<td>84</td>
<td>44.0% (37/84)</td>
<td>34.8% (24/69)</td>
<td>47.4% (18/38)</td>
</tr>
<tr>
<td>A36:</td>
<td>84</td>
<td>41.7% (35/84)</td>
<td>30.0% (21/70)</td>
<td>37.5% (15/40)</td>
</tr>
<tr>
<td>A11:</td>
<td>80</td>
<td>40.0% (32/80)</td>
<td>32.9% (23/70)</td>
<td>43.2% (19/44)</td>
</tr>
<tr>
<td>A34:</td>
<td>76</td>
<td>53.9% (41/76)</td>
<td>42.4% (25/59)</td>
<td>65.5% (19/29)</td>
</tr>
</tbody>
</table>
CMQCC Data-Driven QI: NTSV CS

- Preliminary Data
## Data Quality Measures

### Sample Hospital 3

<table>
<thead>
<tr>
<th>Measure</th>
<th>Nov 2013 – Jan 2014 Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing / Inconsistent Delivery Method</td>
<td>0.3%</td>
</tr>
<tr>
<td>Missing / Inconsistent V27 (Outcome of Delivery)</td>
<td>0.1%</td>
</tr>
<tr>
<td>Missing / Inconsistent Fetal Presentation</td>
<td>2.7%</td>
</tr>
<tr>
<td>Inconsistent Mother’s Date of Birth</td>
<td>0.5%</td>
</tr>
<tr>
<td>Inconsistent Parity</td>
<td>0.1%</td>
</tr>
<tr>
<td>Inconsistent Induction</td>
<td>11.9%</td>
</tr>
<tr>
<td>Missing Maternal Diabetes ICD9 Code</td>
<td>26.7%</td>
</tr>
<tr>
<td>Missing Maternal Hypertension ICD9 Code</td>
<td>36.4%</td>
</tr>
<tr>
<td>Unlinked Mothers</td>
<td>0.1%</td>
</tr>
</tbody>
</table>
CMQCC Data Driven Projects

- **Maternal Mortality and Morbidity**
  - Implementation of safety bundles for Hemorrhage and Preeclampsia
  - Validating measures of Severe Maternal Morbidity
  - Maternal CV Disease

- **National Quality Measures**
  - Preventing Early Elective Delivery
  - Antenatal Steroids
  - First Birth Cesarean Delivery

CMQCC: Transforming Maternity Care
Thank You!

Main@CMQCC.org
Are there confounding factors needing risk adjustment? A Bay Area Story

NTSV CS=24.0%

Hospitals with higher rates of older moms also have lower rates of obese moms