Perinatal Quality Collaboratives: State and National Successes

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National Implementation Director, AIM
Clinical Professor of Obstetrics and Gynecology, Stanford University

Supported by:
California Dept. of Public Health
California Health Care Foundation
Centers for Disease Control (CDC)
Merck for Mothers Project
Yellow Chair Foundation
Agenda

- Challenges of Maternal Mortality and Morbidity
- “Moving the Dial”--Keys for Success at Scale
- Special Value of PQCs and Networking
- Health Equity Considerations

Disclaimers

- Dr. Main has no conflicts of interest
- No brand name products will be discussed
Reduction of Maternal Mortality is one of the Greatest Public Health Success Stories of the Last Century

Figure 50-1  U.S. maternal mortality rate, 1900 to 1997. Rate is the number of deaths per 100,000 live births. (From Centers for Disease Control and Prevention: Healthier mothers and babies, MMWR Morb Mortal Wkly Rep 48:849–857, 1999.)
In the last 15 years, US has seen rises in:

Maternal Mortality: Up 50-70%
Most recent US rates of SMM are 1.9-2.0%
# 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>
</tr>
</thead>
<tbody>
<tr>
<td>VTE</td>
<td>~10%</td>
</tr>
<tr>
<td>Infection</td>
<td>10-15%</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>10-15%</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>10-15%</td>
</tr>
<tr>
<td>Cardiac Disease</td>
<td>25-30%</td>
</tr>
</tbody>
</table>
Maternal Mortality Rate, California and United States; 1999-2013

California: ~500,000 annual births, 1/8 of all US births

Maternal Deaths per 100,000 Live Births

- California Rate
- United States Rate

Year: 1999 to 2013

CA Mortality Review Committee
Pregnancy-Related Mortality in California:
Causes, Characteristics, and Improvement Opportunities

Elliott K. Main, MD, Christy L. McCain, MPH, Christine H. Morton, PhD, Susan Holby, MPH, and Elizabeth S. Lawton, MHS

- Pregnancy-related mortality should not be considered a single clinical entity.
- The five leading causes exhibit different characteristics, degrees of preventability, and contributing factors, with the greatest improvement opportunities identified for hemorrhage and preeclampsia.
Timing of Death Among Major Causes of Maternal Mortality

What states aren't doing to save new mothers' lives

The U.S. maternal death rate is among the highest in the developed world. Eighteen states haven't studied these deaths and others tend to blame moms.

Laura Ungar, USA TODAY
2:19 p.m. PDT Sep. 20, 2018
Pre-pregnancy BMI Among Major Causes of Death

All women giving birth in CA (2002-2005)

Only two causes had high rates of obesity

## Assessments of Preventability

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>North Carolina “Preventable” (CDC)</th>
<th>California “Good or strong chance to alter the outcome”</th>
<th>United Kingdom “Substandard care that had a major contribution”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhage</td>
<td>93%</td>
<td>70%</td>
<td>44%</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>60%</td>
<td>60%</td>
<td>64%</td>
</tr>
<tr>
<td>Sepsis / Infection</td>
<td>43%</td>
<td>50%</td>
<td>46%</td>
</tr>
<tr>
<td>DVT / VTE</td>
<td>17%</td>
<td>50%</td>
<td>33%</td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>22%</td>
<td>29%</td>
<td>25%</td>
</tr>
<tr>
<td>AFE</td>
<td>0%</td>
<td>0%</td>
<td>15%</td>
</tr>
</tbody>
</table>
Key Provider QI Opportunities: Hemorrhage and Preeclampsia

• California Pregnancy Associated Mortality Reviews
  – Missed triggers/risk factors: abnormal vital signs, pain, altered mental status; lack of planning for at risk patients
  – Underutilization of key medications and treatments—did not have a plan!
  – Difficulties getting physician to the bedside
  – “Location of care” issues involving Postpartum, ED and PACU

• University of Illinois Regional Perinatal Network
  - Failure to identify high-risk status
  - Incomplete or inappropriate management

Obstetric Hemorrhage and Preeclampsia: Summary

- Most common **preventable** causes of maternal mortality
- Far and away the most common causes of Severe Maternal Morbidity
- High rates of provider “quality improvement opportunities”

Denial  Delay
Hospitals know how to protect mothers. They just aren’t doing it.

Alison Young, USA TODAY
1:54 p.m. PDT July 27, 2018
Maternal Safety Bundles

What are they?
- “Checklist” of items and practices for every birthing site
- Not a national protocol !!
- Facilities will modify content based on local resources

Uniform Structure:
- **Readiness**
  - Every unit—prepare and educate
- **Recognition & Prevention**
  - Every patient—before event
- **Response**
  - Every Event—team approach
- **Reporting/Systems Learning**
  - Every unit—systems improvement

Available (with resource links) at: [safehealthcareforeverywoman.org](http://safehealthcareforeverywoman.org)
Improvement Tools: What are the Differences?

**Medications/Procedures**

- **“Soup”**
  - Meds: Oxy, Ergo, Prost, TXA, Blood

**Protocol/Guideline**

- **“Directions”**
  - A start, but not nearly enough to lead change by itself

**Safety Bundle**

- **“Support Services”**
  - 1. Make it easy
     - Hem Cart, Order sets, Posters
  - 2. Communications
     - Risk Assess, QBL, Situation Awareness
  - 3. Teamwork
     - Drills, Broad Engage.
  - 4. System Learning
     - Debriefs, Case Reviews

**QI Toolkit**

- **“How-To Guide”**
  - Implementation resources, advice, examples
**GOAL:** is to ensure that 100% of hospitals with maternity services in California are ready to respond to the two most common obstetric emergencies by implementing patient safety bundles for postpartum hemorrhage and preeclampsia.
Reduction in Severe Maternal Morbidity From HEM With a Large (99) Hospital Quality Collaborative (>300,000 patients)

<table>
<thead>
<tr>
<th>California Hospitals with CMQCC Rapid-Cycle Maternal Data Center</th>
<th>Hospitals (N)</th>
<th>Baseline SMM-HEM Rate (per 100 HEM cases)</th>
<th>Post Intervention SMM-HEM Rate (per 100 HEM cases)</th>
<th>Percent Reduction in SMM-HEM</th>
<th>Significance (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals in CMQCC CPMS Collaborative*</td>
<td>99</td>
<td>22.7</td>
<td>18.0</td>
<td>20.8%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>---Without Prior HEM Collaborative Experience*</td>
<td>74</td>
<td>22.7</td>
<td>19.2</td>
<td>15.4%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>---With Prior HEM Collaborative Experience*</td>
<td>25</td>
<td>22.7</td>
<td>16.2</td>
<td>28.6%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Comparison Group: Hospitals not in Collaborative and no prior CMQCC HEM Collaborative Experience</td>
<td>48</td>
<td>28.6</td>
<td>28.2</td>
<td>1.2%</td>
<td>0.7713</td>
</tr>
</tbody>
</table>

CA-PAMR Final Cause of Death Among Preeclampsia Cases, \((n=25)\)

<table>
<thead>
<tr>
<th>Final Cause of Death</th>
<th>Number</th>
<th>%</th>
<th>Rate/100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>16</td>
<td>64.0%</td>
<td>1.0</td>
</tr>
<tr>
<td>Hemorrhagic</td>
<td>14</td>
<td>(87.5%)</td>
<td></td>
</tr>
<tr>
<td>Thrombotic</td>
<td>2</td>
<td>(12.5%)</td>
<td></td>
</tr>
<tr>
<td>Hepatic (liver) Failure</td>
<td>4</td>
<td>16.0%</td>
<td>.25</td>
</tr>
<tr>
<td>Cardiac Failure</td>
<td>2</td>
<td>8.0%</td>
<td></td>
</tr>
<tr>
<td>Hemorrhage/DIC</td>
<td>1</td>
<td>4.0%</td>
<td></td>
</tr>
<tr>
<td>Multi-organ failure</td>
<td>1</td>
<td>4.0%</td>
<td></td>
</tr>
<tr>
<td>ARDS</td>
<td>1</td>
<td>4.0%</td>
<td></td>
</tr>
</tbody>
</table>
## Preventing Stroke from Preeclampsia

### Blood Pressure Comparisons: Baseline and Pre-stroke

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pregnancy Baseline (mm Hg)</th>
<th>Pre-stroke (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean systolic BP</td>
<td>110.9 ± 10.7 (n=25)</td>
<td>175.4 ± 9.7 (n=24)</td>
</tr>
<tr>
<td>Systolic BP range</td>
<td>90-136</td>
<td>159-198</td>
</tr>
<tr>
<td>Systolic BP % &gt; 160</td>
<td>0</td>
<td>95.8 (n=27/28)</td>
</tr>
<tr>
<td>Mean diastolic BP</td>
<td>67.4 ± 6.5 (n=25)</td>
<td>98.0 ± 9.0 (n=24)</td>
</tr>
<tr>
<td>Diastolic BP range</td>
<td>58-80</td>
<td>81-113</td>
</tr>
<tr>
<td>Diastolic BP % &gt; 110</td>
<td>0</td>
<td>12.5 (n=3)</td>
</tr>
<tr>
<td>Diastolic BP 5 &gt; 105</td>
<td>0</td>
<td>20.8 (n=5)</td>
</tr>
</tbody>
</table>

“Treat the Damn Blood Pressure!”

Controlling blood pressure is the key intervention to prevent deaths due to stroke in women with preeclampsia.

Over the last decade, the UK has focused QI efforts on aggressive treatment of both systolic and diastolic blood pressure and has demonstrated a reduction in deaths.
1. Discharge Education
   This and many other patient education materials in English and Spanish can be ordered from www.preeclampsia.org/market-place

2. Early PP Monitoring and Follow-up

3. Listen to the patient!!
Preeclampsia Collaborative Success

- **Dignity Health:** Early treatment of severe HTN decreases SMM and eclampsia (Shields, *AJOG* 2017)
  - Adoption of CMQCC toolkit at 23 hospitals
  - Focused on early recognition and treatment of sBP, MgSO4, PP follow up
  - Eclampsia decreased by 43%, SMM decreased by 29%
  - Intensive monitoring of HTN treatment metrics necessary to cause change (in practice and outcome)

- **Illinois (ILPQC):** Treatment of Severe Hypertension
  - 102 Participating hospitals:
  - Timely treatment (<60min) rose from 14% to 71%
  - SMM among HTN patients fell from 15% to 9% (42% fall)
Maternal Mortality Rate, California and United States; 1999-2013

California: ~500,000 annual births, 1/8 of all US births

Maternal Deaths per 100,000 Live Births

- California Rate
- United States Rate

Year

Maternal Deaths per 100,000 Live Births

CMQCC
Toolkits and Collaboratives
CA Mortality Review Committee
Key Steps for Improving Care “At Scale”

- Linking public health surveillance to actions
- Mobilizing a broad range of public and private partners
- Developing a rapid-cycle Maternal Data Center to support and sustain QI projects
- Implementing a series of data-driven large-scale quality improvement projects

Main et al: Health Affairs 2018; 37:1484-93
CMQCC’s Key Stakeholders/ Partners

State Agencies
- CA Department of Public Health, MCAH
- Regional Perinatal Programs of California (RPPC)
- DHCS: Medi-Cal
- Office of Vital Records
- Office of Statewide Health Planning and Development (OSHPD)
- Covered California

Membership Associations
- Hospital Quality Institute (HQI)/ California Hospital Association (CHA)
- Pacific Business Group on Health (PBGH)
- Integrated Healthcare Association (IHA)

Key Medical and Nursing Leaders
- UC, Kaiser (N&S), Sutter, Sharp, Dignity Health, Scripps, Providence, Public hospitals

Professional Groups (California sections of national organizations)
- 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)

Public and Consumer Groups
- Consumers’ Union
- March of Dimes (MOD)
- California HealthCare Foundation (CHCF)
- Cal Hospital Compare
- Amniotic Fluid Embolism Foundation

Health Plans
- Commercial and Managed Medi-Cal Plans
CMQCC Maternal Data Center

Rapid-cycle data: metrics available within 45 days after every month

- PDD—Discharge Diagnosis File (ICD9/10 Codes)
  Monthly uploads: mother and infant PDD

- Birth Certificate (Clinical Data)
  Monthly uploads: electronic files for ALL California births

- Chart Review (select metrics/QI projects)
  Supplemental files or limited chart reviews

- Automated Linkage of all 3 files

Interactive Analytics
Guide QI Practice
Using Rapid-Cycle Data to Drive QI: Examples

Run Chart

Control Chart

Peer Comparisons

Caterpillar Plot
<table>
<thead>
<tr>
<th>Years</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>California Pregnancy-Associated Mortality Review established</td>
</tr>
<tr>
<td>2008</td>
<td>CMQCC/CDPH OB <strong>Hemorrhage</strong> Task Force</td>
</tr>
<tr>
<td>2009-10</td>
<td>CMQCC <strong>Hemorrhage</strong> QI collaboratives I and II</td>
</tr>
<tr>
<td>2010-11</td>
<td>CMQCC/CDPH <strong>Preeclampsia</strong> Task Force and QI collaborative</td>
</tr>
<tr>
<td>2011</td>
<td>Release of CDPH <strong>Maternal Mortality</strong> report and education campaign</td>
</tr>
<tr>
<td>2011-14</td>
<td>HEN/CMQCC/CHA-HQI QI collaborative focused on <strong>Hemorrhage</strong> and <strong>Preeclampsia</strong></td>
</tr>
<tr>
<td>2015-16</td>
<td>CMQCC/Merck for Mothers QI collaborative for Reduction of <strong>Hemorrhage</strong> and <strong>Hypertension</strong> severe morbidity</td>
</tr>
<tr>
<td>2016-19</td>
<td>CMQCC QI collaboratives (3 cohorts) for Supporting Vaginal Birth and Reducing <strong>Primary Cesarean Delivery</strong></td>
</tr>
</tbody>
</table>
AIM is a Collaborative of Collaboratives

- Engagement of national organizations
- Developing educational and QI resources
- Facilitating sharing of ideas and materials
- Collaborative learning
- Benchmarking
- Group impact
AIM Program: January 2019

AIM States
- Current AIM States (22)
- States with Serious Inten (17)
- Interested States (7)

https://safehealthcareforeverywoman.org/aim-program/
• Provide resources and expertise to nationwide state-based PQCsWith the goal of deepening and accelerating improvement efforts for maternal and infant health outcomes.

• 13 state PQC grantees
• 2nd annual meeting
• AIM is a formal partner
Change Happens Locally

Bundles, Toolkits, Collaboratives…

But How Do I Convince People To Change?
In Athens, to Study With Aristotle...
How to Be Persuasive

- Aristotle’s: 3 Frames for Every Argument
  - **Logos** is an appeal to logic: “statistics show few deaths”, “greater teamwork”, “reduced complications”
  - **Ethos** is an appeal to ethics: “patients deserve the best care”, “safety must come first”, “we strive for patient-centered care”
  - **Pathos** is an appeal to emotion: patient stories are critical, “it could have happened to any of us”, “we will all be patients”

- Vast majority of us went into our profession to help people
- Also good idea to share “WIIFM” with everyone
The death of a neonatal nurse in the hospital where she worked illustrates a profound disparity: The healthcare system focuses on babies but often ignores their mothers.
Kendria Washington gets an ultrasound from Dr. Lisa Hollier at the Center for Children and Women in Houston. In Texas, women die from pregnancy at a rate almost unrivaled in the industrialized world.
Google: USA Today Maternal Mortality

‘I am one of the 50,000’

Every year, 50,000 women in the U.S. suffer injuries or severe complications related to childbirth. Many are lucky to survive. They want you to hear their stories.

USA TODAY Investigations

Susan Goodhue, Maryland

Rachel Yencha, Ohio

Haelie Cobb, Texas

Donielle Bell, Georgia

Avrial Bates, Ohio

I assumed that all hospitals, if they deliver babies, that they are prepared for things to go wrong.

— Rachel Yencha, Ohio
Two Key References for Leading Change

- Everyone has two parts: the emotional side--the Elephant and the rational side--the Rider, have to appeal to both.

- Rider has a terrible weakness- the Rider loves to contemplate and analyze, and, making matters worse, his analysis is almost always directed at problems rather than at bright spots.
Switch: Rider and the Elephant

- What may look like laziness is often exhaustion. Trying to persuade the Elephant is exhausting for both.

- When change works, it’s because leaders are speaking to the Elephant as well as to the Rider.
Two Key References for Leading Change

The Influencer Change Model is about changing behaviors by changing motivation and ability across personal, social, and structural dimensions.
All Washed Up! – YouTube Video

https://www.youtube.com/watch?v=osUwukXSd0k
(or just google: “all washed up video”)

Fourteen-year-old scientist Hyrum Grenny cracks the code on how to get kids to wash their hands, and in doing so teaches us the principles of the Influencer Model. (It is adorable)

Best 6 minutes of QI education you will ever get!
Goal: facilitate the development of OB QI leaders
- Learning QI concepts and applying to QI project
- Year long program (one full day–then monthly calls)
- Hospital multi-disciplinary teams
- New cohort every 6 months
- CEU/MOC credit for participation in the program
Maternal Mortality Rate, California and United States; 1999-2013

California: ~500,000 annual births, 1/8 of all US births
Maternal Mortality Rate, By Race/Ethnicity
Three-Year Moving Averages; 1999-2013

California Only Data

- White, Non-Hispanic
- African-American, Non-Hispanic
- Hispanic
- Asian, Non-Hispanic
- AA-W Mortality Disparity Ratio

Maternal Mortality Rate (per 100,000 live births) vs. Three-Year Moving Average

- 1999-2001
- 2000-2002
- 2001-2003
- 2002-2004
- 2003-2005
- 2004-2006
- 2005-2007
- 2006-2008
- 2007-2009
- 2008-2010
- 2009-2011
- 2010-2012
- 2011-2013

Mortality Disparity Ratio

- Maternal Mortality Rate, By Race/Ethnicity
- Three–Year Moving Averages; 1999-2013
- California Only Data
U.S. Maternal Mortality by Race/Ethnicity

Why do Black Women do so much worse?

Usual explanation by doctors and nurses is that black women have more obesity, more hypertension, more diabetes, and more social disadvantages...
What If We Looked At B:W Disparity In SMM Only Among College Graduates?

And adjusted for age, BMI and other clinical and demographic risk factors...

Black-White disparity in SMM is highest among college graduates (2.2x higher than whites)

**Looking At Absolute Rates:**

- SMM rate in Black women with college degrees: **2.4%**
- SMM rate in White women without high school diplomas: **1.6%**

California linked data: 2010-2015
Serena Williams' Story of Not Being Listened To

Despite history of multiple PE, her doctors and nurses minimized her PP complaints and refused a CT scan (later positive for multiple small PE)

Lt. Comdr. Shalon Irving PhD

LOST MOTHERS

Nothing Protects Black Women From Dying in Pregnancy and Childbirth

Not education. Not income. Not even being an expert on racial disparities in health care.

by Nina Martin, ProPublica, and Renee Montagne, NPR News, Dec. 7, 2017, 8 a.m. EST
Health Equity: What to Do? What are the Action Steps?
Collaborative Action: Collective Impact

- Health Plans (multiple strategies)
- QI Toolkit/Data-driven QI Initiative
- Performance Measures/Public Reporting
- Professional Leadership
- Direct Participation of Pregnant Women
- Medicaid: Fee For Service and Managed Care
- Purchaser/Employer Engagement
- Public Engagement

Cesareans Or Hemorrhage Morbidity

Multiple Leverage Points are much more effective than one or two alone
Thanks to the AIM Team

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Jennie Shaw, MPH, Senior Program Manager

Saanie Sulley, MD, PhD, Data Analyst
Jordan Reeder, Grant Specialist
Karmah McIlvain, Program Assistant
Alexis Amankwanor, MPH, Program Manager (1/22/19)

Visit AIM: SafeHealthCare For EveryWoman.org