Improving Care for Preeclampsia: Designing a Quality Collaborative

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## 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>
### “Preventability” of Maternal Mortality

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>North Carolina “Preventable”</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>Amniotic Fluid Embolism</td>
<td>0%</td>
<td>0%</td>
<td>15%</td>
</tr>
</tbody>
</table>
QI “Ops”: Preeclampsia

- Examples from California Pregnancy Associated Mortality Review (CA-PAMR):
  - Missed triggers: high BP (systolic and diastolic), pain, altered mental status, O2 saturation, fetal distress
  - Underutilization of Magnesium SO4 and anti-hypertensive medications
  - Difficulties getting physician to the bedside, and obtaining consultations
  - “Location of care” issues involving Postpartum, ED and PACU
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 (2013-2014)
Collaborative Essentials…

- Pick important topic, ideally has a national emphasis
- Multi-disciplinary design of teaching points
- Measures (outcome and process)
- Data collection methods and QI
- Round up supporting organizations
- What collaborative model will you use?
Measure Types

- **Outcome**—reduction of morbidities (e.g. rates or “time since…”)
- **Process**—frequency of care process being encouraged (as tightly linked to an outcome as possible)
- **Balancing**—identify unintended consequences
- **Structural**—attributes to change in the facility or medical structure (e.g. policy, coverage model, staffing, equipment)
Measure Caveats

- Measures are critical to driving change and creating success, but...
- Keep them limited
- Make them important
- Pay careful attention to collection burden
A California Toolkit to Transform Maternity Care

Improving Health Care Response to Preeclampsia

THIS COLLABORATIVE PROJECT WAS DEVELOPED BY:

THE PREECLAMPSIA TASK FORCE
CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE
MATERNAL, CHILD AND ADOLESCENT HEALTH DIVISION; CENTER FOR FAMILY HEALTH
CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

CMQCC
CALIFORNIA MATERNAL QUALITY CARE COLLABORATIVE

ACOG District II Website
(thru ACOG website)

www.CMQCC.org

Maternal Safety Bundle for Severe Hypertension in Pregnancy
Executive Summary:
Hypertension in pregnancy

American College of Obstetricians and Gynecologists,

Obstet Gynecol 2013;122:1122-31
Toolkit Contents

- Teaching materials
- Practical guides to implementation
- “Postable” algorithms, guides, protocols
- Sample policies, procedures
- Sample order sets
- Sample simulation and drills
- Sample debrief form
- Clinical “Pearls”
Teaching Slides:
4-Step Program to Improve Preeclampsia Outcomes

- Make the Right Diagnosis (new criteria)
- Treat the Damn BP!
- Deliver not too early, and not too late
- Early postpartum F/U for everyone who is NOT a “simple case” (formerly-known-as “mild”)
“Treat the Damn Blood Pressure!”

Controlling blood pressure is the optimal 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.
How Do Women Die Of Preeclampsia?

CA-PAMR Final Cause of Death Among Preeclampsia Cases, 2002-2004 (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>
# Preeclampsia Mortality Rates in California and UK

<table>
<thead>
<tr>
<th>Cause of Death among Preeclampsia Cases</th>
<th>CA-PAMR (2002-04) Rate/100,000 Live Births</th>
<th>UK CMACE (2003-05) Rate/100,000 Live Births</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>1.0</td>
<td>.47</td>
</tr>
<tr>
<td>Pulmonary/Respiratory</td>
<td>.06</td>
<td>.00</td>
</tr>
<tr>
<td>Hepatic</td>
<td>.25</td>
<td>.19</td>
</tr>
<tr>
<td><strong>OVERALL</strong></td>
<td><strong>1.6</strong></td>
<td><strong>.66</strong></td>
</tr>
</tbody>
</table>

The overall mortality rate for preeclampsia in California is **greater than 2 times** that of the UK, largely due to differences in deaths caused by stroke.
# 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 % ≥ 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 % ≥ 110</td>
<td>0</td>
<td>12.5 (n=3)</td>
</tr>
<tr>
<td>Diastolic BP 5 ≥ 105</td>
<td>0</td>
<td>20.8 (n=5)</td>
</tr>
</tbody>
</table>

CMQCC Preeclampsia Quality Collaborative (26 Hospitals, 2013-2014)

- **Goal:** Reduce preeclampsia maternal morbidity

- **Aim 1:** Reduce the rate of severe morbidities in women with severe preeclampsia, eclampsia or preeclampsia superimposed on pre-existing hypertension by 50% by October 31, 2014

- **Aim 2:** Reduce the percentage of women (with severe preeclampsia, eclampsia or preeclampsia superimposed on pre-existing hypertension) with prolonged postpartum lengths of stay by 25% by October 31, 2014

- **Aim 3:** Achieve 100% on required one-time only Deliverables and progress (as specified) on all quantifiable Process Measures by October 31, 2014
CMQCC Preeclampsia Quality Collaborative (26 Hospitals, 2013-2014)

- **Outcome measures:**
  - Prolonged Postpartum LOS (≥4d vag; ≥6d CS)
  - CDC Severe Maternal Morbidity (ICD9 codes typical of an ICU admission)

- **Process measures:**
  - **Severe HTN treated in under 60 min**
  - Debriefs of all severe HTN cases
  - Outpatient F/U of all severe HTN women within 72hrs

- **Balancing measures:**
  - Relative low blood pressure in the 60min after treatment
  - Fetal Heart Rate change of category
Models for Quality Collaboratives-I

- **IHI (Institute for Healthcare Improvement)**
  - Leadership via expert panel
  - Best with a medium number of hospitals (20-30)
  - Formal agreement on aims and commitment
  - 2-3 in-person meetings of all hospital leaders to share ideas and pep-talks
  - Monthly group check-in phone calls to report progress
  - Monthly reporting of metrics (large number)
  - Volunteer (or pay) to join (therefore selective)

- Proven effectiveness, but expensive for all parties
Models for Quality Collaboratives-II

- HEN (Hospital Engagement Network)
  - Program-based leaders, run thru Quality Dept
  - Can engage many hospitals (20-80+)
  - One site visit (if lucky)
  - Webinars on related topics
  - Periodic individual check-in calls to report progress
  - Periodic reporting of metrics (limited number)
  - Mixed incentives to join (therefore mixed enthusiasm)

- Less expensive, popular, variable success
Models for Quality Collaboratives-III

“Mentor” Model

- Formal needs assessment
- Paired (MD/RN) consultants work with a small group of hospitals (6-8)
- One site visit with Grand Rounds and review of needs assessment
- Monthly group check-in phone calls to report progress
- Monthly reporting of limited metrics (2-4)
- Multiple paths to join

Hybrid method, Seems practical and exciting, but less documented results
Barriers and Strategies Analysis

• Identify Barriers
  - BP stabilized before meds given
  - No knowledge of BP parameters
  - Competing priorities
  - Unable to access meds
  - RN reluctant to give IV meds
  - Magnesium sulfate given instead
  - MD not available
  - Fear of hypotension
  - Unknown

• Local Teams brainstorm and implement solutions (QI Tactics)

• Data monitoring to gauge progress

Timely Treatment: within 60 minutes

Process 1: Timely Treatment for Severe Hypertension

Preeclampsia Collaborative Follow-up Data (Q2 2014)
72.4% - 123/170

Baseline was Retrospective

Q1 2014 63.3%
(105/166)
Timing for Treatment of Gravidas with sBP≥160 or dBP≥110

Sample hospital from CMQCC Preeclampsia Collaborative 2013
Baseline was Retrospective
Preeclampsia: Reasons Not Treated

Numbers represent overall totals from each hospital for months marked as complete.

Baseline was Retrospective
Baseline was Retrospective
Severe Morbidity (including hemorrhage/transfusions)
Severe Morbidity (excluding hemorrhage/transfusions)

Outcome 1. Severe Morbidity (excluding Hemorrhage) with Pre/eclampsia

Preeclampsia Collaborative Follow-up Data (Q2 2014)
7.3% - 22/303

Collaborative Baseline Average: 7.1%
Prolonged Postpartum LOS

Outcome 2. PPLOS with Pre/eclampsia

Preeclampsia Collaborative Follow-up Data (Q2 2014)
8.9% – 27/303

Collaborative Baseline Average: 5.3%
Transforming Maternity Care

Process 2: Debrief Severe Hypertension

Preeclampsia Collaborative Follow-up Data (Q2 2014)
29.4% - 50/170

Collaborative Baseline Average: 9.7%
Monitor for diastolic BP <80 within 1 hour after treatment

Balance 1: Monitor for dPB <80 within 1h after antihypertensives given

Preeclampsia Collaborative Follow-up Data (Q2 2014)
35.1% – 47/134

CMQCC: Transforming Maternity Care
Balance 2: FHR Category Change After Treatment

Collaborative Baseline Average: 4.8%

Preeclampsia Collaborative Follow-up Data (Q2 2014)
0.0% - 0/47

CMQCC: Transforming Maternity Care
This and many other patient education materials in English and Spanish can be ordered from [www.preeclampsia.org/market-place](http://www.preeclampsia.org/market-place)
CMQCC Preeclampsia Quality Collaborative: Preliminary Lessons

- **Outcome measures:**
  - CDC Severe Maternal Morbidity – works
  - Postpartum LOS not the best measure

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  - Debriefs of all severe HTN cases
  - Might consider Mag SO4 for all severe Preeclampsia if that is an issue in your area

- **Balancing measures:**
  - Very instructive, useful for future if there is resistance to treatment for fear of hypotension
CMQCC Preeclampsia Quality Collaborative: Preliminary Lessons

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  - Very instructive, useful for future if there is resistance to treatment for fear of hypotension
DRAFT: National Safety Bundle for Hypertension in Pregnancy

Readiness: (every unit)
- Adopt standard diagnostic criteria, monitoring and treatment for severe preeclampsia/eclampsia (include order sets and algorithms).
- Unit team education, reinforced by regular unit-based drills
- Process for timely triaging of pregnant and postpartum women with hypertension including ED and outpatient areas.
- Rapid access to medications used for severe hypertension/eclampsia:
- System plan for escalation, obtaining appropriate consultation and maternal transport, as needed.

Recognition: (every patient)
- Adoption of a standard protocol for the measurement and assessment of BP and urine protein for all pregnant and postpartum women.
- Implementation of standard response to maternal early warning criteria •
- Implementation of facility-wide standards for educating women
Response: (all severe hypertension/preeclampsia)
- Facility-wide standard protocols with checklists for management and treatment of:
  - Severe hypertension
  - Eclampsia, seizure prophylaxis, and magnesium over-dosage
  - Postpartum emergency department and outpatient presentation of severe hypertension/preeclampsia
  - Support plan for patients, families, and staff for ICU admissions and serious complications of severe hypertension

Reporting/Systems Learning
- Implementations of a huddle for high risk cases and post-event team debrief
- Review all severe hypertension/eclampsia/ICU cases for systems issues
- Monitor outcomes and process metrics –
Thank You!

Visit: CMQCC.org