Objectives

- Assess trends in pregnancy-related mortality in the US
- State most frequent and emerging causes of pregnancy-related mortality in the US
- Identify strategies for implementation of a patient safety program

Key points

Consider maternal mortality a sentinel event
- Fatality reviews are one strategy to move from data to action to improvement
- Incorporate social determinants of health framework
- Success = Partnerships
  - public health + health care +
  - payers/purchasers + community +
  - women
“What we choose to measure is a statement of what we value in health”
- James Marks, MD, MPH

“The indicators a society chooses to report to itself about itself are surprisingly powerful. They reflect collective values and inform collective decisions. A nation that keeps a watchful eye on its salmon runs or the safety of its streets makes different choices than does a nation that is only paying attention to its gross national product.”
- Donella H. Meadows

Marks JM. Safe Motherhood: Values, purpose, and possibility. Mat Child Health J 2002
Meadows DH. The Global Citizen: Using salmon runs and gardens to measure our well-being. Valley News (Lebanon, NH), May 22, 1993:24

“The most surprising thing…”

• It is very difficult to identify maternal deaths at the population level
  - Organizational definitions (vital statistics vs. surveillance)
  - Temporal and causal relationship to pregnancy

• Multiple etiologies

• Under-funded public health agencies
  - State reviews have multiple (or no) funding sources

• National Center for Health Statistics has not reported U.S. MMR since 2007

DEFINITIONS

Maternal Mortality Rate
Number of women who die from pregnancy-related causes within 42 days postpartum / the number of live births in that year) x 100,000 (identified as “O-codes” on death certificates

Pregnancy-Associated Deaths
Death of a woman within one year postpartum from any cause

Pregnancy-Related Deaths
Death of a woman within one year postpartum related to pregnancy or aggravated by the pregnancy or its management

Not-Pregnancy-Related Deaths
Death of a woman within one year postpartum unrelated to pregnancy or its management
Maternal Mortality by Race, United States, 1935–2007

Maternal Mortality Ratios in Selected Countries 1980-2008

Hogan et al, Lancet 2010; 375: 1609–23
The United States is the only developed country to have seen a rise in maternal mortality between 1990 and 2013.

**Why Maternal Mortality Matters**

- Approx. 75 Pregnancy Related Mortalities per year in CA

  - Severe Morbidity: ~1% or 5,000/year
  - Significant Complication: ~10% or 50,000/year

Maternal complications
4th leading cause of infant death in 2005


Why is maternal mortality rising?

- Better data collection accounts for about 30%
- More pregnant women have chronic health conditions such as obesity, hypertension or heart disease that contribute to worse outcomes
- Social factors, such as poverty, reduced education, exposure to chronic stress, are present for many pregnant women
- Factors related to health care systems and access to quality care, both inpatient and outpatient, are likely to be involved and could include possible overuse or underuse of obstetrical interventions
Maternal Mortality Reviews

Essential surveillance and improvement tools to reduce preventable death and injury

Although deaths are rare— (~700 per year in US)— Maternal complications occur at 50-100 times the rate of mortality

Maternal mortality

...sentinel health event

...indicator of social and economic values

...political commitment

Maternal Mortality Rate, California and United States; 1999-2010

![Graph showing maternal mortality rates from 1999 to 2010 for California and the United States.](chart.png)
Major Recognition of the Problem

Issue 44, January 26, 2010
Preventing Maternal Death

Spring 2010
Amnesty International

Where Is the “M” in Maternal-Fetal Medicine?
M. E. S. Hess, M.D.

December 2010
Obstetrics & Gynecology

http://www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_44.htm

123(5):973-977, May 2014

Current Commentary
The National Partnership for Maternal Safety

Who is missing?
Obstetric Hemorrhage
Preeclampsia/ Hypertension
Prevention of VTE in Pregnancy

Note: The bundles represent outlines of recommended protocols and materials important to safe care but the specific contents and protocols should be individualized to meet local capabilities. Example materials are available from perinatal collaboratives and other organizations.

4 R Framework
Council on Patient Safety

Readiness
Recognition
Response
Reporting

The 4Rs characterize actions necessary to prevent maternal mortality and morbidity and can guide

SafeHealthCareForEveryWoman.org

Bundles
Obstetric Hemorrhage
Hypertension
Venous Thromboembolism

Maternal Early Warning Criteria
Facility Review after Maternal Event
Patient, Family and Staff Support after Maternal Event
Rising Maternal Mortality and Morbidity: 
We All Have Work to Do

CMOCC
California Maternal Quality Care Collaborative

Formed in 2006 in partnership with CA Dept of Public Health, to explore rise in maternal mortality and morbidity, and implement quality improvement initiatives using SOCIO-MEDICAL LENS

CMOCC is located at Stanford University, School of Medicine, Department of Pediatrics, Division of Neonatal and Developmental Medicine

The Conceptual Framework of Complex Innovation Implementation

Components of effective implementation
1) Management Support
2) Financial Resource Availability
3) Implementation Policies and Practices
4) Implementation Values Fit
5) Champions

(Helfrich et al 2007)
Build a common purpose
  Through shared basic assumptions
Create QI collaborative structure
  Embody values
  Utilize collective intelligence
One of the core shared assumptions was that clinicians want to do good work and provide safe care.

Underlying Assumptions 1
Clinicians deeply care about providing high quality maternity care, but…
  Their time and resources are limited
  Leadership is often missing
  There is little ability to compare practices & outcomes
Opportunities for improvement are present:
  Maternal outcomes have worsened
  Large practice variation among hospitals and physicians
  Evidence-based research is available as a model for improvement

Underlying Assumptions 2
Transformation (change) is not easy
Champions are essential
  Need to work at state and local levels
  Champions need support, data, training, role models
  We need to be in it for the long haul
Collaboration is critical for our success
  Maximizes resources of time, money and knowledge
  Increases peer support and peer learning
  Creates synergy and increased capacity
  “The whole is greater than the sum of its parts”
Racial-Ethnic Disparities in Maternal Mortality

African-American women die from pregnancy-related causes more often than women in other racial-ethnic groups

>4-fold higher risk of maternal death overall
Independent of age, parity or education

FIG. 1. Socioecological model of African American women and sexual and reproductive health influences and outcomes.
### What are Quality Priorities? Opinions Varied…

**Maternal Mortality Reviews:**
- OB hemorrhage
- Critical care support
- Venous Thromboembolus prevention
- Lack of recognition of severe maternal illness
- Prior Cesarean birth
- Maternal obesity
- Lack of access to specialists
- Lack of recognition/care for postpartum depression

**Provider Interviews:**
- Labor inductions
- Early labor admissions
- Lack of access to specialists
- Lack of standardization for oxytocin use

**Payers/Public Interviews:**
- Labor Cesarean birth rate
- Poor term baby outcomes
- 3rd and 4th degree lac's
- VBAC accessibility
- Preterm birth, particularly 34-37 weeks

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### CMQCC Key Partner/Stakeholders

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

**Public and Consumer Groups**
- California HealthCare Foundation
- March of Dimes (MOD)
- Kaiser Family Foundation
- Patient Advocacy Groups

**Professional Groups**
- ACOG | AWHONN | ACOG | SOAP | AAFP | AAP | AND MORE

**Key Medical and Nursing Leaders**
- University and Hospital Systems

**Hospital Associations**
- California Hospital Association / Hospital Quality

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

**Purchasers**
- CALPERS | Medi-Cal HMOs | Pacific Business Group on Health | Silicon Valley Employers

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**Chance to Alter Outcome among Pregnancy-Related Deaths (N=329), California, 2002-2007**

<table>
<thead>
<tr>
<th>Cause</th>
<th>CI 95% Low</th>
<th>CI 95% High</th>
<th>% Good/Strong</th>
<th>% Some Chance</th>
<th>% None</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVD</td>
<td>26%</td>
<td>34%</td>
<td>10%</td>
<td>71%</td>
<td>15%</td>
</tr>
<tr>
<td>PRE</td>
<td>82%</td>
<td>98%</td>
<td>3%</td>
<td>44%</td>
<td>1%</td>
</tr>
<tr>
<td>HEM</td>
<td>74%</td>
<td>90%</td>
<td>23%</td>
<td>42%</td>
<td>0%</td>
</tr>
<tr>
<td>VTE</td>
<td>17%</td>
<td>33%</td>
<td>3%</td>
<td>72%</td>
<td>0%</td>
</tr>
<tr>
<td>Sepsis</td>
<td>53%</td>
<td>78%</td>
<td>14%</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>CVA</td>
<td>34%</td>
<td>50%</td>
<td>30%</td>
<td>30%</td>
<td>0%</td>
</tr>
<tr>
<td>AFE</td>
<td>9%</td>
<td>18%</td>
<td>12%</td>
<td>68%</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>65%</td>
<td>83%</td>
<td>47%</td>
<td>0%</td>
<td>7%</td>
</tr>
</tbody>
</table>

**OVERALL**
- 41% Good to strong chance
- 44% Some chance
- 15% No chance
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
- Difficulties getting physician to the bedside
- "Location of care" issues involving Postpartum, ED and PACU

- Present in >95% of cases
- Present in >90% of cases

California Pregnancy-Associated Mortality Review (CA-PAMR) Quality Improvement Review Cycle

1. Identification of cases
2. Information collection, review by multidisciplinary committee
3. Cause of Death, Contributing Factors and Quality Improvement (QI) Opportunities identified
4. Strategies to improve care and reduce morbidity and mortality
5. Evaluation and Implementation of QI strategies and tools

Toolkits Developed:
- Hemorrhage
- Preeclampsia
- CVD (in development)
- VTE (in development)

Statewide QI Collaboratives

www.CMQCC.org
All pregnant women deserve the best care we can provide

How can we learn from their deaths?
How can we honor their lives?

Maternal Mortality Rate, California and U.S. 1999-2013

Lessons from CMQCC history

Common Purpose: Women’s lives matter; Providing good quality care matters
Collaborate!
Strategic Choices
Partnerships / Collaborations
Quality Improvement Topics
Persistence
Stay true to your vision = Data ↔ Action
Sustain the gains