Welcome to today’s Webinar

- Racial Disparities in Maternal Mortality: Spotlight on Cardiovascular Disease

Announcements:

- All participants are muted – please use the Zoom Q&A feature to ask questions any time throughout the presentation; they will be addressed at the end
- Today’s webinar will be recorded and archived (within 72 hours) on CMQCC’s YouTube Channel: www.youtube.com/CMQCC
- Email cmorton@stanford.edu with follow up questions or comments

- While you wait, please answer the poll questions.
- Thank you for joining us!
WEBINAR
Racial Disparities in Maternal Mortality: Spotlight on Cardiovascular Disease

Findings from the California Pregnancy-Associated Mortality Review (CA-PAMR)

November 7, 2018

• Host: Christine Morton, PhD, Research Sociologist, CMQCC
• Introductory Remarks: Connie Mitchell, MD, MPH, Deputy Director, Center for Family Health at California Department of Public Health
• Moderator: Elliott Main, MD, Medical Director, CMQCC
Welcome, thank you and why we are here

Connie Mitchell, MD, MPH
Deputy Director, Center for Family Health
Disparities in Maternal Mortality Rate by Race/Ethnicity, California, 1999-2013

SOURCЕ: State of California, Department of Public Health, California Birth and Death Statistical Master Files, 1999-2013. Maternal mortality rates for California (deaths ≤ 42 days postpartum) were calculated using ICD-10 cause of death classification (codes A34, O00-O95,O98-O99). Produced by California Department of Public Health, Center for Family Health, Maternal, Child and Adolescent Health Division, May, 2015.
Disparities in Infant Mortality Rate by Race/Ethnicity, California, 2000-2015

Data Sources: California Birth Cohort Files, 2000-2015
Prepared by the Epidemiology, Surveillance and Federal Reporting, Maternal, Child and Adolescent Health Division, Center for Family Health
Disparities in Preterm Singleton Births by Race/Ethnicity, California, 2007-2016

Note: Includes California resident live births with gestational age range 17-47 weeks. Preterm is <37 weeks gestation.

Gestational age is based on obstetric estimate.

Source: California Department of Public Health, 2007-2016 Birth Statistical Master Files
Prepared by the Epidemiology, Surveillance and Federal Reporting, Maternal, Child and Adolescent Health Division, Center for Family Health
Strategies for Interventions to Reduce Racial Disparities in Health Outcomes

- Reduce socioeconomic inequalities
- Increase access to healthcare
- Ensure high quality care for all
- Change the structural environment in which people live to be health promoting
- Reduce health risks that are borne more by certain sub-populations
CMQCC Webinar Speakers

Overview of Racial Disparities in California Pregnancy-Related Mortality

Paula Krakowiak, PhD
California Department of Public Health
Maternal Child Adolescent Health Division, Epidemiology

Quality Improvement Opportunities among Women who Died from Cardiovascular Disease in California

Lucy Van Otterloo, PhD, RNC, CNS
Community Perinatal Network
Regional Perinatal Program of California

Moving Toward Equitable Implementation of the CVD Screening Algorithm

Afshan B. Hameed, MD, FACOG, FACC
Professor OB/GYN, Division of Maternal Fetal Medicine
Professor, Division of Cardiology, Medical Director, Obstetrics
Medical Director, Quality and Safety, University of California, Irvine
Overview of racial disparities in California pregnancy-related deaths

Paula Krakowiak, PhD
California Department of Public Health
Maternal Child and Adolescent Health Division
Epidemiology Surveillance and Federal Reporting Branch
Key Definitions

Maternal Mortality Rate (WHO)
Deaths while pregnant or within 42 days post-pregnancy from pregnancy-related causes per 100,000 live births

Pregnancy-Associated Deaths (CA-PAMR, CDC/ACOG)
Death of a woman while pregnant or within 1 year post-pregnancy from any cause

Pregnancy-Related Deaths
Subset of pregnancy-associated deaths. Only include deaths related to pregnancy or aggravated by pregnancy or its management

Not Pregnancy-Related Deaths
Subset of pregnancy-associated deaths. Deaths not related to pregnancy or its management

CA-PAMR Webinar
November 7, 2018
Maternal Mortality Ratios, California Residents and the United States; 1999-2013

Maternal Mortality Rate (early and late deaths) California Residents, 1999-2013

HP 2020 Objective – 11.4 Deaths per 100,000 Live Births

SOURCE: State of California, Department of Public Health, California Birth and Death Statistical Master Files, 1999-2013. Maternal mortality for California (Early maternal deaths ≤ 42 days postpartum) was calculated using ICD-10 cause of death classification (codes A34, O00-O95,O98-O99) and code O96 is also included when calculating Early and Late Maternal Deaths up to one year postpartum. Produced by California Department of Public Health, Center for Family Health, Maternal, Child and Adolescent Health Division, March, 2015.
Disparities in Maternal Mortality by Race/Ethnicity, California Residents, 1999-2013

SOURCE: State of California, Department of Public Health, California Birth and Death Statistical Master Files, 1999-2013. Maternal mortality rates for California (deaths ≤ 42 days postpartum) were calculated using ICD-10 cause of death classification (codes A34, O00-O95,O98-O99). Produced by California Department of Public Health, Center for Family Health, Maternal, Child and Adolescent Health Division, May, 2015.
What is CA-PAMR?

- Enhanced surveillance of pregnancy-associated deaths while pregnant or within 1 year of the end of pregnancy
- Initiated in 2006 by the California Department of Public Health (CDPH) to investigate rise in maternal mortality and widening racial/ethnic disparity in California
- Seeks to identify:
  - Cause of death and timing
  - Whether pregnancy-related
  - Contributing / Critical factors that may have led to death
  - Level of preventability
  - Opportunities to improve care and support of (expectant) mothers

**Goal:** To reduce pregnancy-related deaths and associated health disparities
CA-PAMR Project Team

- California Department of Public Health (CDPH); Maternal, Child and Adolescent Health (MCAH)
  - Project home, funder
  - Public health authority
  - Vital records, epidemiology

- Public Health Institute (PHI)
  - Procure investigative reports, medical records
  - Data management and analysis

- California Maternity Quality Care Collaborative (CMQCC)
  - Quality improvement
  - Committee support
  - Engage maternity care clinicians

- Multidisciplinary Expert Review Committee
CA-PAMR Methodology

Construct Pregnancy-Associated Death Cohort

Pre-screen P-A deaths: Apply exclusion criteria

Abstract data: Coroner investigative reports, Medical records, Other relevant data

Expert Committee reviews cases: Identify COD, P-R deaths, preventability, quality improvement opportunities (QIOs)

Analyze quantitative and qualitative data

Expert Committee produces data-driven recommendations
THE CALIFORNIA PREGNANCY-ASSOCIATED MORTALITY REVIEW

Report from 2002 to 2007
Maternal Death Reviews

This project was supported by Federal Title V Maternal Child Health block grant funds received from the California Department of Public Health; Center for Family Health; Maternal, Child and Adolescent Health Division

Spring 2018

CDPH Website: https://www.cdph.ca.gov/Programs/CFH/DMCAH/Pages/PAMR.aspx

Or search: “California Pregnancy-Associated Mortality Review (CA-PAMR)”

Website contains:
• Project description, background and methods
• Key findings from latest review of obstetric deaths
• Links to Reports and Toolkits

CA-PAMR Webinar

November 7, 2018
### Leading Causes of Pregnancy-Related Deaths, California, 2002-2007 (N=333)

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular Disease (CVD)</td>
<td>87</td>
<td>26%</td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>51</td>
<td>15%</td>
</tr>
<tr>
<td>Other CVD</td>
<td>36</td>
<td>11%</td>
</tr>
<tr>
<td>Preeclampsia/Eclampsia</td>
<td>54</td>
<td>16%</td>
</tr>
<tr>
<td>Obstetric Hemorrhage</td>
<td>33</td>
<td>10%</td>
</tr>
<tr>
<td>Venous Thromboembolism (VTE)</td>
<td>29</td>
<td>9%</td>
</tr>
<tr>
<td>Sepsis</td>
<td>27</td>
<td>8%</td>
</tr>
</tbody>
</table>

**CVD Pregnancy-Related Mortality Rate:** 2.6 deaths per 100,000 live births
### All Pregnancy-Related Deaths by Race/Ethnicity, California, 2002-2007 (N=333)

<table>
<thead>
<tr>
<th>Race/ Ethnicity</th>
<th>Total Deaths</th>
<th>Pregnancy-Related</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MR</td>
</tr>
<tr>
<td>Black</td>
<td>71</td>
<td>39.9</td>
</tr>
<tr>
<td>White</td>
<td>81</td>
<td>8.5</td>
</tr>
<tr>
<td>Hispanic, any race</td>
<td>151</td>
<td>8.9</td>
</tr>
<tr>
<td>Other</td>
<td>30</td>
<td>6.1</td>
</tr>
</tbody>
</table>

*MR = Mortality Ratio (per 100,000 live births); CI = Confidence Interval*

Pregnancy-Related Mortality Rate among **Black women**: **39.9**

**4.7 times higher rate than white women**
## CVD Pregnancy-Related Deaths by Race/Ethnicity, California, 2002-2007 (N=87)

<table>
<thead>
<tr>
<th>Race/ Ethnicity</th>
<th>CVD Deaths</th>
<th>Total Deaths</th>
<th>CVD Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Percent</td>
<td>MR</td>
</tr>
<tr>
<td>Black</td>
<td>31</td>
<td>44%</td>
<td>71</td>
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<tr>
<td>White</td>
<td>22</td>
<td>27%</td>
<td>81</td>
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<tr>
<td>Hispanic, any race</td>
<td>30</td>
<td>20%</td>
<td>151</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>13%</td>
<td>30</td>
</tr>
</tbody>
</table>

**MR = Mortality Ratio (per 100,000 live births); CI = Confidence Interval**

**CVD Pregnancy-Related Mortality Rate among Black women:** 17.4 deaths per 100,000 live births

7.6 times higher rate than white women
Top Contributing Factors for CVD Pregnancy-Related Deaths in California

- Underlying medical condition
- Delay in seeking care
- Obesity
- Lack of recognition of CVD symptoms

Patient-level

- Inadequate response to clinical warning signs
- Ineffective care
- Misdiagnosis
- Failure to refer or consult

Provider-level

No differences in proportion of contributing factors by race/ethnicity, except for obesity.
No differences in preventability by race/ethnicity

November 7, 2018
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
- CVD
- Venous Thromboembolism
- Hemorrhage
- Preeclampsia

CA-PAMR Webinar
November 7, 2018
Quality Improvement Opportunities among Women who Died from Cardiovascular Disease in California

Lucy Van Otterloo, PhD, RNC, CNS
Community Perinatal Network
Regional Perinatal Program of California
Cardiovascular Disease: Quality Improvement Opportunities

Spotlight on CVD
- 87 maternal deaths due to CVD (26%)
  - Chance to alter outcome
    - (strong-to-good): 26%
    - (some): 56%
    - (none): 19%
- Analytic approach: Qualitative analysis using 4R framework
- Multidisciplinary team: Nursing; Sociology; Obstetrics
- Goal: identify key quality improvement opportunities
  - 276 quality improvement opportunities (QIOs) identified
Improvement Opportunities

[Alternative] approaches to recognition, diagnosis, treatment or follow up, at the patient, provider, and/or facility/system levels, that may have led to better patient care and/or a better outcome.

Quality Improvement Opportunity (QIO)

QIOs were determined by COMMITTEE CONSENSUS

The 4Rs characterize actions necessary to prevent maternal mortality and morbidity and can guide implementation of quality improvement measures.

Bingham, Lyndon, Lagrew, & Main, 2011; D’Alton, Main, Menard, & Levy, 2014
4 R Framework and QIO Definitions

**Readiness**
- Facility preparation
- Clinician preparation
- Patient knowledge

**Recognition**
- Risk factors
- Symptoms
- Misdiagnosis

**Response**
- Timing of treatment
- Inadequate treatment
- Coordination of care
- Follow-up care

**Reporting**
*not included in CA-PAMR data
QIO Readiness Themes among CVD deaths, CA-PAMR, 2002-2007

Facility preparation
- Women at very high risk for morbidity not cared for at facilities with specialist expertise and capacity
- Women at high risk not cared for on the right unit within the facility
- Lack of standardized polices and protocols

Clinician preparation
- Lack of routine assessment of all pregnant women especially those with known risk factors
- Lack of knowledge of how to perform CPR on a pregnant woman

Woman’s knowledge
- Awareness of signs and symptoms warranting medical attention
QIO Recognition Themes among CVD deaths, CA-PAMR, 2002-2007

- Missed risk factors
  - Family or medical history
  - Obesity
  - Current or past substance use

- Missed signs and symptoms
  - Shortness of breath, decreased oxygen saturation, tachycardia, crackles, wheezing, shoulder pain, fatigue, cyanosis, anemia, murmur

- Missed diagnosis/evaluation
  - Anxiety, asthma, pneumonia, pyelonephritis, substance use
QIO Response Themes among CVD deaths, CA-PAMR, 2002-2007

- Delayed treatment
  - Necessary diagnostic measures, medications, intubation, cesarean, triage and transport

- Inadequate or inappropriate treatment
  - Mismanagement of the woman’s deteriorating condition

- Lack of follow-up
  - Women with high-risk factors or symptoms during delivery hospitalization were not followed post-discharge
Readiness Action Recommendations

- Facility preparation
  - Identification and transfer of women with high-risk factors during pregnancy and postpartum period
    - Availability of appropriate equipment
    - Access to maternal-fetal medicine/subspecialties
    - Improve communication and collaboration between obstetrics and emergency department and/or intensive care unit
  - Clinician education
  - Provide social services/case management

November 7, 2018
Readiness Action Recommendations

- **Clinician Preparation**
  - Physician and staff education
    - Pulse oximetry use
    - Obstetric cardio-pulmonary resuscitation

- **Woman’s knowledge**
  - Prenatal and discharge teaching for risk factors, risk-reduction strategies, presence of symptoms, and when to seek care
Recognition Action Recommendations

- Missed risk factors
  - Routine risk assessment ante-, intra-, and postpartum

- Missed signs and symptoms
  - Assess and report abnormal warning signs

- Missed diagnosis/evaluation
  - Consider cardiovascular diagnosis in presence of common pregnancy concerns
Response Action Recommendations

- **Timing of treatment**
  - Begin immediately
  - Early transport to higher level of care

- **Type of treatment**
  - Standardized policies for evaluation and medication
    - EKG, Chest x-ray, cardiac enzymes, ECG
    - Ace inhibitors; Beta blockers; Furosemide

- **Coordination of care**
  - Routine consultation & co-management between OB & cardiologist/intensivist

- **Follow-up care**
  - Earlier follow-up after discharge, esp. postpartum
Disparities

- Substantial disparity in CVD mortality occurred among African American women – no clear answers
  - Higher incidence of risk factors associated with CVD
    - Not identified as high risk needing further evaluation
  - Access to quality care
    - Insurance accessibility – loss of healthcare coverage
    - Appropriate diagnostic measures
    - Delayed treatment
  - Racism, chronic stress, and social environment
Moving Toward Equitable Implementation of the CVD Screening Algorithm

Afshan B. Hameed, MD, FACOG, FACC
Professor OB/GYN, Division of Maternal Fetal Medicine
Professor, Division of Cardiology, Medical Director, Obstetrics
Medical Director, Quality and Safety, University of California, Irvine
Significant reductions in maternal mortality and morbidity can not be accomplished without addressing the gaps in maternity care for black women.
Racial Disparities in Pregnancy-Related Mortality, CA-PAMR 2002-07

Pregnancy-Related Mortality Due to Cardiomyopathy: United States, 2006-2010

Pregnancy-related mortality ratio
16 deaths per 100,000 live births

<table>
<thead>
<tr>
<th>Race-Ethnicity</th>
<th>Mortality Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td>11.7</td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>12.0</td>
</tr>
<tr>
<td>Other</td>
<td>14.2</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>38.9</td>
</tr>
</tbody>
</table>

non-Hispanic black vs. non-Hispanic white 3.2

Creanga AA et. al. Obstet Gynecol 2015;125:5-12
Characteristics and Risk Factors among CA-PAMR, 2002-2006

- Medi-Cal: 67%
- Obese (BMI>=30): 55%
- African-American, non-Hispanic: 23%
- Hypertension during pregnancy: 31%
- Methamphetamine or cocaine use (per toxicology report): 24%

Characteristics and Risk Factors


- 245 CMP deaths (70% PPCMP)
- 6-fold excess risk of death for African-American women

Creanga AA et al. Obstet Gynecol 2015;125:5-12
Timing of CVD Diagnosis, CA-PAMR 2002-2006, (n=64)

- Preexisting (prior to pregnancy)
- Prenatal period
- At labor and delivery
- Postpartum period
- Postmortem

Timing of Death

- 30% of all CVD deaths were late, i.e. >42 days from birth/fetal demise vs. 7.3% of non CVD pregnancy-related deaths
- Driven by CMP deaths, i.e. 43% late deaths

Signs and Symptoms among Women who died of CVD, CA-PAMR 2002-2006

Symptoms
(SOB, wheezing, palpitations, edema, chest pain, dizziness, or extreme fatigue)

- Prenatal period: 43%
- Labor and delivery: 51%
- Postpartum: 80%

Abnormal physical exam findings

- HTN >140/90 mm Hg (64%)
- Tachycardia >120 bpm (59%)
- Crackles, S3 or gallop rhythm etc. (44%)
- O2 <90% (39%)

Only 2 women entered pregnancy with known CVD


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Hypertension in African Americans

- More prevalent in this population
- Accelerated progression from pre-hypertension to hypertension
- Higher nocturnal BP – total BP load

Patient Factors
- Lower socioeconomic status
  - High sodium/low potassium intake
  - Poor maternal nutrition – low birth weight with renal disease
- Obesity

Genetic factors
- Susceptibility to left ventricular hypertrophy for the same BPs
  
  (Kizner JR et. al. Differences in left ventricular structure between black and white hypertensive adults. Hypertension 2001;43:1182)
- 4-5 fold higher risk of renal failure

Environmental factors
- Racism and stress
  
  Carson AP et. al. Hypertension 2011;57:1101
  Selassie A et. al. Hypertension 2011;58:579
Why?

- Increased burden of cardiovascular risk factors
  - Hypertension
  - Diabetes
  - Obesity
- Genetic
- Environmental
Cardiovascular Complications in Hypertensive African Americans

<table>
<thead>
<tr>
<th></th>
<th>Blacks vs. Whites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall CV mortality</td>
<td>3 x higher</td>
</tr>
<tr>
<td>Mortality &lt;50 year of age</td>
<td>6-7 x higher</td>
</tr>
</tbody>
</table>

Carson AP et. al. Hypertension 2011;57:1101
Selassie A et. al. Hypertension 2011;58:579
Final Common Pathway

- Heart Failure
- Arrhythmias
- Death
25 year old obese (BMI 38) African-American G2P2 presents 10 days after an uncomplicated vaginal birth with fatigue and persistent cough since delivery.

- BP 110/80, HR 110, RR 28, afebrile, with O2 sat 94% on room air.

- She gets diagnosed with respiratory infection and is prescribed an antibiotic. Her fatigue is attributed to lack of sleep by the care provider.
One week later, she presents again with continued symptoms. Antibiotics are switched and beta-agonists are added for presumptive “new-onset asthma.”

Two days later, the patient experiences cardiac arrest at home and resuscitation attempts are unsuccessful.

Autopsy findings were indicative of cardiomyopathy.
Red Flags

- Shortness of breath at rest
- Severe orthopnea ≥ 4 pillows
- Resting HR ≥120 bpm
- Resting systolic BP ≥160 mm Hg
  - Resting RR ≥30
- Oxygen saturations ≤94% with or without personal history of CVD

PROMPT EVALUATION and/or hospitalization for acute symptoms

CONSULTATIONS with MFM and Primary Care/Cardiology

Personal History of CVD

Without Red Flags

CONSULTATIONS with MFM and Primary Care/Cardiology

©California Department of Public Health, 2017; supported by Title V funds. Developed in partnership with California Maternal Quality Care Collaborative Cardiovascular Disease in Pregnancy and Postpartum Taskforce. Visit: www.CMQCC.org for details
Suggestive of Heart Failure:
- Dyspnea
- Mild orthopnea
- Tachypnea
- Asthma unresponsive to therapy

Suggestive of Arrhythmia:
- Palpitations
- Dizziness/syncope

Suggestive of Coronary Artery Disease:
- Chest pain
- Dyspnea

**SYMPTOMS**
*NYHA class ≥ II*
- Dyspnea
- Mild orthopnea
- Tachypnea
- Asthma unresponsive to therapy

**VITAL SIGNS**
- Resting HR ≥110 bpm
- Systolic BP ≥140 mm Hg
  - RR ≥24
  - Oxygen sat ≤96%

**RISK FACTORS**
- Age ≥40 years
- African American
- Pre-pregnancy obesity (BMI ≥35)
- Pre-existing diabetes
- Hypertension
- Substance use (nicotine, cocaine, alcohol, methamphetamine)
- History of chemotherapy

**ABNORMAL FINDINGS**
Heart: Loud murmur or
Lung: Basilar crackles

**PHYSICAL EXAM**

<table>
<thead>
<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultation indicated:</td>
<td>MFM and Primary Care/Cardiology</td>
</tr>
<tr>
<td>Results abnormal CVD highly suspected</td>
<td>Results negative Signs and symptoms resolved Reassurance and routine follow-up</td>
</tr>
</tbody>
</table>

≥ 1 Symptom + ≥ 1 Vital Signs Abnormal + ≥ 1 Risk Factor or ANY COMBINATION ADDING TO ≥ 4

Obtain: EKG and BNP
- Echocardiogram +/- CXR if HF or valve disease is suspected, or if the BNP levels are elevated
  - 24 hour Holter monitor, if arrhythmia suspected
- Referral to cardiologist for possible treadmill echo vs. CTA vs. alternative testing if postpartum
  Consider: CXR, CBC, Comprehensive metabolic profile, Arterial blood gas, Drug screen, TSH, etc.
  Follow-up within one week

©California Department of Public Health, 2017; supported by Title V funds. Developed in partnership with California Maternal Quality Care Collaborative Cardiovascular Disease in Pregnancy and Postpartum Taskforce. Visit: [www.CMQCC.org](http://www.CMQCC.org) for details.
We applied the algorithm to 64 CVD deaths from 2002-2006 CA-PAMR.

56 out of 64 (88%) cases of maternal mortality would have been identified.

Detection increased to 93% when comparison was restricted to 60 cases that were symptomatic.
CVD Screening

- Toolkit Implementation
  - Baseline screening on all pregnant and postpartum women
  - Establish screen positive rate
  - Validation of the CVD algorithm
Implementation Steps

- EMR dot phrase/template for outpatient/inpatient
- Screen all women by applying algorithm
- Follow up information on screen positive by algorithm and results of further cardiac testing
- Collaborate with other institutions to combine the information
UCI – Study Protocol

- Descriptive study of algorithm implementation
- Goals:
  - Describe the clinical burden of screening in our population
  - Describe outcomes for women designated “at risk” based on the algorithm
  - Determine which variables contribute highest “relative risk” of true cardiac disease
- Apply algorithm to all patients at least once in pregnancy
Primary outcome: “positive screen”
- Red flag criteria
- Prior CVD history
- Score ≥ 3 or 4
- Physical exam findings
- Persistent concerning symptoms

Secondary outcomes:
1. Cardiovascular disease suspected
   - (abnormal ECG or BNP > 100)
2. Cardiovascular disease confirmed
   - Echocardiogram findings –
     - Systolic or diastolic dysfunction
     - Chamber/septal hypertrophy or dilation
     - Pulmonary hypertension
     - Valve disease
   - Pathologic arrhythmia
     - Confirmed by ECG/Holter or EP study
3. Need for cardiovascular medications
UCI Study Protocol

- Proposed review at 3 and 6 months
- Submitted to IRB - approved as QA project
- Started implementation April 9, 2018
  - Epic dot phrase with algorithm
  - “cardiovascular screen” placed in problem list
- Baseline information for later validation study
CVD Screening Toolkit in Pregnant/Postpartum Women

Please answer the following questions as a part of the CMQCC toolkit to evaluate and screen for possible CVD. This is a screening tool and should not be used in lieu of clinical judgement.

1. Does the patient have any 'Red Flags' on presentation, if so, please select those present?
Red flags include:
- SOB at rest
- Severe orthopnea
- HR >120 BPM
- SBP > 160
- RR > 30
- O2 Sat < 94%

Yes*: [Blank List Multiple Choice Single Line:19988]*

*If Yes, please refer to hospital for immediate evaluation; recommend ECG, BNP and possible TTE.

2. Does the patient have a personal history of CV disease, cardiac surgery, ischemic heart disease?
{Blank List Multiple Choice Multiple Lines:19989}

SOB at rest
Severe Orthopnea (> or = 4 pillows)
Resting HR > or = 120 BPM
Resting SBP > or = 160 mmHg
Resting RR > or = 30
O2 Saturation < or = 94%
2. Does the patient have a personal history of CVD without 'Red Flags'? (Including: congenital heart disease, cardiac surgery, ischemic heart disease, or cardiomyopathy. Of note, NOT HTN)
   {Blank List Multiple Choice Multiple Lines:19989}

3. Select any of the following abnormalities the patient presents with OR is elicited through examination in each respective category:

<table>
<thead>
<tr>
<th>Concerning Symptoms</th>
<th>{Blank List Multiple Choice Multiple Lines:19996}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal Vital Signs</td>
<td>{Blank List Multiple Choice Multiple Lines:}</td>
</tr>
<tr>
<td>Risk Factors</td>
<td>{Blank List Multiple Choice Multiple Lines:}</td>
</tr>
<tr>
<td>Abnormal Physical Exam Findings</td>
<td>{Blank List Multiple Choice Multiple Lines:}</td>
</tr>
</tbody>
</table>

4. In review of Question 3, please select any of the following criteria recommended work-up and consultation:
   {Blank List Multiple Choice Multiple Lines:20013}**

   **If any Abnormal Physical Exam Findings, please order ECG, BNP, TTE and refer to cardiology.

5. Did this patient meet any of the aforementioned criteria listed in Question 4?
   {Blank List Single Selection:20014}
New Problem

<table>
<thead>
<tr>
<th>Problem:</th>
<th>Screening for cardiovascular condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display:</td>
<td>Screening for cardiovascular condition</td>
</tr>
<tr>
<td>Priority:</td>
<td>Noted: 4/8/2018</td>
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<tr>
<td>Class:</td>
<td>Resolved:</td>
</tr>
<tr>
<td>Present on admission?</td>
<td>Yes</td>
</tr>
<tr>
<td>Episodic:</td>
<td>G2P0, PREGNANCY</td>
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<tr>
<td>Noted:</td>
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CVD Screening Information

- Date of Patient Screening: 4/8/2018
- Screening Practitioner: Nisha Garg, MD
- Patient met inclusion criteria as indicated in Question #4: Yes/No
California Toolkits to Transform Maternity Care

NEW Toolkits

- Venous Thromboembolism Toolkit (2018)
- Cardiovascular Disease Toolkit (2017)

Other Toolkits

- Supporting Vaginal Birth Toolkit (2016)
- OB Hemorrhage Toolkit (ver. 2.0, 2015)
- Preeclampsia Toolkit (2014)
- Early Elective Deliveries Toolkit (2010)

The Toolkit series were developed by CMQCC with funding provided by California Department of Public Health, federal Title V MCH block grant funds
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Maternal Mortality Rate, California and United States; 1999-2013

Thank you for attending today’s Webinar

- Racial Disparities in Maternal Mortality: Spotlight on Cardiovascular Disease

- Announcements
  - Today’s webinar will be recorded and archived (within 72 hours) on CMQCC’s YouTube Channel: www.youtube.com/CMQCC
  - Email cmorton@stanford.edu with follow up questions or comments
  - Look for the evaluation survey in tomorrow’s email! We want to hear how our webinars are relevant to your work to improve maternity care