Clinical Safety & Effectiveness
Cohort # 24
Team # 1

Implementation of Cardiac Risk Assessment Screening Tool into the Initial Obstetric Visit
The Team

• **Division**
  - Patrick Ramsey, MD/MSPH, MFM Attending
  - Angela Boyd, MD, PhD, MFM Fellow
  - Tania Roman, MD, MPH, MFM Fellow
  - Evangelina Yebra, RN, RBG Clinic Director
  - Srini Reddy, MD, PGY-3
  - Jeffrey Chang, MD, PGY-1
  - Nimi Bhattatiry, MS3

• **Facilitator**
  - Sherry Martin

• **Sponsor Department**
  - Department of Obstetrics and Gynecology
Background

- Cardiovascular Disease (CVD) affects approximately 1% of all pregnancies.

- The number of pregnant women with CVD risk factors is rising.

- Data from the Texas Maternal Morbidity and Mortality Task Force found that 12 out of 89 maternal deaths in 2009 were attributed to Cardiac Disease.

Note: The cause of death is unknown for 6.5% of all pregnancy-related deaths.

Severe Maternal Morbidity as Defined by the CDC:

- Pulmonary edema/Acute heart failure
- Puerperal CVD
- Heart failure/Arrest during surgery
- Eclampsia
- DIC
- MI
- ARF
- ARDS
- AFE

Cardiac arrest/Arrhythmia
- Ventilation/tracheostomy
- Hysterectomy
- Blood transfusion
- Air and thrombotic embolism
- Sickle cell disease with crisis
- Shock
- Sepsis
- Severe anesthesia complications

Red: CVD
Blue: Other potential codes associated with CVD complications
UHS Severe Maternal Morbidity (SMM) Rate (2011-2016)
A USA TODAY analysis of billing data from 7 million births found about one in eight hospitals have complication rates of at least double the norm.

Alison Young and John Kelly and Christopher Schnaars, USA TODAY

In Texas, officials at University Hospital in San Antonio explained its complication rate of 6.9 percent – more than four times the median – by saying its patients are uniquely complex.

University Hospital, also an OB/GYN teaching site, said it could be fairly compared only to a tiny group of specialty hospitals in Texas. Asked to identify peers, officials named three – University of Texas Medical Branch Hospital in Galveston, Ben Taub Hospital in Houston and Parkland Hospital in Dallas.

All three have lower rates, USA TODAY found. And University’s rate was more than four times higher than one of them, the UT hospital in Galveston.

“You know, they’re probably not true apples to apples,” University chief medical officer Dr. Bryan Alsip said after being shown the numbers.
# Severe Maternal Morbidity (SMM) Hospital Rate Comparison 2014-2017

<table>
<thead>
<tr>
<th>Category</th>
<th>UH</th>
<th>National</th>
<th>Texas</th>
<th>BTH</th>
<th>PMH</th>
<th>MH</th>
<th>MMH</th>
<th>NCBH</th>
<th>SLBH</th>
<th>SWG</th>
<th>CHOSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMM all mothers</td>
<td>6.9%</td>
<td>1.4%</td>
<td>1.4%</td>
<td>3.3%</td>
<td>4.9%</td>
<td>0.6%</td>
<td>0.5%</td>
<td>1.2%</td>
<td>1.5%</td>
<td>5.8%</td>
<td>3.1%</td>
</tr>
<tr>
<td>SMM black mothers</td>
<td>8.9%</td>
<td>2.6%</td>
<td>2.4%</td>
<td>4.9%</td>
<td>6.9%</td>
<td>N/A</td>
<td>N/A</td>
<td>1.6%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>SMM Low income paid by Medicaid</td>
<td>6.1%</td>
<td>1.9%</td>
<td>2.0%</td>
<td>3.1%</td>
<td>4.8%</td>
<td>0.8%</td>
<td>0.5%</td>
<td>1.8%</td>
<td>1.7%</td>
<td>6.2%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Episiotomy Rate</td>
<td>9.2%</td>
<td>7.8%</td>
<td>N/A</td>
<td>3.6%</td>
<td>2.0%</td>
<td>11.7%</td>
<td>14.1%</td>
<td>6.4%</td>
<td>5.3%</td>
<td>7.6%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Cesarean Rate</td>
<td>23.4%</td>
<td>19.9%</td>
<td>N/A</td>
<td>15.2%</td>
<td>16.7%</td>
<td>25.2%</td>
<td>24.0%</td>
<td>25.5%</td>
<td>20.2%</td>
<td>21.1%</td>
<td>24.1%</td>
</tr>
<tr>
<td>Total Births</td>
<td>12,422</td>
<td>N/A</td>
<td>N/A</td>
<td>14,729</td>
<td>44,015</td>
<td>23,087</td>
<td>15,747</td>
<td>16,330</td>
<td>15,233</td>
<td>6,856</td>
<td>3,308</td>
</tr>
</tbody>
</table>
CVD Algorithm Validation

- 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.
Outcome Goal

• Our long term objective is to reduce Severe Maternal Morbidity and Mortality (SMM) rates by identifying those with underlying Cardiovascular Disease in pregnancy.
OUR AIM STATEMENT

The aim of this project is to increase the utilization of a Cardiovascular Disease (CVD) risk assessment tool from 0% to 80% during the time period of March 2019 to May 2019 in our Robert B. Green (RBG) Clinic.

The process begins when women have their initial OB encounter and ends when the physician completes the assessment. This is important to implement because it aligns with our strategic goal to identify women at risk for CVD in pregnancy.
Cardiovascular Disease (CVD) Screening Toolkit in Pregnant/Postpartum Women

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

1. Does the patient have any ‘Red Flags’ on presentation, if so, please select those present?

Red flags include:

☐ Shortness of breath at rest
☐ Resting Heart rate ≥ 120 bpm
☐ Resting Respiratory rate ≥ 30
☐ Severe orthopnea (≥ 4 pillows)
☐ Resting Systolic BP ≥ 160 mmHg
☐ O2 Saturation ≤ 94%

*If Yes, please refer to hospital for immediate evaluation. Collect patient info, call inpatient OB team, and recommend ECG, BNP, possible TTE and Cardiology Consult.

2. Please note if the patient has any abnormal Vital Signs?

☐ Resting HR ≥ 110 bpm
☐ Resting RR ≥ 24
☐ Systolic BP ≥ 140 mmHg
☐ O2 Saturation ≤ 90%

3. Does the patient have any Risk Factors?

☐ Age ≥ 40 years
☐ African American
☐ Pre-Pregnancy Obesity (BMI ≥ 35)
☐ Pre-gestational Diabetes
☐ Hypertension
☐ History of Chemotherapy
☐ Substance Use (Cocaine, Alcohol, Methamphetamine)

4. Does the patient have a Personal History of CVD without ‘Red Flags’?

☐ Congenital heart disease
☐ Ischemic heart disease
☐ Cardiac surgery
☐ Peripartum cardiomyopathy

Adapted from the CMQCC CVD Screening Toolkit, last edited 4/1/2019
5. Does the patient have any abnormal Self-Reported Symptoms?

☐ Dyspnea
☐ Tachypnea
☐ Palpitations
☐ Chest Pain
☐ Mild Orthopnea
☐ Asthma unresponsive to therapy
☐ Dizziness or Syncope

6. Does the patient have any Abnormal Physical Exam findings?

☐ Diastolic Murmur
☐ Basilar Crackles
☐ Cyanosis
☐ Loud Systolic murmur (>III/IV intensity)
☐ Jugular Venous Distention
☐ Clubbing

Recommended Management:
1. If any Self-Reported Symptoms are persistent, please order TTE and consider referral to cardiology. Please note, TTE can be done as an outpatient as long as patient is otherwise stable. If intermittent order CBC, BNP and ECG. (Can use Cardiovascular Disease Order Set to place orders)

2. If any Personal History of CVD or Abnormal Physical Exam Findings, please order BNP, ECG, TTE and refer to cardiology

3. If 1 concerning symptom AND 1 Abnormal VS AND1 Risk Factor, please order ECG, BNP and MFM Consult.

4. If ≥ 4 abnormalities identified then order ECG, BNP and MFM Consult

**If Abnormal BNP or ECG --> order TTE, and Cardiology and MFM consult

Thank you again for taking the time to screen your patient for CVD - Please ensure the following is completed at the end of this encounter

1. The acronym, cvdscreen is inserted and filled out at the end of the assessment (acronym available to copy from Angela Boyd)
2. Orders are placed for appropriate labs, imaging, and consultations with documentation of those needing follow-up at next encounter.
3. This form is placed in the "CVD in Pregnancy/Postpartum Screening Binder" (with Patient Sticker)

Additional Questions or Concerns by healthcare providers?

Please contact Dr. Boyd, Dr. Roman or Dr. Ramsey for any scenario that is unclear, additional questions, or you feel any issue warrants further discussion.

Adapted from the CMQCC CVD Screening Toolkit, last edited 4/1/2019
<table>
<thead>
<tr>
<th>Goal</th>
<th>Primary Drivers</th>
<th>Interventions</th>
<th>Individual Responsible</th>
<th>Reliability Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase the utilization of a Cardiac risk assessment tool from 0% to 80% during the time period of March 2019 to May 2019 in our Robert B. Green (RGB) OB Clinic</td>
<td>Lack of use of validated CVD Screening Tool</td>
<td>Obtain and document Oxygen Saturation on all Obstetric patients at every visit (March, 2019)</td>
<td>Eva Yebra</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Develop CVD Screening tool based on the California Maternal Quality Care Collaborative CVD Screening tool (March 2019)</td>
<td>Angela Boyd, Tania Roman, Patrick Ramsey</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Create acronym for residents to place at the end of the New OB assessment (March 2019)</td>
<td>Angela Boyd</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Integrate CVD tool into EMR (May 2020)</td>
<td>Angela Boyd, Tania Roman, Eva Yebra</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Lack of Education for implementation</td>
<td>Provide medical students education on the CVD screening tool during OB/GYN Orientation (March-June 2019)</td>
<td>Tania Roman, Angela Boyd</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide Resident and Faculty education (March-June 2019)</td>
<td>Tania Roman, Angela Boyd, Patrick Ramsey</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide Nursing staff education in clinic (March 2019)</td>
<td>Eva Yebra</td>
<td>1</td>
</tr>
</tbody>
</table>
People

- MD does not perform evaluation
- Student not familiar with screen
- Nursing staff not aware of screen
- Patient not categorized correctly

Process, Policies, Procedures

- Nursing staff does not perform screen
- Orders not placed
- .dot phrases not placed
- Misplaced forms
- EMR failure
- Not enough forms printed out

Plant

Equipment, Machines

Implementation of Cardiac Risk Assessment Screening Tool
Implementing the Change

Do

• The CVD Screening Tool was implemented in RBG clinic on 3/25/2019

• The Nursing staff, Medical students and Residents received education prior to and the 1st day of implementation.

• We provided lunch to the residents as incentives to complete the assessment the first and third day of implementation

• An email reminder with the Screening tool was sent to the residents 1 week after initial implementation

• The above was repeated with each new group of Medical Students and Residents.
# Data Collection Plan

<table>
<thead>
<tr>
<th>Type of Measure</th>
<th>Measure</th>
<th>Data Elements</th>
<th>Data Category</th>
<th>Data Source</th>
<th>Data Frequency</th>
<th>Data Steward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process</td>
<td>% of New OB with Complete vital sign assessment</td>
<td># New OB with Complete Vital Sign Assessment/# New OB</td>
<td>New</td>
<td>Manual</td>
<td>Workflow</td>
<td>Weekly</td>
</tr>
<tr>
<td>Process</td>
<td>% of New OB flagged for Screening</td>
<td># New OB flagged for CVD Screening/# New OB</td>
<td>New</td>
<td>Manual</td>
<td>Workflow</td>
<td>Weekly</td>
</tr>
<tr>
<td>Process</td>
<td>% of New OB with EMR Entry of CDV Assessment</td>
<td># New OB with CVD EMR Entry/# New OB</td>
<td>New</td>
<td>Manual</td>
<td>Workflow</td>
<td>Weekly</td>
</tr>
<tr>
<td>Outcome</td>
<td>% of New OB with Completed CDV Assessment</td>
<td># New OB with Completed CVD Assessments/# New OB</td>
<td>New</td>
<td>Manual</td>
<td>Workflow</td>
<td>Weekly</td>
</tr>
<tr>
<td>Outcome</td>
<td>% of Screen Positive New OB Receiving Appropriate Evaluation</td>
<td># Screen Positive New OB Receiving Completed Evaluation/# Screen Positive New OB</td>
<td>New</td>
<td>Manual</td>
<td>Workflow</td>
<td>Weekly</td>
</tr>
<tr>
<td>Outcome</td>
<td>Severe Maternal Morbidity (SMM) Rate</td>
<td># SMM (CDC Definition)/10,000 Live births</td>
<td>Existing</td>
<td>Automatic</td>
<td>EHR/ Administrative</td>
<td>Quarterly</td>
</tr>
<tr>
<td></td>
<td>Screen Positive (%)</td>
<td>Screen Negative (%)</td>
<td></td>
<td></td>
<td></td>
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<td>--------------------------------</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Screened</td>
<td>76</td>
<td>2 (2.6)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>74 (97.4)</td>
<td></td>
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</tr>
<tr>
<td>Total New OB</td>
<td>178</td>
<td>5 (2.8)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>173 (97.1)</td>
<td></td>
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<tr>
<td>Screened (%)</td>
<td>42.6</td>
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</tr>
</tbody>
</table>
Return on Investment

(Cost Averted $^1$) – (Cost for Positive Screens $^2$)

Screening Costs$^3$

$^1$ Cost Averted: Cardiac patient stay in CCU ante- and post-natal

$^2$ Cost for Positive Screen: Echo, EKG, BNP, CBC and Cardiology consult

$^3$ Screening Costs
## Cost of a Workup for Screen Positive Patient

<table>
<thead>
<tr>
<th>Test</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Echocardiogram</td>
<td>1564</td>
</tr>
<tr>
<td>EKG/ECG</td>
<td>253</td>
</tr>
<tr>
<td>BNP</td>
<td>106</td>
</tr>
<tr>
<td>CBC</td>
<td>45</td>
</tr>
<tr>
<td>Cardiology Consult *</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1968</strong></td>
</tr>
</tbody>
</table>

*Source: UHS Charge Master*
Patient Case

RR is a 22 year old, G2P0010 at 27 5/7 weeks of gestation who presented with complaints of Shortness of breath (SOB) and non-specific chest pain to an outside hospital. Per report from her primary OB/GYN she denied any medical conditions. Prior to transfer in the ER she had increased SOB and desaturated down to the 80s while getting a CT scan. She was intubated and transferred to UHS for a higher level of care. She was ultimately found to have Pulmonary Hypertension, underwent an emergent Cesarean and had a very long, complicated hospital stay from February 7 to March 22. On further questioning she endorsed a history of “some cardiac condition”.

Charges for procedures and tests = $96,516.68*

Source: Information obtained from Bill Bedwell
Return on Investment

\[
\frac{($96,516^1) - ($2068^2) \times 100}{6} = $1,517,400
\]

1. **Cost Averted:** Cardiac patient stay in CCU ante- and post-natal
2. **Cost for Positive Screen:** Echo, EKG, BNP, CBC and Cardiology consult
3. **Screening Costs**
Conclusion/What’s Next

With our current method of implementation focusing primarily on education and weekly reinforcement we did not reach our initial goal of 80 percent screening at the Initial OB visit.

**Our next steps are:**
1. Provide feedback to providers/personnel on weekly basis
2. Obtain input from providers/personnel about barriers
3. Improve promotion of project via visual aids and incentives
4. Hold providers/personnel accountable when tool is not done
5. Incorporate CVD screening tool into electronic medical record (EMR)
6. Make screening tool a “hard stop” in EMR
3RD ANNUAL
HIGH RISK PREGNANCY
and HEART DISEASE

Saturday
March 30, 2019
San Antonio, Texas

Sponsored By:
UT Health San Antonio
Joe R. and Teresa Lozano
Long School of Medicine
and The Charles C. Brown and
Anne S. Brown Distinguished
Professorship in Cardiovascular
Disease Endowment,
UT Health San Antonio

University Health System

Location:
Nurse Conference Center
San Antonio/Park North
610 NW Loop 410, Suite 217
San Antonio, TX 78216

HighRiskPreg.org
Thank you!
Percent of Patients Screened at Initial OB Visit

- UCL: 0.7508
- CL: 0.4270
- LCL: 0.1032

Week:
1 2 3 4 5 6 7 8

Percent Screened:
0.00% 10.00% 20.00% 30.00% 40.00% 50.00% 60.00% 70.00% 80.00% 90.00% 100.00%
People

- MD does not perform evaluation
- Nursing staff does not perform screen
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- Patient not categorized correctly

Process, Policies, Procedures

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Implementation of Cardiac Risk Assessment Screening Tool
How Will We Know That a Change is an Improvement?
Data Collection Method

• Types of Measures
  – Obtain weekly reports of new OB patients in RBG OB clinic (Process)
  – Will audit the patient charts for acronym documentation at end of assessment (Process)
  – Will determine percent of new OB patients screened weekly by reconciling screening tools placed in binder with weekly report (Outcome)
  – Will determine the percentage of screened new OB patients that screened positive (Outcome)