Decreasing Maternal Child Health Disparities Through Systems Redesign and Shared Decision Making

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Established in 1970 in Tucson, AZ

Provides services to 1 in 10 people in Pima County

14 locations
El Rio Birth and Women’s Health Center Site Tucson AZ

- CABC Accredited Freestanding Birth Center
- 36 years in Tucson
- One of 4 Midwifery Sites
- Services include well-women health, pregnancy care, and more
Results from the Center for Medicare and Medicaid Innovation Strong Start for Mothers and Newborns Project

Cross-Barnet, Hill, Marcele, McCarthy (2019)
CMMI Strong Start For Mothers and Newborns

Enhanced prenatal care initiative to improve outcomes for low-income women and infants

- Preterm birth rates
- Low birthweight
- Cost of care

Three evidence-based enhanced prenatal care models

- Birth Centers
- Group Prenatal Care
- Maternity Care Homes
AABC Strong Start Enrollment

- 45 Sites in 19 States
- 14,396 Medicaid recipients
- 9818 Infants
The Birth Center
Primary Care in an Integrated Health Care System

Ancillary Services
- Laboratory Tests
- Social Services & Nutrition Consultants
- Notification & Referral for Pediatric Care
- Laboratory Tests

Birth Center / Primary Care
- Registration & Orientation
- Informed Consent
- History & Physical
- Antepartum Care
- Counselling / Education
- Continuous Screening

- Admission to the Birth Center for Labor
- Birth Center Birth
- Postpartum Care
- Newborn Care
- Education
- Discharge
- 2-3 Day Home Visit
- 7-10 Day Office Visit
- 4-6 Week Exam
- Family Planning
- Breastfeeding Support
- Parenting Support

Hospital / Physician Care
- OB Consultation
- Antepartum Referral
- Intrapartum Referral
- Hospital Birth
- Postpartum or Newborn Referral
- Discharge
- OB Consultation
- Postpartum Referral

Client Receiving Birth Center Model of Enhanced Prenatal Care
- Individualized and time-intensive health education
- Continuity of care with same providers
- Network for seamless transfer to high-risk care
- Trust, respect, and shared decision-making
- Timely access and non-traditional hours

All components of usual prenatal care
Strong Start Impact Analysis

- Birth certificates for 12 states and District of Columbia (2014-2016)
- Medicaid eligibility files for 12 states and DC (2014-2016)
- Medicaid claims and encounter data for 8 states and DC (2014-2015)
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Birth Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical gestational age (weeks)</td>
<td>39.0</td>
<td>38.6</td>
<td>0.4</td>
<td><em>p &lt; 0.01</em></td>
</tr>
<tr>
<td>Preterm birth rate</td>
<td>6.3%</td>
<td>8.5%</td>
<td>-2.2</td>
<td><em>p &lt; 0.01</em></td>
</tr>
<tr>
<td>Very preterm birth rate</td>
<td>1.7%</td>
<td>2.2%</td>
<td>-0.4</td>
<td>n.s.</td>
</tr>
<tr>
<td>Birthweight (grams)</td>
<td>3,342.8</td>
<td>3,263.8</td>
<td>79.0</td>
<td><em>p &lt; 0.01</em></td>
</tr>
<tr>
<td>Low birthweight rate</td>
<td>5.9%</td>
<td>7.4%</td>
<td>-1.5</td>
<td><em>p &lt; 0.05</em></td>
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<tr>
<td>Very low birthweight rate</td>
<td>1.0%</td>
<td>1.1%</td>
<td>-0.1</td>
<td>n.s.</td>
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<tr>
<td>Rate of Apgar score greater than or equal to 7</td>
<td>98.2%</td>
<td>98.2%</td>
<td>0.0</td>
<td>n.s.</td>
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<tr>
<td><strong>Process Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-section rate</td>
<td>17.5%</td>
<td>29.0%</td>
<td>-11.5</td>
<td><em>p &lt; 0.01</em></td>
</tr>
<tr>
<td>VBAC rate</td>
<td>24.2%</td>
<td>12.5%</td>
<td>11.6</td>
<td><em>p &lt; 0.01</em></td>
</tr>
<tr>
<td>Weekend delivery rate</td>
<td>23.7%</td>
<td>19.8%</td>
<td>4.0</td>
<td><em>p &lt; 0.01</em></td>
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</table>
### Outcomes

#### Expenditure Outcomes (Means)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Prenatal care expenditures</td>
<td>$2,203</td>
<td>$2,192</td>
<td>$10</td>
<td>n.s.</td>
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<tr>
<td>Total expenditures during delivery period</td>
<td>$6,527</td>
<td>$8,286</td>
<td>-$1,759</td>
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<tr>
<td>Total delivery and post-delivery expenditures</td>
<td>$10,562</td>
<td>$12,572</td>
<td>-$2,010</td>
<td>p &lt; 0.01</td>
</tr>
</tbody>
</table>

#### Utilization Outcomes (Means)

<table>
<thead>
<tr>
<th>Outcomes</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Number of ED visits 8 months before delivery month</td>
<td>1.19</td>
<td>1.16</td>
<td>0.03</td>
<td>n.s.</td>
</tr>
<tr>
<td>Number of hospitalizations 8 months before delivery month</td>
<td>0.03</td>
<td>0.03</td>
<td>0.0</td>
<td>n.s.</td>
</tr>
<tr>
<td>Number of days in NICU</td>
<td>0.71</td>
<td>0.95</td>
<td>-0.24</td>
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<tr>
<td>Number of ED visits for mother 11 months after delivery month</td>
<td>0.63</td>
<td>0.67</td>
<td>-0.04</td>
<td>n.s.</td>
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<tr>
<td>Number of hospitalizations for mother 11 months after delivery month</td>
<td>0.04</td>
<td>0.04</td>
<td>0.01</td>
<td>n.s.</td>
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<tr>
<td>Number of ED visits for infant in the first year of life</td>
<td>0.86</td>
<td>0.99</td>
<td>-0.13</td>
<td>p &lt; 0.01</td>
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<tr>
<td>Number of hospitalizations for infant in the first year of life</td>
<td>0.07</td>
<td>0.08</td>
<td>-0.01</td>
<td>p &lt; 0.05</td>
</tr>
</tbody>
</table>
BC Prenatal care is time intensive and relationship-based

Includes referrals to needed resources, health education and emotional support

Midwives see fewer women per day to achieve these outcomes

Incentivizing birth center prenatal care results in savings to Medicaid

Cost savings: better prepared mothers, breastfed babies, lower rates of cesareans and interventions
Estimated Cost Savings Analysis

- Lower caesarean rates and fewer medical interventions, reductions in preterm, low birthweight births when care provided through the freestanding birth center.

- Estimated Medicaid savings cesareans prevented per 10,000 births $4.35 million (facility savings only).

- Estimated savings reduction in preterm births and NICU admissions per 10,000 births $24.25 million.

- Estimated cost increase to enhanced prenatal care would be offset by savings.
El Rio and Idealized Design
Planned Birth Location, Race and Ethnicity

Consumer Driven, or by Systems Design?
Place of Birth, Race and Ethnicity

Consumer Driven, or by Systems Design?
Systems Driven Health Disparities

- Structures of Care
- Site of Birth
- Outcome: Cesarean Birth and Race
- Outcome: Breastfeeding and Race
JC PC 02 NTSV Cesarean By Race

African American

- Primary cesarean: 14.7%
- Vaginal: 85.3%

White

- Primary cesarean: 8.6%
- Vaginal: 91.4%

*P=<0.05
JC PC 05- Exclusive Breastfeeding on Discharge By Race

African American
- Exclusive: 71.1%
- No: 28.9%

White
- Exclusive: 80.8%
- No: 19.2%

*P=<0.05
Exploring Institutionalized Racism and Preference Sensitive Care

State of the Science
Random System Structure?

Could:

A random phone call for an appointment determines outcome?

As random as your zip code?

As random as first available appointment?
El Rio Systems
Redesign: Methods

Listen to Women

1. Semi-structured interviews with pregnant and non-pregnant patients (n=104)
2. Short surveys with pregnant patients (n=42)
3. Transferred data to and analyzed data with Stata 15.1
   a. Demographic data
   b. Categorical data: Chi 2 tests for statistical significance
### Surveys: Results - Demographic Characteristics

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>101</td>
<td>100</td>
</tr>
<tr>
<td>Semi-Structured Interviews</td>
<td>59</td>
<td>58.4</td>
</tr>
<tr>
<td>Surveys</td>
<td>42</td>
<td>41.6</td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td><strong>English</strong></td>
<td>89</td>
<td>89.0</td>
</tr>
<tr>
<td>Spanish</td>
<td>10</td>
<td>10.0</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Race/Ethnicity– Surveys Only</strong></td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>9</td>
<td>21.4</td>
</tr>
<tr>
<td>Black</td>
<td>1</td>
<td>2.4</td>
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<tr>
<td><strong>Hispanic</strong></td>
<td>23</td>
<td>54.8</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
<td>4.8</td>
</tr>
<tr>
<td>Native American/American Indian</td>
<td>2</td>
<td>4.8</td>
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<tr>
<td>More than 1 response</td>
<td>5</td>
<td>11.9</td>
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</table>
## Surveys: Results - Demographic Characteristics

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<tr>
<th>Payment – Surveys Only</th>
<th>n</th>
<th>%</th>
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<tr>
<td>Private Insurance</td>
<td>8</td>
<td>21.6</td>
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<tr>
<td>Medicaid</td>
<td>21</td>
<td>56.8</td>
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<tr>
<td>Self-Pay</td>
<td>2</td>
<td>5.4</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>16.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>37</td>
<td>100</td>
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<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>8</td>
<td>8.3</td>
</tr>
<tr>
<td><strong>20-24</strong></td>
<td>27</td>
<td>27.8</td>
</tr>
<tr>
<td><strong>25-29</strong></td>
<td>39</td>
<td>40.2</td>
</tr>
<tr>
<td><strong>30-34</strong></td>
<td>23</td>
<td>23.7</td>
</tr>
<tr>
<td><strong>35-39</strong></td>
<td>9</td>
<td>9.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>97</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Previous Birth</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>59</td>
<td>59.0</td>
</tr>
<tr>
<td>No</td>
<td>41</td>
<td>41.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
### Surveys: Results - Medical Characteristics

#### Table 2. Medical Characteristics

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Uncompleted Pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>20</td>
<td>21.7</td>
</tr>
<tr>
<td><strong>No</strong></td>
<td>41</td>
<td>44.6</td>
</tr>
<tr>
<td>No prior pregnancies</td>
<td>31</td>
<td>33.7</td>
</tr>
<tr>
<td>Previous Cesarean Section</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>6</td>
<td>6.6</td>
</tr>
<tr>
<td><strong>No</strong></td>
<td>44</td>
<td>48.4</td>
</tr>
<tr>
<td>No prior pregnancies</td>
<td>41</td>
<td>45.0</td>
</tr>
<tr>
<td>Medical Risk Factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>17</td>
<td>17.7</td>
</tr>
<tr>
<td><strong>No</strong></td>
<td>79</td>
<td>82.3</td>
</tr>
</tbody>
</table>
Survey: Results – Preferences for Birth Experience

Plan for pain management during delivery n=94

- Medication: 48%
- No medication: 43%
- Undecided: 9%

Plan for location of birth n=96

- Hospital: 94%
- BWHC: 3%
- Unsure: 3%
Surveys: Results - Knowledge and Preferences

Knowledge of BWHC (n=82)
- No: 32.9%
- Unsure: 12.2%
- Yes: 54.9%

Would consider BWHC delivery (n=81)
- No: 45.7%
- Unsure: 32.1%
- Yes: 22.2%

Would like early release from place of delivery (n=83)
- No: 36.1%
- Unsure: 30.1%
- Yes: 33.7%

Know someone with out of hospital delivery (n=84)
- No: 71.4%
- Unsure: 4.8%
- Yes: 23.8%
Surveys: Results - Hospital Births

Reason for hospital birth, n=87

- Safety/Medical Risk Factors: 45%
- Recommendation: 18%
- Previous Experience/Familiar: 16%
- Other: 21%

Because there are doctors who can help me to give birth safely.
Safe, clean.
A lot more medical stuff is there.
Me siento segura.
Too many ‘what ifs’.

I'm going to TMC because this is where the midwives deliver.
Good reviews.
I heard TMC is good and I'll feel secure and comfortable.

I had my second son there and I liked how I was attended.
They took great care of me last time.
I had a great previous experience.

It would be easiest for me because I have really low pain tolerance.
I have never thought about water birth.
Where else would you go? I didn’t know there were other options.
Shared Decision Making

- What is shared decision making?
  - Collaborative healthcare approach between clinicians and patients
  - Decision Aid (DA) tools
- How does it work?
  - Combines best practices with patient values
  - Guides patients through harms and benefits of options
- Why is it important?
  - Ensures care is best suited for patient
  - Produces higher patient satisfaction
  - Builds trust between patient and provider
Decision Aids (DA): Methods

1. Developed Decision Aid (DA) tools following International Patient Decision Aid Standards (IPDAS) and decisional conflict measured with SURE test
   a. Birth Settings
   b. Pain Management Options
2. Piloted tools (n=102) between Congress (n=51) and BWHC (n=51)
3. Collected and combined data in Excel spreadsheet
4. Conducted 2-tailed tests to identify significant difference in SURE scores influenced by location, race/ethnicity, insurance plans, and history of pregnancy
Example of Pain Management SURE Test

Demographics
Age: ______________
Payment Method (circle one): Private Insurance  Medicaid  Tri-Care  Self-Pay  Other: ______________
Race and Ethnicity (circle all you identify with): Asian  Black  Hispanic/Latinx  Middle-Eastern  Native American  Pacific Islander  White  Other: ______________
Are you currently pregnant? Yes  No
If yes, what month is your due date? ______________
Have you been pregnant before? Yes  No
If yes, how many times? ______________
Have you given birth before (circle one)? Yes  No
If yes, how many times? ______________
If yes, where did you give birth (circle one)? Hospital  Home  Birth Center
If yes, have you had a cesarean delivery? Yes  No

Pre-Assessment
Please answer the following questions about your current Pain Management decision.
A. Which Pain Management option do you prefer? Please circle one.
   No Medication (Natural)  Analgesics (Epidural)  Anesthetic (IV Medications)  Unsure

B. Considering the option you prefer, please answer the following questions.

<table>
<thead>
<tr>
<th>SURE</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sure of myself</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understanding information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk-benefit ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encouragement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The SURE Test © O'Connor and Lessar, 2008
Example of Pain Management Values Section

Values
When making a decision, it is important to know what you value. Here are things to consider when making your decision:

<table>
<thead>
<tr>
<th><strong>Risks and Side Effects</strong></th>
<th><strong>Questions to Consider</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What risks am I most concerned about? What risks am I willing to take? What advantages are important to me?</td>
</tr>
<tr>
<td><strong>Effectiveness</strong></td>
<td>Is this option most effective for me?</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>Is cost a factor? What does my insurance cover?</td>
</tr>
</tbody>
</table>

Rank the importance of your values from least to greatest (1-3). 1 being more important, 3 being less important. Use each number once.

___ Risks
___ Effectiveness
___ Cost

Decision
Rank the Pain Management choices in order of how likely you will pick them (1-3). 1 being more likely, 3 being less likely. Use each number once.

___ No Medication (Natural)
___ Analgesic (Epidural)
___ Anesthetic (IV Medications)

Next steps
- Speak with your provider about questions you have
- Learn more about your options
- Start planning
DA: Results - Decisional Conflict Scores

Figure 1: Initial SURE scores of Congress and BWHC patients for both Birth Settings and Pain Management tools

Figure 2: Follow-up SURE scores of Congress and BWHC patients for both Birth Settings and Pain Management tools
DA: Results - Decisional Conflict Scores

Overall Breakdown Pre and Post SURE Scores

<table>
<thead>
<tr>
<th></th>
<th>Pre-SURE</th>
<th>Post-SURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SURE OF MYSELF</td>
<td>87</td>
<td>90</td>
</tr>
<tr>
<td>UNDERSTANDING</td>
<td>79</td>
<td>98</td>
</tr>
<tr>
<td>RISK-BENEFIT RATIO</td>
<td>84</td>
<td>97</td>
</tr>
<tr>
<td>ENCOURAGEMENT</td>
<td>98</td>
<td>97</td>
</tr>
</tbody>
</table>
DA: Results - Demographics

Figure 4: Race and Ethnicity: Congress vs BWHC

Figure 5: Age: Congress vs BWHC
DA: Results - Demographics

Insurance: Congress vs BWHC

N=102

PRIVATE: Congress 21, BWHC 32
MEDICAID: Congress 23, BWHC 13
TRI-CARE: Congress 2, BWHC 2
SELF-PAY: Congress 1, BWHC 2
OTHER: Congress 0, BWHC 2
N/A: Congress 4, BWHC 0
DA: Results - Pregnancy History
DA: Results - Values

Overall Rank of Values: Birth Settings and Pain Management

- N/A: 2
- Access to Medication: 1
- Support: 12
- Effectiveness: 7
- Cost: 6
- Risk: 29 (Birth Settings) 40 (Pain Management)

N=102
DA: Results - Patient Feedback

Overall Patient Feedback

N=78

<table>
<thead>
<tr>
<th>YES</th>
<th>SOMEWHAH</th>
<th>NO</th>
<th>N/A</th>
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<tbody>
<tr>
<td>44</td>
<td>14</td>
<td>43</td>
<td>19</td>
</tr>
<tr>
<td>32</td>
<td>7</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>19</td>
<td>7</td>
<td>18</td>
<td>19</td>
</tr>
</tbody>
</table>

- New Information?
- More Certain?
- Less Certain?
- Any Questions?
Systems Redesign
Preference Sensitive Care

Woman

TMC MWC

BWHC

Congress

Southeast Northwest
Prenatal Site and Birth Center/ Midwifery Center Birth

BWHC Births

MWC Births

Congress  BWHC  Congress  MWC
Questions and Discussion