What are Social Determinants?

Thursday, February 16
10:45 - 12:00 PM

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What are Social Determinants?
Social determinants of health & how they impact maternal and neonatal outcomes

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No conflicts of interest

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Language and positionality

• Inclusive language and the limits thereof
• Focus on individual- and community-level social determinants and needs, less on policy
• Positionality: cis-gender, heterosexual, mother, MFM, urban academic institution, researcher, multiracial Asian, Chicago
Learning objectives

1. Understand the concept of “social determinants of health” and the root causes of imbalances that affect social determinants
2. Consider how social and structural determinants influence the health of birthing people and their offspring
3. Reflect on how clinicians, health systems leaders, and researchers can generate equity-promoting solutions by addressing social determinants of health
Outline

• Rationale for understanding social determinants of health (SDoH)

• Definitions and types of SDoH

• Social ecological model: a framework to understand SDoH in the maternal-child health context

• Intervening on social needs in maternity care
Setting the stage:
Why should we think about SDoH?
MORTALITY GAP FOR U.S. MOMS

In the U.S., black women who are expecting or who are new mothers die at rates similar to those of the same women in lower-income countries, while the maternal mortality rate for white U.S. mothers more closely resembles rates in more affluent nations.

### Non-Hispanic Black Women

<table>
<thead>
<tr>
<th>Country</th>
<th>Maternal deaths per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>40</td>
</tr>
<tr>
<td>Brazil</td>
<td>44</td>
</tr>
<tr>
<td>Malaysia</td>
<td>40</td>
</tr>
<tr>
<td>Mexico</td>
<td>38</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>36</td>
</tr>
</tbody>
</table>

### Non-Hispanic White Women

<table>
<thead>
<tr>
<th>Country</th>
<th>Maternal deaths per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>12.4</td>
</tr>
<tr>
<td>New Zealand</td>
<td>11</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>9</td>
</tr>
<tr>
<td>France</td>
<td>8</td>
</tr>
<tr>
<td>Japan</td>
<td>5</td>
</tr>
</tbody>
</table>

Money Protects White Mothers and Babies. It Doesn’t Protect Black Ones.

The researchers found that maternal mortality rates were just as high among the highest-income Black women as among low-income white women. Infant mortality rates between the two groups were also similar.

The richest Black women have infant mortality rates at about the same level as the poorest white women.
## Social and Economic Factors Drive Health Outcomes

<table>
<thead>
<tr>
<th>Economic Stability</th>
<th>Neighborhood and Physical Environment</th>
<th>Education</th>
<th>Food</th>
<th>Community and Social Context</th>
<th>Health Care System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>Housing</td>
<td>Literacy</td>
<td>Food security</td>
<td>Social integration</td>
<td>Health coverage</td>
</tr>
<tr>
<td>Income</td>
<td>Transportation</td>
<td>Language</td>
<td>Access to healthy options</td>
<td>Support systems</td>
<td>Provider availability</td>
</tr>
<tr>
<td>Expenses</td>
<td>Safety</td>
<td>Early childhood education</td>
<td>Food security</td>
<td>Community engagement</td>
<td>Provider linguistic and cultural competency</td>
</tr>
<tr>
<td>Debt</td>
<td>Parks</td>
<td>Vocational training</td>
<td>Access to healthy options</td>
<td>Stress</td>
<td>Quality of care</td>
</tr>
<tr>
<td>Medical bills</td>
<td>Playgrounds</td>
<td>Higher education</td>
<td>Access to healthy options</td>
<td>Exposure to violence/trauma</td>
<td></td>
</tr>
<tr>
<td>Support</td>
<td>Walkability</td>
<td>Zip code / geography</td>
<td>Access to healthy options</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Racism and Discrimination

- Speech
- Literacy
- Literacy
- Language
- Language
- Early childhood education
- Early childhood education
- Vocational training
- Vocational training
- Higher education
- Higher education
- Food security
- Food security
- Access to healthy options
- Access to healthy options
- Social integration
- Social integration
- Support systems
- Support systems
- Community engagement
- Community engagement
- Stress
- Stress
- Exposure to violence/trauma
- Exposure to violence/trauma

### Health Outcomes
- Mortality
- Morbidity
- Life Expectancy
- Health Care Expenditures
- Health Status
- Functional Limitations

Perinatal health outcomes:
- Maternal outcomes – HDP, CS, PPH, death
- Neonatal outcomes – PTB, SGA, LGA, NICU, death
- Patient-Reported outcomes – experience with care, self-reported health, health-related quality of life
- Cost
Pregnancy as a window of opportunity

- ACCESS
- ACCEPTABILITY & MOTIVATION
- POSITIVE SPREAD
- LIFE COURSE BENEFIT
Social justice rationale

“The goal of social justice is full and equal participation of all groups in a society that is mutually shaped to meet their needs.

Social justice includes a vision of society in which the distribution of resources is equitable and all members are psychologically and physically safe and secure.”

-Bell, 2013
Defining social determinants of health: Understanding the roots of inequity
Health Equity

• Attainment of the highest level of health for all people

• Requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and social determinants of health – and to eliminate disparities in health and health care
It’s not about race…

- Stigma
- Structural policies, oppression
- Implicit bias
- Institutionalized racism
- Social instability
- Stress
- Language
- Access
- Family and community support
- Physical and built environment
- Self-efficacy and empowerment
- Knowledge and education
Healthy People definition:

“SDoH are the conditions in the environments where people are born, live, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks”
Environment affects health more than individual behaviors

Fish 1: Would Fish 1 be as happy, safe, and healthy if its water were dirty? What if its bowl were cracked and the water was leaking out?

Fish 2: No matter how much Fish 2 tries, it may never reach its full health potential due to its dirty water and cracked bowl.

SDoH...are shaped by the distribution of money, power and resources at global, national and local levels.

The social determinants of health are mostly responsible for health inequities - the unfair and avoidable differences in health status seen within and between countries.

World Health Organization
Centers for Disease Control and Prevention: SDoH Framework
SDoH Domains

- Economic stability
- Education access and quality
- Health care access and quality
- Neighborhood and built environment
- Social and community context
Domain 1: Economic stability

• GOAL: Help people earn steady incomes that allow them to meet their health needs

• RATIONALE:
  – 1 in 10 people in the US live in poverty
  – Low income prevents people from being healthy and affording the things they need to stay healthy
Domain 2: Education

• GOAL: Increase educational opportunities and help children and adolescents do well in school

• RATIONALE:
  – People with higher education are more likely to be healthier and live longer
  – Stress of poverty and low education has long-term health impacts
Domain 3: Health care

• **GOAL:** Increase access to comprehensive, high-quality health care services

• **RATIONALE:**
  – 1 in 10 people in the US don’t have health insurance
  – Many barriers exist to receipt of timely, comprehensive health care
Domain 4: Neighborhood

• GOAL: Create neighborhoods and environments that promote health and safety

• RATIONALE:
  – Many people live in neighborhoods with high rates of violence, unsafe air and/or water, or other health and safety risks
  – Minoritized and low-income people are more likely to have unsafe environments
Domain 5: Social context

• GOAL: Increase social and community support

• RATIONALE:
  – Relationships with friends, family, and community can have a major impact on health and well-being
  – Interventions to improve social and community support are critical throughout the lifespan
Root causes of disparities in SDoH
Central role of systemic racism

- Systemic racism is a root cause of power and wealth imbalances that affect SDoH
- Exposure to systemic racism is associated with chronic stress leading to morbidity, epigenetic changes
- Role of allostatic load – increased weathering caused by effort required to cope with acute and chronic life stressors
Understanding SDoH and maternal-child health through the Social Ecological Model
Social Ecological Model:
Multilevel influence and domains for intervention

- Individual
- Interpersonal
- Institutional
- Community
- Society, policy, environment
## Environmental exposures

### Table. Summary of Evidence Key Questions 1 Through 6

<table>
<thead>
<tr>
<th>Exposure and outcome</th>
<th>Studies finding an association, No./Total No.</th>
<th>Births/study, mean (SD)</th>
<th>Total births in millions</th>
<th>Increased risk, median (range), %&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Studies finding racial disparity, No./total No.</th>
<th>Notable findings&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air pollution</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preterm birth</td>
<td>19/24</td>
<td>318 960 (393 272)</td>
<td>7.3</td>
<td>11.5 (2.0-19.0)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>10/19</td>
<td>Preterm birth risk increased 52% for asthmatic mothers</td>
</tr>
<tr>
<td>Low birth weight</td>
<td>25/29</td>
<td>661 205 (878 074)</td>
<td>18.5</td>
<td>10.8 (2.0-36.0)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>13/25</td>
<td>Low birth weight risk increased 3% for each 5-km proximity to a solid waste plant</td>
</tr>
<tr>
<td>Stillbirth</td>
<td>4/5</td>
<td>1 020 975 (1 176 174)</td>
<td>5.1</td>
<td>14.5 (6.0-23.0)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1/4</td>
<td>Stillbirth risk increased 42% with high third-trimester exposure</td>
</tr>
<tr>
<td><strong>Heat</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Preterm birth</td>
<td>4/5</td>
<td>192 625 (207 995)</td>
<td>0.8</td>
<td>15.8 (9.0-22.0)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>2/4</td>
<td>Preterm birth risk increased 11.6% per 5.6 °C increase</td>
</tr>
<tr>
<td>Low birth weight</td>
<td>3/3</td>
<td>902 277 (985 803)</td>
<td>2.7</td>
<td>31.0 (13.0-49.0)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1/3</td>
<td>Term birth weight decreased 16 g per IQR temperature increase</td>
</tr>
<tr>
<td>Stillbirth</td>
<td>2/2</td>
<td>115 943 (115 933)</td>
<td>0.2</td>
<td>NA&lt;sup&gt;e&lt;/sup&gt;</td>
<td>2/2</td>
<td>Stillbirth risk increased 6% per 1 °C increase the week before delivery during the warm season</td>
</tr>
</tbody>
</table>

Abbreviations: IQR, interquartile range; NA, not applicable.

<sup>a</sup> Risk presented as range from significant studies. The median is calculated from the range; a pooled analysis was not performed. For consistency, the whole pregnancy exposure was presented where possible.

<sup>b</sup> Single study unless specified.

<sup>c</sup> For whole pregnancy PM<sub>2.5</sub> exposure.

<sup>d</sup> For whole pregnancy heat exposure.

<sup>e</sup> The only 2 studies on heat and stillbirth did not provide comparable outcomes that could be combined into a range with a median.
## Maternal mortality & abortion legislation

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>95% CI</th>
<th>(p)†</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary outcome</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>All-cause mortality rate in reproductive-aged females (per 100,000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supportive states</td>
<td>-6.70</td>
<td>-15.65 to 2.24</td>
<td>.256</td>
</tr>
<tr>
<td>Moderate states</td>
<td>0.59</td>
<td>-6.31 to 7.50</td>
<td></td>
</tr>
<tr>
<td><strong>Secondary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal mortality rate (per 100,000 live births)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supportive states</td>
<td>-2.51</td>
<td>-6.75 to 1.72</td>
<td>.021†</td>
</tr>
<tr>
<td>Moderate states</td>
<td>-5.79</td>
<td>-9.88 to -1.70</td>
<td></td>
</tr>
<tr>
<td>Infant mortality rate (per 1,000 live births)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supportive states</td>
<td>-1.10</td>
<td>-1.56 to -0.64</td>
<td>&lt;.001‡</td>
</tr>
<tr>
<td>Moderate states</td>
<td>-0.56</td>
<td>-1.09 to -0.04</td>
<td></td>
</tr>
<tr>
<td>Fetal mortality rate (per 1,000 births)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supportive states</td>
<td>-0.64</td>
<td>-1.41 to 0.13</td>
<td>.019‡</td>
</tr>
<tr>
<td>Moderate states</td>
<td>-0.69</td>
<td>-1.18 to -0.20</td>
<td></td>
</tr>
</tbody>
</table>

* Restrictive states is the reference group.
† The \(P\)-value presented is a type 3 \(P\)-value, which tests the null hypothesis that all levels of a categorical predictor have the same effect on the outcome as the reference category, conditional on the other covariates in the model, that is, year and percentage of the population in poor health.
‡ Remained significant after Benjamini-Hochberg correction to control false discovery rate at \(q=0.05\).
## Maternal mortality & abortion legislation

<table>
<thead>
<tr>
<th>Law Description</th>
<th>Estimate</th>
<th>95% CI</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of laws</td>
<td>1.09</td>
<td>0.36–1.82</td>
<td>.003*</td>
</tr>
<tr>
<td>Trigger law (bans abortion on overturn of <em>Roe v Wade</em>)</td>
<td>5.69</td>
<td>2.38–9.01</td>
<td>.001*</td>
</tr>
<tr>
<td>Prohibition of abortion after a certain gestational age</td>
<td>3.13</td>
<td>0.22–6.04</td>
<td>.04</td>
</tr>
<tr>
<td>Laws that require certain types of counseling</td>
<td>4.52</td>
<td>0.55–8.50</td>
<td>.026*</td>
</tr>
<tr>
<td>Laws requiring in-person counseling or consent or both</td>
<td>3.88</td>
<td>0.47–7.29</td>
<td>.026* .021†</td>
</tr>
<tr>
<td>Laws that require an ultrasonogram before abortion procedure</td>
<td>1.80</td>
<td>−3.13 to 6.74</td>
<td>.47</td>
</tr>
<tr>
<td>Laws that prohibit insurance coverage of abortion</td>
<td>2.50</td>
<td>−0.72 to 5.73</td>
<td>.128 .001†</td>
</tr>
<tr>
<td>Laws that prohibit Medicaid coverage of abortion</td>
<td>1.13</td>
<td>−2.55 to 4.81</td>
<td>.546</td>
</tr>
<tr>
<td>Laws that limit access to medication abortion</td>
<td>5.29</td>
<td>1.01–9.57</td>
<td>.015*</td>
</tr>
<tr>
<td>Laws that require parental consent for abortions in those younger than 18 y</td>
<td>−0.12</td>
<td>−3.73 to 3.50</td>
<td>.950 .019†</td>
</tr>
<tr>
<td>TRAP laws</td>
<td>5.09</td>
<td>1.76–8.43</td>
<td>.003*</td>
</tr>
</tbody>
</table>

TRAP, Targeted Regulation of Abortion Providers.

* Remained significant after Benjamini-Hochberg correction to control false discovery rate at \( q=0.05 \).

† Remained significant after Benjamini-Hochberg correction to control false discovery rate at \( q=0.05 \).
Community segregation

• Among NHB birthing individuals in Chicago, high levels of racial segregation were associated with higher odds of spontaneous preterm birth

• Role of potential environmental factors – environmental toxins, access, chronic stress prior to and during pregnancy as a potential mechanism
Access to grocery stores and fast food

- Neighborhood characteristics are influential

- Residence in high fast-food density neighborhoods was associated with increased odds of GDM in the greater Houston area

**FIGURE 1**
Geographical distribution of gestational diabetes mellitus (GDM) prevalence and fast food restaurant density within Harris County, Texas

A. GDM prevalence and B. fast food restaurant density (per 100,000 inhabitants) in different ZIP code areas of Harris County, Texas, assembled by ArcGIS 10.3 Desktop Advanced (Erie, Redlands, CA).

Community
Community-level food insecurity & T1D/T2D control

• Columbus, Ohio – retrospective cohort study of pregnant individuals with T1D or T2D
• Compared individuals living in food-secure vs. food-insecure communities
• Food-insecure = low access AND low income per USDA

| Association between community level food insecurity and glycemic control among pregnant individuals with pregestational diabetes. |
|---|---|---|---|
| Community level food insecurity | Yes n (%) or mean (SD) | No n (%) or mean (SD) | Unadjusted analysis | Adjusted analysis |
| Early pregnancy | | | | |
| A1c < 6.0 % | 12/75 (16.0) | 100/343 (29.2) | 0.55 (0.32–0.95) | 0.55 (0.33–0.92) |
| Late pregnancy | | | | |
| A1c < 6.0 % | 28/71 (39.4) | 145/305 (47.5) | 0.83 (0.61–1.13) | 0.90 (0.67–1.20) |
| Longitudinal analysis | | | | |
| Decrease in A1c of ≥ 2 % | 25/71 (35.2) | 65/305 (21.3) | 1.65 (1.13–2.42) | 1.55 (1.06–2.28) |
| Mean change in A1c | 1.46 (1.65) | 1.00 (1.51) | 0.46 (0.06–0.86) | 0.47 (0.06–0.87) |

Venkatesh, Primary Care Diabetes 2022
Multidimensionality of food access

- Cost of healthy food
- Temporality of food access
- Sharing or giving up food for others (children)
- Quality of nutrient sources

“I love vegetables…and yet again looking at the budget and what we have, either I get that stalk of celery or I could get those four boxes of pasta that I could have dinner for a couple more days, instead of that one snack.”

Yee, JHCPU 2015; Gomez, AJP 2021
Inaccessibility of community resources

- Limited accessibility of community resources for healthy pregnancy support
- Culturally mismatched resources
- Unwelcoming community environments
- Desire for faith-based resources

“We have farmers markets offered through the health department but they’re only offered during certain seasons and they only have it like one day. So if you’re not able to go that one day you’re just screwed.”

“I mean those groups, they would ideally help women to get resources but, but the group of people that go there is a very intimidating group and turns a lot of people off.”
Institutional
Institutional quality

• Themes distinguishing high- vs. low-performing hospitals:
  – Senior leadership involvement in quality activities
  – Strong focus on standards and standardized care
  – Strong nurse-physician communication and teamwork
  – Adequate physician and nurse staffing and supervision
  – Sharing of performance data
  – Explicit awareness that racial and ethnic disparities exist and that racism can lead to differential treatment
Challenges to postpartum healthcare

- Environment:
  - Transportation challenges
  - Limited childcare
  - Housing instability

- Access:
  - Lack of access to a primary care provider
  - Insurance limitations

- Institutional:
  - Lack of continuity
  - Appointment scheduling difficulties

- Interpersonal:
  - Language barrier
  - Focus on the pregnancy, not the patient

- Individual:
  - Low health literacy
  - Mood issues
  - Limited family support

- Providers:
  - Non-clinical task burden
  - Short appointment length
  - Training gaps

- Patients:
  - Inability to place referrals in the system
  - Concern for patient autonomy

Ruderman, Women’s Health issues 2021
Challenges to postpartum healthcare
Barriers to postpartum OGTT and primary care

**Patient**
- Public insurance
- Less education
- Exposure to racism
- Lower health literacy
- Greater anxiety about T2DM
- Attendance at postpartum visit

**Clinician**
- Limited knowledge about T2DM
- Remote from training
- Failure to order OGTT
- Failure to follow-up results

**System**
- Inadequate Medicaid coverage
- Copay costs for OGTT visits
- Appointment complexity
- Inadequate parental leave
- Fragmented healthcare systems
- Disconnected EMR

Martinez, AJOG 2017
Battarbee, AJP 2018
Society, policy, environment
Community
Institutional
Interpersonal
Individual

Interpersonal
Social instability

“The only thing that’s helping me is getting a [Food Stamp Program] card, but sometimes that doesn’t even help since I’m living [with family] and I don’t really have money for myself. ‘Cause I’m helping get food for everybody else…I have my WIC, I’m not eating anything out of it…I have nothing for myself.”

“I live in a rough neighborhood…the whole anxiety, it’s kind of like it’s even more…like there’s shootings all the time…”

- Social chaos
- Lack of social support
- Unpartnered status
- Violence – neighborhood and interpersonal
- Financial instability
- Late or fragmented care
- Inconsistent schedule

Yee, JHCPU 2015; Colicchia, Obstet Gynecol 2016
Discrimination & implicit bias

• Attitudes or stereotypes that affect our understanding, actions, and decisions in an unconscious manner and cause us to have attitudes about other people based on personal characteristics

• Pervasive, subconscious, & activated involuntarily

• Particularly important in environments prone to cognitive overload or high stress – like L&D – where reliance on automatic processes are more frequently used
Society, policy, environment
Community
Institutional
Interpersonal
Individual

Individual
Health literacy

The degree to which individuals can obtain, process, and understand the basic health information and services they need to make appropriate health decisions
Inadequate health literacy is linked to...

- Lower use of PREVENTIVE CARE
- Less adherence to TREATMENT
- More HOSPITAL STAYS
- Higher MORTALITY RATES
Pregnancy care requires high health literacy

- Low HL is associated with differences in:
  - Cesarean delivery
  - Major perineal laceration
  - Small-for-gestational-age status
  - Low birthweight
  - 5-minute Apgar score <4
- Differences in literacy contribute to perinatal health disparities

“It’s [reading labels] difficult for me....’cause I’m not good at math. And then I just be like, oh my god this is so complicated...I just ignore it.”

Yee, JAMA Network Open 2021
Yee, JHCPU 2015
Opportunities for intervention on SDoH
Multi-sectoral collaborations to improve perinatal health: It’s more than just about health care
Multilevel opportunities for intervention

Society, policy, environment
Community
Institutional
Interpersonal
Individual

MACRO to MICRO
Society, policy, environment
Maternal cash transfers

Mommibus
Baby's First Years publishes first findings:
Monthly cash support to families impacts infant brain activity

Our new study shows that an anti-poverty intervention had a direct impact on children’s brain development. After one year, infants of mothers in low-income households receiving $333 in monthly cash support were more likely to show faster brain activity, in a pattern associated with learning and development at later ages. Read more here.

Baby's First Years is a pathbreaking study of the causal impact of monthly, unconditional cash gifts to low-income mothers and their children in the first four years of the child’s life. The gifts are funded through charitable foundations. The study will identify whether reducing poverty can affect early childhood development and the family processes that support children’s development.
Cash Aid to Poor Mothers Increases Brain Activity in Babies, Study Finds

The research could have policy implications as President Biden pushes to revive his proposal to expand the child tax credit.

Can giving parents cash help with babies’ brain development?

A new study suggests that regular cash payments to parents can speed up brain activity in infants.

By Dylan Matthews | dylan@ vox.com | Updated Jan 27, 2022, 3:52pm EST

WASHINGTON — A study that provided poor mothers with cash stipends for the first year of their children’s lives appears to have changed the babies’ brain activity in ways associated with stronger cognitive abilities. Follow-up could help link the effects to longer-term outcomes.
Black Maternal Health Momnibus Act of 2021

1. Make critical investments in **social determinants of health** that influence maternal health outcomes, like housing, transportation, and nutrition.

2. Provide funding to **community-based organizations** that are working to improve maternal health outcomes and promote equity.

3. Comprehensively study the unique maternal health risks facing **pregnant and postpartum veterans** and support VA maternity care coordination programs.

4. Grow and diversify the **perinatal workforce** to ensure that every mom in America receives culturally congruent maternity care and support.

5. Improve **data collection processes and quality measures** to better understand the causes of the maternal health crisis in the United States and inform solutions to address it.

6. Support moms with **maternal mental health** conditions and substance use disorders.

7. Improve maternal health care and support for **incarcerated moms**.

8. Invest in **digital tools** like telehealth to improve maternal health outcomes in underserved areas.

9. Promote **innovative payment models** to incentivize high-quality maternity care and non-clinical perinatal support.

10. Invest in federal programs to address the unique risks for and effects of **COVID-19 during and after pregnancy** and to advance respectful maternity care in future public health emergencies.

11. Invest in community-based initiatives to reduce levels of and exposure to **climate change-related risks for moms and babies**.

12. Promote **maternal vaccinations** to protect the health and safety of moms and babies.
COMMUNITY

Food programming

Community-wide initiatives
EatSF: Vouchers for Veggies

- Multi-organization partnership to enroll low-income Latinx and Black pregnant people into fruit and vegetable voucher program
- $40 each month in vouchers redeemable for fruits and vegetables, plus standard WIC package
- Pre-post analysis:
  - Improvement in food security
  - Improvement in daily intake of produce
- Goal: improve access to healthy food, improving health, and reduce preterm birth rates

https://eatsfvoucher.org/our-programs/nutrition-for-pregnant-people/

Ridberg, Journal of Hunger and Env Nutrition 2021
Cradle Cincinnati

• Collaborative effort to reduce infant mortality in Hamilton County, OH
• Success at reducing preterm birth and neonatal mortality through community and healthcare partnerships
• Core principles:
  • Extensive partnership
  • Focus energy on equity
  • Co-creating solutions with families
  • Systems improvement
  • Constant communication
  • Growing knowledge

1A Replicate one neighborhood’s success at eliminating extreme preterm birth.
Learn More

1B Address implicit bias, starting in prenatal care settings.
Learn More

1C Mitigate stress during pregnancy through social support.
Learn More

1D Increase the % of pregnancies that are expected and have healthy timing.
Learn More

1E Decrease the % of women smoking during the second and third trimester of their pregnancies.
Learn More

https://dev.cradlecincinnati.org/
Society, policy, environment
Community
Institutional
Interpersonal
Individual

Institutional
INSTITUTIONAL

- Equity-focused SDoH bundles
- Tailored prenatal care & social needs screening
Patient safety bundles: Attending to SDoH in every patient, every time

“...A structured way of improving the process of care and patient outcomes:

A small, straightforward set of evidence-based practices...that, when performed collectively and reliably, have been proven to improve patient outcomes. The bundle...offers a standardized approach for delivering well-established, evidence-based practice to be implemented with complete consistency, for every patient, every time – resulting in improved patient outcomes”

-Institute for Healthcare Improvement
To address the immediate postpartum period, specifically hospital discharge to outpatient obstetrical care, ongoing specialist care, and community supports and services.

While ideally all elements of a patient safety bundle would be implemented in all relevant settings, this may be aspirational for some settings based on capacity and resources. For this reason, elements that are considered foundational to addressing morbidity and mortality in the postpartum period are **bolded** below.

**SDoH focus in bundles**

- **Trauma-informed protocols**
- **Develop referral resources and communication pathways with community-based organizations**
- **Screen for social needs and provide resources**
- **Align templates, resources and referrals with patient’s literacy, language, cultural needs, geographic location, access**
MiPATH: Michigan Plan for Appropriate Tailored Healthcare in pregnancy

- Tailored prenatal care care – group/individual, timing and frequency of visits
- Incorporation of telemedicine
- Standardized assessment for medical, social, and structural determinants of health in routine care delivery
- Ample medical and social resources
INTERPERSONAL

Patient navigation

Preterm birth prevention intervention
Patient navigation

Patient-centered intervention that uses trained personnel to facilitate complete and timely access to health services
Goals of patient navigation

- Identify patient-level barriers to health care access
- Improve timeliness of care
- Provide health education
- Facilitate shared decision making
- Offer social support & resources

McKenney, AJOG 2018; Yee, AJOG 2021
IMPaCT intervention

**Recruitment**
N=30
Inclusion criteria:
- Self-identified non-Hispanic Black race/ethnicity
- Singleton gestation
- Prior preterm birth due to:
  - Preterm labor
  - PPROM
  - Preeclampsia
- Documented preterm birth prevention plan
Exclusion criteria:
- Multiple gestation
- >20 weeks gestation
- non-English speaking

**Intake** (12-20 weeks)
- Consent
- Randomization

**Preterm Birth Prevention Education Videos** (access at randomization)
- All intervention participants: Lifestyle modifications
- Based on preterm birth prevention recommendations:
  - Serial cervical length/cerclage
  - Supplemental progesterone
  - Low-dose aspirin

**Employment Toolkit**
(available at randomization)
- Employment Law Infographic:
  - Summary of protections from:
    - Family Medical Leave Act
    - Affordable Care Act
    - Pregnancy Discrimination Act
- Limitations of federal protections
- Free legal aid resource information
- Employer letter

**Encouragement Text Messages**
(weekly)
Example text message:
"You’ve gotta go a great distance with your program of care. The nurse line is open Mon-Fri, 8 am – noon and 1 pm – 4 pm at [phone number]. After hours call [phone number]."

**Active Control**
Clinical Staff Introductory Video (access at randomization)
Information-only Text Messages (weekly) Example Text message: “The nurse line is open Mon-Fri, 8 am – noon and 1 pm – 4 pm at [phone number]. After hours call [phone number]."

**FIG. 1.** Participants’ flow through the IMPaCT intervention randomized controlled trial. IMPaCT, IMProving the Clinical encounter To enhance delivery of an Individualized Prematurity Prevention Plan intervention.
IMPaCT intervention

**FIG. 1.** Participants’ flow through the IMPaCT intervention randomized controlled trial. IMPaCT, IMProving the Clinical encounter To enhance delivery of an Individualized Prematurity Prevention Plan.
Individual
INDIVIDUAL

Preeclampsia warning signs visual aid

mHealth application for diabetes
Visual aids for preeclampsia awareness

• 120 pregnant people randomized to receive a standard pamphlet, no information, or new tool

• Better understanding of preeclampsia with new visual aid

• No differences in knowledge improvement by HL status
SweetMama: mHealth tool to address social determinants of diabetes-related perinatal health

- Promotes diabetes literacy and numeracy
- Connects to community-based food, exercise, and social support resources
- Motivational and goal-setting exercises
- Appointment tracking, reminders, and logistical support
- Culturally-relevant
Summary of evidence on SDoH interventions

• Most social needs interventions address violence, social support, food insecurity, and housing

• Interventions with BOTH screening and ongoing services appear to have better outcomes

• Clinically-embedded interventions may be successful at improving perinatal outcomes, but more rigorous studies are needed
Final thoughts on SDoH assessment & interventions
1. Universal, standardized SDoH assessment
2. Aim for solution-based design & design justice

- Target unique processes of obstetric care
- Function despite limitations of health system
- Establish clear and measurable SDoH goals
- Center maternal and family experience
- Center the margins
3. Goal = Equitable implementation

Occurs when strong equity components—including explicit attention to the culture, history, values, and needs of the community—are integrated into the principles and tools of implementation science.

(DuMont, Metz, Woo 2019)
4. Evaluate SDoH interventions

- Systematic and empirical investigations of the effects of a SDoH intervention are a must.
- Intervention evaluation types vary by intervention:
  - Traditional experimental (RCT) and quasi-experimental (difference-in-difference, interrupted time series) research designs
  - Plan-Do-Study-Act cycles
  - Process evaluations and process mapping
  - Qualitative evaluations with stakeholders
Gaps in addressing SDoH in maternal-child care

- Data collection is inadequate
- Most SDoH interventions are individual level
- Biomedical interventions rarely consider social needs
- Innovative care delivery models are needed
- Community engagement often overlooked
- Implementation science remains nascent