Compared to What?
Discerning Healthy Start Impact on Birth Outcomes using Propensity Score Matching Methods

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Overview of Presentation

1. Introduce the MomsFirst home visiting program
2. Estimating causal effects in the absence of RCT
3. Use of propensity score analysis to estimate the relationship between program receipt and:
   a. Low birth weight (LBW)
      Defined as <2500 grams
   b. Prematurity
      Defined as <37 weeks gestation
Racial disparity in Ohio (2014):
Black rate: 14.3  } Black babies 2.7 times more likely to die than white babies.
White rate: 5.3* } *The MomsFirst IMR for 2010-2015 matches the White rate for the state of Ohio at 5.3

8 Case Managers and 36 Community Health Workers Provided MomsFirst services to 1,823 Participants and Their Families
397 Teen Participants
123 Incarcerated Participants
766 New Participants
695 Births to Program Participants

15,416 Home Visits Completed
9,863 Medical Appointments Attended
1,738 Depression Screenings Administered
1,525 Reproductive Life Plans Completed
1,461 Intimate Partner Violence Screenings Completed
134 Referrals to Job Training

Infant Mortality Rate:
MomsFirst: 8.6
City of Cleveland: 15.6* (*preliminary)

“This program has given me hope to know there are people who can help and who care”
— MomsFirst participant

“Now that my baby is here, I feel I am prepared and knowledgeable to care for him without too many worries”
— MomsFirst participant

“This program is a help for moms like myself that try to do the best we can”
— MomsFirst participant
Estimating the Counterfactual

Receives the Treatment

Does not receive Treatment

?
Determining Program Effect

The result of pre-existing group differences
Sources of Data

**Raw data file:** MomsFirst program records

- **Geocode & Standardize**

**CHILD System** → Match MomsFirst records to CHILD System → Dataset that contains MomsFirst data linked at the individual child level to birth certificates
Timeframe for Analysis

MomsFirst program data (N=4,227)

Birth certificates (N=27,810)

2007  2008  2009  2010  2011  2012
MomsFirst Dosage

![MomsFirst Dosage Chart]

# of Participants

# of Visits Received
Comparison: Demographic/Social Risk Factors

- **First time mom**: MomsFirst Participant - 38.0%, Non-Participant - 29.0%
- **Father's info NOT on birth cert**: MomsFirst Participant - 64.0%, Non-Participant - 40.0%
- **Medicaid birth**: MomsFirst Participant - 89.2%, Non-Participant - 67.9%
- **WIC recipient**: MomsFirst Participant - 89.0%, Non-Participant - 67.3%
- **< HS education**: MomsFirst Participant - 48.0%, Non-Participant - 29.0%
- **Un-married**: MomsFirst Participant - 93.0%, Non-Participant - 72.0%
- **African American**: MomsFirst Participant - 83.1%, Non-Participant - 55.9%
- **Teen mom**: MomsFirst Participant - 21.6%, Non-Participant - 8.1%
Comparison: Medical Risk Factors

- Pregnant w/ twins: MomsFirst Participant - 3.6%, Non-Participant - 3.5%
- Inadequate prenatal care: MomsFirst Participant - 40.6%, Non-Participant - 36.1%
- Previous preterm infant: MomsFirst Participant - 5.0%, Non-Participant - 5.5%
- Previous cesarean: MomsFirst Participant - 11.5%, Non-Participant - 14.3%
- Gestational diabetes: MomsFirst Participant - 3.4%, Non-Participant - 5.3%
- Chronic hypertension: MomsFirst Participant - 3.4%, Non-Participant - 3.5%
- Pregnancy induced hypertension: MomsFirst Participant - 7.1%, Non-Participant - 6.5%
- Tobacco use: MomsFirst Participant - 17.9%, Non-Participant - 18.0%
Birth Outcomes

African American Women

- LBW: MomsFirst Participant - 13.3%, Non-Participant - 16.9%
- Premature: MomsFirst Participant - 14.1%, Non-Participant - 17.7%

White Women

- LBW: MomsFirst Participant - 7.7%, Non-Participant - 9.5%
- Premature: MomsFirst Participant - 10.7%, Non-Participant - 11.1%
Calculating a Propensity Score: Selecting covariates

- Variables used to estimate PS included:
  - Demographics – Age, Race, Marital status, Education, First time parent
  - SES – WIC, Medicaid receipt
  - Medical risk factors – hypertension, previous preterm small infant, previous cesarean

- Nearest neighbor match with replacement using teffects psmatch in Stata
Calculating a Propensity Score: Exploring overlap

- Regressed propensity to receive MomsFirst on covariates using logistic model
- 93.2% of treatment participants matched (6.8% didn’t match b/c of missing data)
Calculating a Propensity Score: Assess balance

- Prior to PS match:
  - 10 covariates significantly different between treatment and control
- After PS match:
  - 0 covariates significantly different between treatment and control
Results: Low Birth Weight

Total Sample
• MomsFirst participants are 1.025 times more likely to deliver a healthy birth weight baby, p<.001

African American Only
• MomsFirst participants are 1.027 times more likely to deliver a healthy birth weight baby, p<.001

For every 40 women served by MomsFirst, 1 more baby is born at healthy birth weight. In 2015, 695 babies were born to participating women. Had these women not received MomsFirst, 17 additional babies would have been born at low birth weight.
Results: Prematurity

**Total Sample**
- MomsFirst participants are 1.015 times more likely to delivery a full term baby, \( p = .033 \)

**African American Only**
- MomsFirst participants are 1.019 times more likely to delivery a full term baby, \( p = .014 \)

For every 66 women served by MomsFirst, 1 more baby is born at full term. In 2015, 695 babies were born to participating women. Had these women not received MomsFirst, 10 additional babies would have been premature.
Conclusions

1. The effect of MomsFirst is statistically significant, but modest in size.
   a. Women who participate in MomsFirst have statistically significantly better birth outcomes than they would have had, had they not participated.

2. The effect is larger for African American participants.
Next Steps

• Estimate program effect on infant mortality
• Follow-up subgroup analyses
  – High dose recipients
  – First-time mothers
• Further refine propensity score analysis
  – Including additional data from CHILD System
  – Exploring alternative matching techniques
Thank you!

Questions?