

# **Associations between Pregnancy Intention and Maternal and Offspring Health: A 2012-2015 South Carolina PRAMS Propensity Scores Analysis**

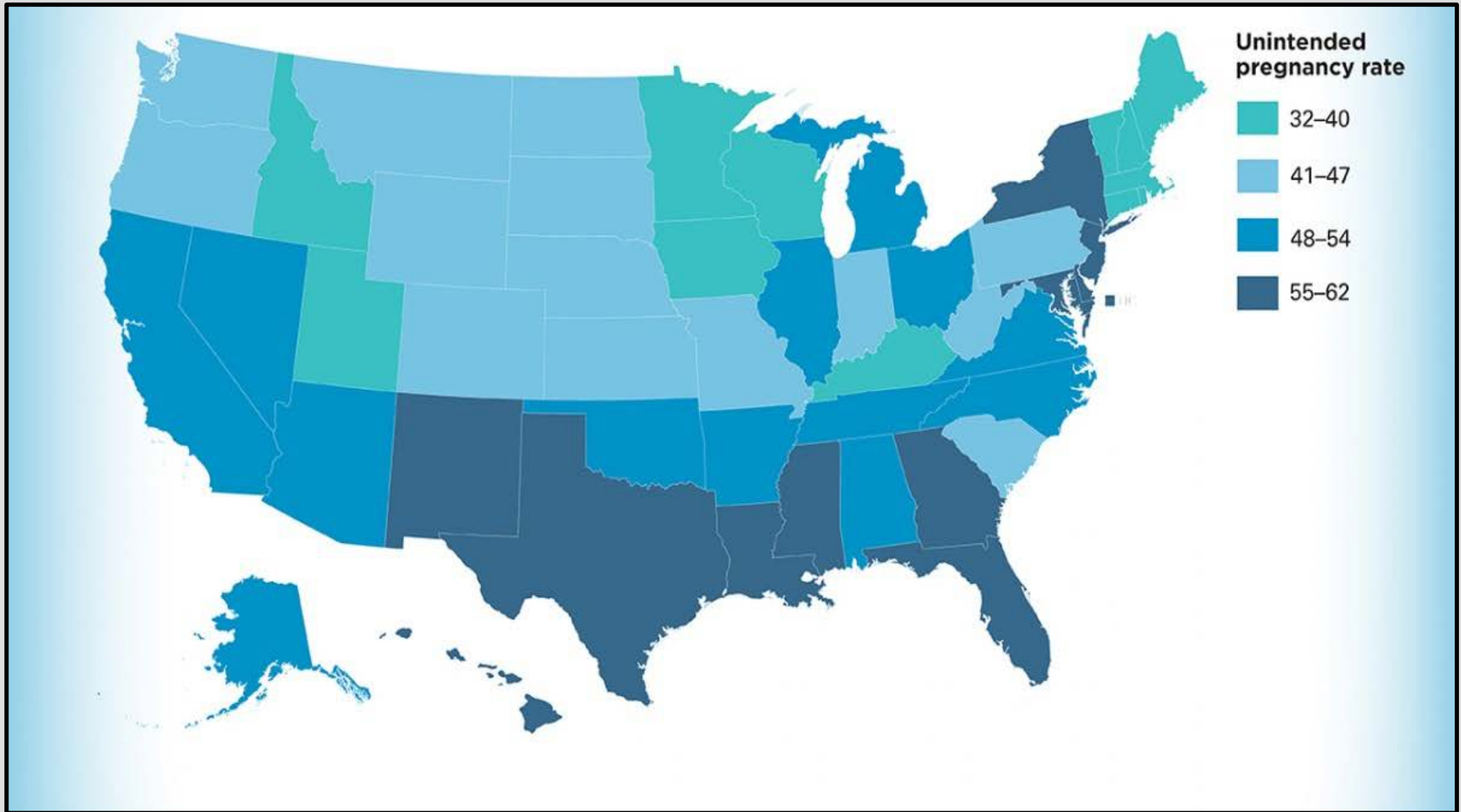
**Presenter: Danielle Stevens**

**Date: February 4, 2019**

- I. Background
- II. Objective
- III. Methods
  - i. Study Design & Population
  - ii. Statistical Analyses
- IV. Results
- V. Conclusions



# Outline



## FACT SHEET

# Unintended Pregnancy in the United States



On average, U.S. women want to have two children. To accomplish that goal, a woman will spend close to three years pregnant, postpartum or attempting to become pregnant, and about three decades—more than three-quarters of her reproductive life—trying to avoid pregnancy.

### Defining pregnancy desires

Although researchers have been measuring unintended pregnancy for decades, the conventional approach to categorizing recalled pregnancy desires does not capture the complexities of women's and couples' desires, their experiences prior to pregnancy or the context in which a pregnancy occurs. As a result, sources of data available to characterize pregnancy desires and experiences are limited. The Guttmacher Institute is aware of these limitations, and our experts are working to address them in our work. The findings included in this fact sheet are the most current available.

An unintended pregnancy is one that

then or sooner. It is important to note that women defined as having an "intended" pregnancy have not necessarily expressed an intention or plan to become pregnant.

### Pregnancy incidence

- In 2011, there were 98 pregnancies for every 1,000 women aged 15–44 in the United States.
- In 2011, there were 45 unintended pregnancies for every 1,000 women aged 15–44 in the United States. In other words, nearly 5% of reproductive-age women have an unintended pregnancy each year.
- The unintended pregnancy rate is significantly higher in the United States than in many other developed countries.
- In 2011, nearly half (45%, or 2.8 million) of the 6.1 million pregnancies in the United States were unintended. Specifically, 27% of all pregnancies were "wanted later" and 18% of preg-

women of color. Rates tend to be lowest among higher-income women (at or above 200% of poverty), white women, college graduates and married women.

- The rate of unintended pregnancy among women with incomes less than 100% of the poverty was 112 per 1,000 in 2011, more than five times the rate among women with incomes of at least 200% of poverty (20 per 1,000 women).
- The proportion of pregnancies that are unintended generally decreases with age. The highest unintended pregnancy rate in 2011 was among women aged 20–24 (81 per 1,000 women). However, traditional estimates understate the risk of unintended pregnancy among adolescents because these estimates typically include all women, whether or not they are sexually active. When rates are recalculated including only those sexually active, women aged 15–19 have the highest unintended pregnancy rate of any age-group.

## Family Planning

- Overview
- Objectives
- Interventions & Resources
- National Snapshots

### Goal

Improve pregnancy planning and spacing, and prevent unintended pregnancy.

### Overview

Family planning is one of the 10 great public health achievements of the 20th century.<sup>1</sup> The availability of family planning services allows individuals to achieve desired birth spacing and family size, and contributes to improved health outcomes for infants, children, women, and families.<sup>1, 2, 3</sup>

Family planning services include:<sup>4, 5, 6</sup>



View HP2020 Data for:  
Family Planning

## Reproductive Health

### Reproductive Health

- About Us +
- Data and Statistics +
- Emergency Preparedness and Response +
- Maternal and Child Health Epidemiology Program +
- Pregnancy Risk Assessment Monitoring System
- Infertility +
- Assisted Reproductive Technology (ART)
- Depression Among Women +

## Unintended Pregnancy Prevention

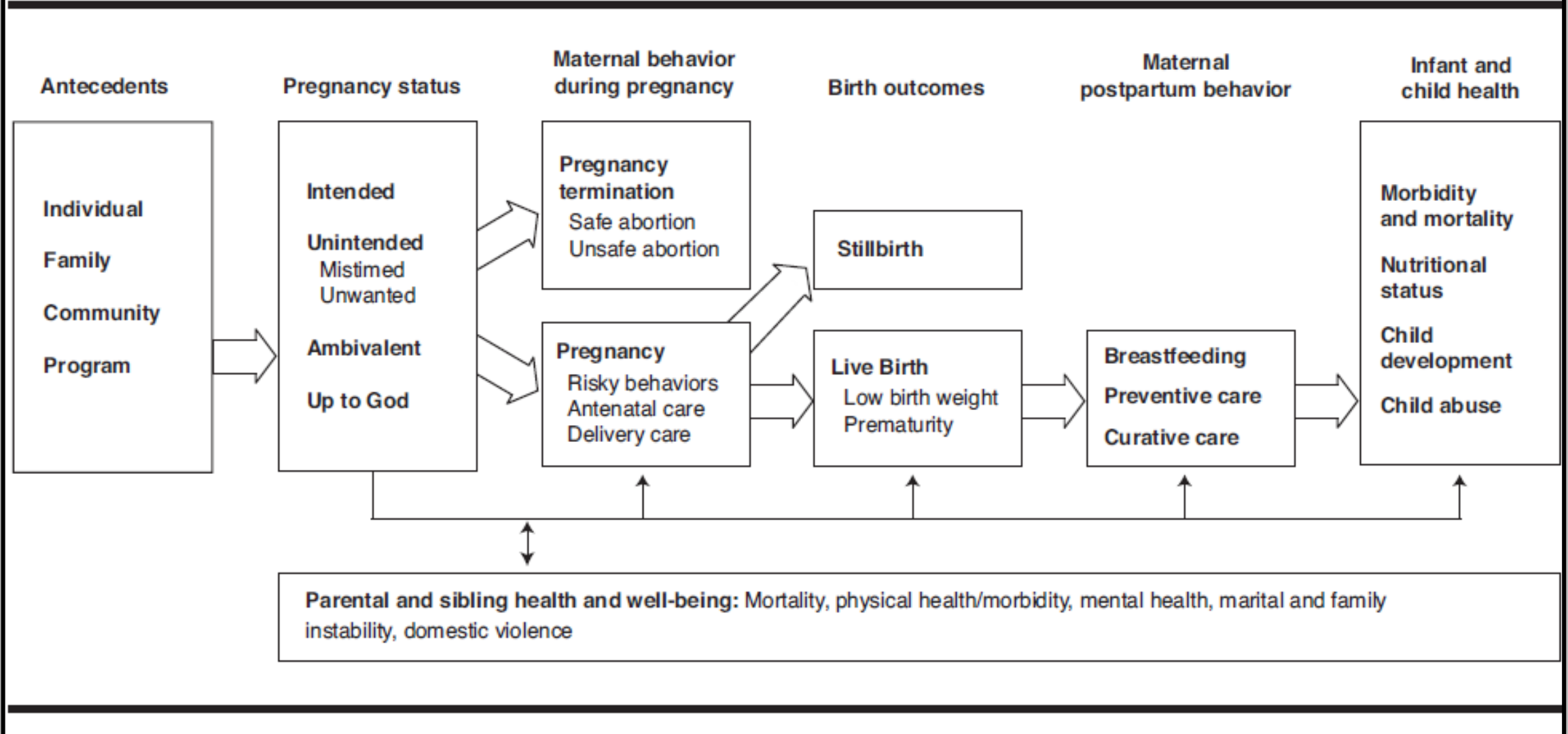
An unintended pregnancy is a pregnancy that is reported to have been either unwanted (that is, the pregnancy occurred when no children, or no more children, were desired) or mistimed (that is, the pregnancy occurred earlier than desired). Unintended pregnancy is a core concept that is used to better understand the fertility of populations and the unmet need for contraception (birth control) and family planning. Unintended pregnancy mainly results from not using contraception, or inconsistent or incorrect use of effective contraceptive methods.

Unintended pregnancy is associated with an increased risk of problems for the mom and baby. If a pregnancy is not planned before conception, a woman may not be in optimal health for childbearing. For example, women with an unintended pregnancy could delay prenatal care that may affect the health of the baby. Therefore, it is important for all women of reproductive age to adopt healthy behaviors such as—

- Taking [folic acid](#).
- Maintaining a [healthy diet and weight](#).
- Being [physically active regularly](#).
- [Quitting tobacco use](#).
- Abstaining from [alcohol](#) and [drugs](#).
- Talking to your health care provider about [screening and proper management of chronic diseases](#).



**Figure 1** Potential effects of unintended pregnancy on infant, child, and parental health outcomes



**Aim: Examine the association between pregnancy intention and maternal and infant health and behaviors using the South Carolina (SC) Pregnancy Risk Assessment Monitoring (PRAMS) data from 2012-2015**

**Hypothesis: After controlling for confounding, we will see no significant differences in maternal and infant health behaviors between unintended versus intended pregnancies**

# Study Design & Population

- Study Design: Cross-sectional
- Study Population: SC singleton births 2012-2015
- Study Sample: SC PRAMS VII (2012-2015)
  - Multi-mode survey with tiered sampling frame
  - 229,609 SC births → 6,846 sampled to participate → 3,029 (weighted n = 201,742) singleton births
  - Exclusions: BMI <18.5 kg/m<sup>2</sup> or BMI ≥60 kg/m<sup>2</sup> pre-pregnancy (n=131)

# Statistical Analyses

- Logistic & linear regression for unintended versus intended pregnancy predicting maternal and child health and behavioral outcomes
  - Model 1: Unadjusted
  - Model 2: Adjusted for maternal sociodemographics (age, race, education, on Medicaid, income)
  - Model 3: Adjusted for maternal sociodemographics and behaviors (birth control use, exercise, prenatal vitamin use, smoking, alcohol consumption)
  - Model 4: Adjusted for maternal sociodemographics, behaviors, and health (metabolic health, stress, depression, household abuse)
  - Model 5: Adjusted for maternal sociodemographics, behaviors, health, and previous births (previous live birth, previous preterm, previous LBW)
  - Model 6: Propensity Scores model adjusted for maternal sociodemographics, behaviors, health, and previous births



Maternal Behaviors:  
exercise, vitamin use,  
smoking, alcohol  
consumption, birth  
control

Maternal  
Sociodemographics:  
age, race, education,  
health insurance,  
income

Maternal Health:  
Metabolic disease,  
anxiety/stress,  
depression, abuse

Previous Births: live  
birth, LBW, premature

Pregnancy  
Intention

Maternal Outcomes:  
postpartum checkup,  
depression, diabetes, birth  
control use

Offspring Outcomes:  
Cesarean delivery, NICU,  
LBW, SGA, LGA,  
premature, breastfed

Preconception Period

Pregnancy Period

Postnatal Period

Pregnancy Intention Weighted by SC PRAMS Survey Weights			
Pre-pregnancy Characteristics	Unintended (N=102585)	Intended (N=90321)	P-Value
Maternal Age			
<20 yrs	12808 (12.5%)	4540 (5.0%)	<0.0001 <sup>1</sup>
20-25 yrs	33506 (32.7%)	12032 (13.3%)	
25-34 yrs	46050 (44.9%)	58093 (64.3%)	
35+ yrs	10221 (10.0%)	1590 (17.3%)	
Maternal Race			
White	55335 (54.1%)	63845 (70.8%)	<0.0001 <sup>1</sup>
Black	40235 (39.4%)	15505 (17.2%)	
Mixed/Other	6676 (6.5%)	10829 (12.0%)	
Maternal Education			
<High School	15104 (14.7%)	14959 (16.6%)	<.0001 <sup>1</sup>
High School/GED	32787 (32.0%)	13424 (14.9%)	
Some College	39164 (38.2%)	24231 (26.8%)	
College Grad	15513 (15.1%)	37678 (41.7%)	
Medicaid Recipient			
No	29552 (29.3%)	2622 (67.0%)	<.0001 <sup>1</sup>
Yes	71405 (70.7%)	2417 (33.0%)	
Income			
<\$26K	61593 (65.4%)	28441 (33.7%)	<.0001 <sup>1</sup>
>\$26K	32640 (34.6%)	56023 (66.3%)	
Birth Control			
No	46235 (50.1%)	12650 (77.2%)	<.0001 <sup>1</sup>
Yes	46036 (49.9%)	3728 (22.8%)	
Exercise			
No	27174 (26.5%)	15693 (17.4%)	0.0008 <sup>1</sup>
Yes	75410 (73.5%)	74628 (82.6%)	
Multivitamin Use			
No	77106 (75.4%)	34951 (38.8%)	<.0001 <sup>1</sup>
Yes	25186 (24.6%)	55212 (61.2%)	

Pregnancy Intention Weighted by SC PRAMS Survey Weights			
Pre-pregnancy Characteristics	Unintended (N=102585)	Intended (N=90321)	P-Value
Smoking			
No	66391 (66.4%)	70171 (78.8%)	<.0001 <sup>1</sup>
Yes	33577 (33.6%)	18891 (21.2%)	
Alcohol Consumption			
No	40490 (40.1%)	37676 (42.3%)	0.5104 <sup>1</sup>
Yes	60501 (59.9%)	51485 (57.7%)	
Metabolic Disorder			
No	40993 (42.1%)	40844 (46.5%)	0.1948 <sup>1</sup>
Yes	56296 (57.9%)	47086 (53.5%)	
Depression			
No	88818 (88.1%)	82705 (91.7%)	0.0788 <sup>1</sup>
Yes	12011 (11.9%)	7507 (8.3%)	
Stress			
No	18360 (18.2%)	30592 (34.1%)	<.0001 <sup>1</sup>
Yes	82533 (81.8%)	59160 (65.9%)	
Household Abuse			
No	95303 (94.8%)	88719 (98.9%)	<.0001 <sup>1</sup>
Yes	5203 (5.2%)	1025 (1.1%)	
Previous Live Birth			
No	39760 (39.1%)	35228 (39.5%)	0.9106 <sup>1</sup>
Yes	61817 (60.9%)	53947 (60.5%)	
Previous LBW			
No	92756 (90.4%)	84609 (93.7%)	<.0584 <sup>1</sup>
Yes	9829 (9.6%)	5712 (6.3%)	
Previous Preterm			
No	92662 (90.3%)	83080 (92.0%)	0.3560 <sup>1</sup>
Yes	9922 (9.7%)	7242 (8.0%)	

# Statistical Analyses: Propensity Scores

- A multivariable logistic regression model adjusted for maternal sociodemographics, behaviors, health, and previous births was used to calculate the predicted probability of an intended pregnancy ( $p$ ).
- For unintended pregnancies, we calculated the inverse probability of treatment weights (IPTW) for the propensity scores model as the inverse of the predicted probability of an intended pregnancy ( $\frac{1}{p}$ ).
- For intended pregnancies, we calculated the IPTW for the propensity scores model as  $\frac{1}{1-p}$ .
- To reduce bias, 54 weights that were above the 95<sup>th</sup> percentile for our dataset were trimmed.
- These trimmed IPTW were multiplied by the survey weight when running the final logistic and linear regression models for our maternal and infant outcomes.
- Baseline and post-weighting covariate balance was assessed using standardized differences and the absolute value of the t-statistic.

Pregnancy Intention Weighted by SC PRAMS & IPTW Weights			
Pre-pregnancy Characteristics	Unintended (N=90116)	Intended (N=74124)	P-Value
Maternal Age			
<20 yrs	9441 (10.5%)	6561 (8.9%)	0.8553 <sup>1</sup>
20-25 yrs	28466 (31.6%)	20529 (27.7%)	
25-34 yrs	43178 (47.9%)	40558 (54.7%)	
35+ yrs	9031 (10.0%)	6475 (8.7%)	
Maternal Race			
White	51675 (57.3%)	43110 (58.2%)	0.9626 <sup>1</sup>
Black	33637 (37.3%)	26539 (35.8%)	
Mixed/Other	4805 (5.3%)	4474 (6.0%)	
Maternal Education			
<High School	10552 (11.7%)	8958 (12.1%)	0.8106 <sup>1</sup>
High School/GED	27777 (30.8%)	18449 (24.9%)	
Some College	34271 (38.0%)	29421 (39.7%)	
College Grad	17516 (19.4%)	17295 (23.3%)	
Medicaid Recipient			
No	28036 (31.1%)	25871 (34.9%)	0.5645 <sup>1</sup>
Yes	62080 (68.9%)	48252 (65.1%)	
Income			
<\$26K	55360 (61.4%)	40938 (55.2%)	0.4082 <sup>1</sup>
>\$26K	34756 (38.6%)	33185 (44.8%)	
Birth Control			
No	49113 (54.5%)	41541 (56.0%)	0.8482 <sup>1</sup>
Yes	41003 (45.5%)	32582 (44.0%)	
Exercise			
No	20946 (23.2%)	10734 (14.5%)	0.1203 <sup>1</sup>
Yes	69170 (76.8%)	63389 (85.5%)	
Multivitamin Use			
No	64756 (71.9%)	48289 (65.1%)	0.3276 <sup>1</sup>
Yes	25360 (28.1%)	25835 (34.9%)	

Pregnancy Intention Weighted by SC PRAMS & IPTW Weights			
Pre-pregnancy Characteristics	Unintended (N=90116)	Intended (N=74124)	P-Value
Smoking			
No	56420 (62.6%)	48387 (65.3%)	0.1313 <sup>1</sup>
Yes	33696 (37.4%)	25737 (34.7%)	
Alcohol Consumption			
No	33254 (36.9%)	28758 (38.8%)	0.7976 <sup>1</sup>
Yes	56862 (63.1%)	45365 (61.2%)	
Metabolic Disorder			
No	40364 (44.8%)	34902 (47.1%)	0.7656 <sup>1</sup>
Yes	49752 (55.2%)	39222 (52.9%)	
Depression			
No	81153 (90.1%)	66814 (90.1%)	0.9842 <sup>1</sup>
Yes	8963 (9.9%)	7310 (9.9%)	
Stress			
No	16648 (18.5%)	12114 (16.3%)	0.6481 <sup>1</sup>
Yes	73468 (81.5%)	62009 (83.7%)	
Household Abuse			
No	86248 (95.7%)	71949 (97.1%)	0.5625 <sup>1</sup>
Yes	3868 (4.3%)	2175 (2.9%)	
Previous Live Birth			
No	34118 (37.9%)	25165 (33.9%)	0.5675 <sup>1</sup>
Yes	55998 (62.1%)	48959 (66.1%)	
Previous LBW			
No	81905 (90.9%)	70869 (95.6%)	0.0521 <sup>1</sup>
Yes	8211 (9.1%)	3255 (4.4%)	
Previous Preterm			
No	81949 (90.9%)	66203 (89.3%)	0.7421 <sup>1</sup>
Yes	8167 (9.1%)	7920 (10.7%)	

# Unadjusted and Adjusted Logistic Regression Models for the Odds of Maternal and Infant Outcomes by Pregnancy Intention

	Pregnancy Intention (Unintended vs. Intended)					
	OR <sub>unadj</sub> (95% CI)	OR <sub>adj</sub> (95% CI) <sup>a</sup>	OR <sub>adj</sub> (95% CI) <sup>b</sup>	OR <sub>adj</sub> (95% CI) <sup>c</sup>	OR <sub>adj</sub> (95% CI) <sup>d</sup>	OR <sub>adj</sub> (95% CI) <sup>e</sup>
<b>Maternal Outcomes</b>						
Postpartum Check-up	<b>0.54</b> (0.31, 0.92)*	<b>0.49</b> (0.26, 0.93)*	0.22 (0.05, 1.11)	<b>0.20</b> (0.04, 0.98)*	<b>0.18</b> (0.04, 0.91)*	<b>0.10</b> (0.04, 0.30)*
Postpartum Depression	<b>1.79</b> (1.27, 2.53)*	<b>1.73</b> (1.17, 2.56)*	<b>2.36</b> (1.02, 5.43)*	<b>2.55</b> (1.06, 6.13)*	<b>2.55</b> (1.06, 6.18)*	1.68 (0.76, 3.68)
Diabetes	1.06 (0.72, 1.55)	1.27 (0.82, 1.97)	1.43 (0.61, 3.33)	1.34 (0.55, 3.29)	1.40 (0.56, 3.50)	1.36 (0.59, 3.18)
Postpartum Birth Control	1.27 (0.90, 1.78)	1.33 (0.90, 1.96)	1.59 (0.84, 3.00)	1.58 (0.83, 3.01)	1.56 (0.81, 3.00)	1.10 (0.56, 2.15)
<b>Infant Outcomes</b>						
Cesarean Delivery	<b>0.62</b> (0.47, 0.81)*	<b>0.57</b> (0.41, 0.79)*	<b>0.51</b> (0.29, 0.91)*	<b>0.46</b> (0.25, 0.83)*	<b>0.46</b> (0.25, 0.87)*	<b>0.40</b> (0.22, 0.74)*
Elective	<b>0.55</b> (0.35, 0.87)*	0.76 (0.44, 1.31)	0.57 (0.22, 1.49)	0.58 (0.22, 1.56)	0.78 (0.30, 2.06)	0.89 (0.35, 2.14)
NICU	1.15 (0.81, 1.62)	1.09 (0.74, 1.62)	1.13 (0.58, 2.19)	1.21 (0.61, 2.40)	1.31 (0.64, 2.68)	1.17 (0.64, 2.11)
Premature	1.01 (0.73, 1.39)	0.87 (0.59, 1.28)	0.71 (0.41, 1.23)	0.74 (0.42, 1.31)	0.79 (0.44, 1.41)	0.80 (0.48, 1.32)
LBW	<b>1.32</b> (1.09, 1.57)*	1.16 (0.91, 1.46)	0.94 (0.61, 1.46)	1.07 (0.68, 1.70)	1.15 (0.71, 1.86)	0.81 (0.52, 1.25)
SGA	1.39 (0.94, 2.05)	1.09 (0.73, 1.62)	1.31 (0.57, 3.00)	1.51 (0.60, 3.80)	1.53 (0.61, 3.86)	1.56 (0.74, 3.28)
LGA	<b>0.65</b> (0.42, 0.99)*	0.86 (0.52, 1.44)	1.07 (0.42, 2.72)	0.96 (0.37, 2.48)	0.86 (0.33, 2.25)	1.42 (0.49, 4.16)
Breastfed	<b>0.41</b> (0.30, 0.56)*	<b>0.56</b> (0.38, 0.82)*	0.56 (0.28, 1.11)	0.57 (0.28, 1.21)	0.58 (0.28, 1.22)	<b>0.42</b> (0.23, 0.78)*

<sup>a</sup>Model adjusted for maternal sociodemographics (age, race, education, on Medicaid, income)

<sup>b</sup>Model adjusted for maternal sociodemographics and behaviors (birth control use, exercise, prenatal vitamin use, smoking, alcohol consumption)

<sup>c</sup>Model adjusted for maternal sociodemographics, behaviors, and health (metabolic health, stress, depression, household abuse)

<sup>d</sup>Model adjusted for maternal sociodemographics, behaviors, health, and previous births (previous live birth, previous preterm, previous LBW)

<sup>e</sup>Propensity Scores model adjusted for maternal sociodemographics, behaviors, health, and previous births

\*p<0.05

# Conclusions

## ○ Strengths:

- Representative sample
- Sample size
- Methodology
- Multiple outcomes
- Many confounders

## ○ Limitations:

- Generalizability
- Teen pregnancies included
- Still some uncontrolled confounding
- Exposure assessment
- Measurement error due to self-report

# Conclusions

“Mothers with unintended pregnancies are less likely to initiate breastfeeding, receive a postpartum check-up, or have a Cesarean delivery, and more likely to experience postpartum depression”

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**Thank You**