LEVEL-OF-EFFORT APPROACH TO ASSESSING INCREMENTAL NONRESPONSE BIAS IN PRAMS

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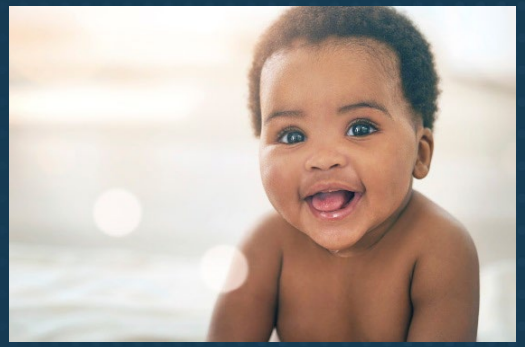
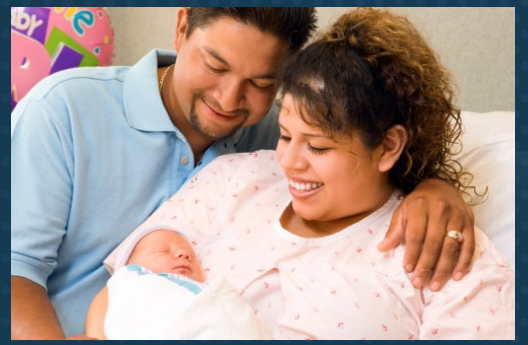




Centers for Disease Control and Prevention

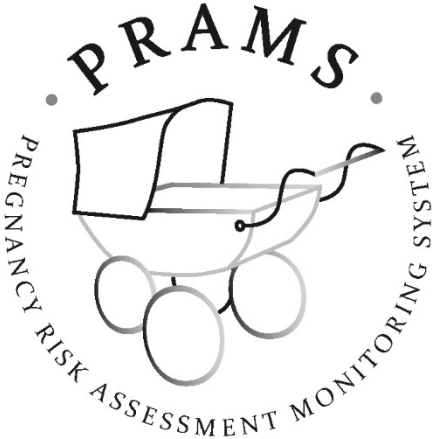
National Center for Chronic Disease Prevention and Health Promotion

Division of Reproductive Health; *Far Harbor LLC

BACKGROUND

- **Decreasing survey response rates are driving new interest in non-response (NR) bias research**
  - **The level-of-effort (LOE) approach simulates low response rates (RR) in higher RR surveys**
  - **Later respondents are treated as non-respondents**

- **Research Question: *Do survey estimates from earlier versus later respondents exhibit differential bias?***
  - **Assumption: Respondents requiring greater effort are more similar to nonrespondents**
  - **Can be tested since PRAMS samples from birth certificates with information (i.e., demographics, medical) on respondents and nonrespondents**



METHODS

- **Selected 20 sites from PRAMS (2019)**
- **Criteria:**
  - **Response rate**
  - **Sample size**
  - **Urbanicity (*FiveThirtyEight index*)**
  - **Diversity (*WalletHub index*)**
  - **Geographical area**

		Urbanicity % of population in locale		
Diversity	Response rate (RR)	Rural	Mix	Urban
Homogeneous	Low RR	WV, NH	IN	
	Medium RR	ND	MO	PA
	High RR	MS, SD*	OR*	PR
Diverse	Low RR	OK*	SC	AZ*, FL*
	Medium RR	AK*	VA	IL
	High RR		KS	NYC*, MA

Note:
* Special subpopulation: [AK – Alaska Native; AZ – Hispanic (Mexican); FL – Hispanic (Cuban); NYC – Chinese and other races; OK – Hispanic and Native American; OR – Asian; SD – Native American]

RR:	Low: 0-55% (n=7)	Medium: 55-60% (n=6)	High: 60+% (n=7)
Sample size:	<1000 (n=6)	1000-1265 (n=8)	1266+ (n=6)

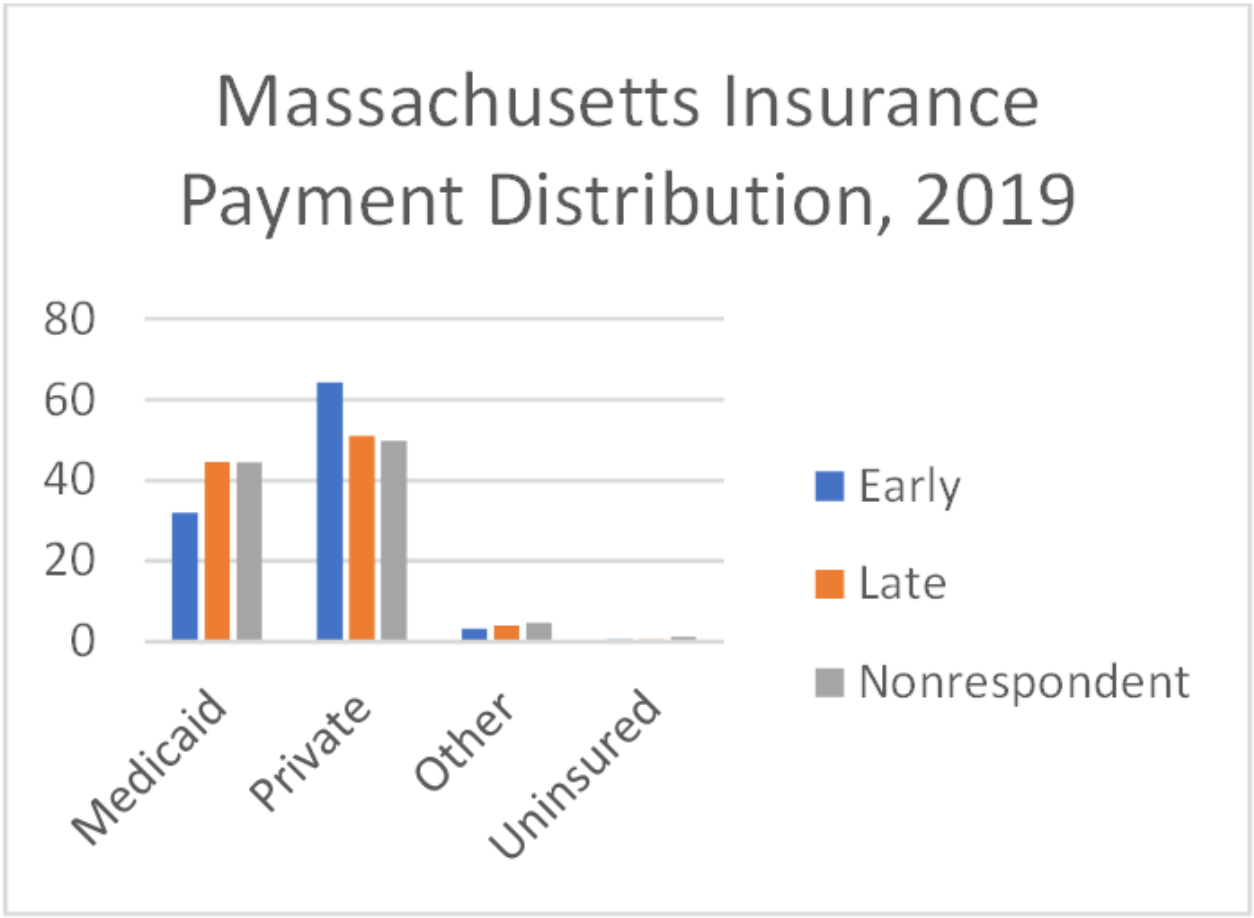
METHODS

- **Examples of 21 core PRAMS variables selected for analysis**

Contraception related	Medical conditions /health services	Other behavioral indicators	Demographic/SES
Intended pregnancy	Gestational diabetes	Physical abuse before pregnancy	Less than 100% of federal poverty level (FPL)
Postpartum birth control (BC) use	Flu shot	Smoking before pregnancy	
Moderate/Most effective postpartum BC method	Teeth cleaned during pregnancy	Smoking during pregnancy	
Discuss BC at postpartum visit (PPV)	Maternal postpartum visit	Still breastfeeding	

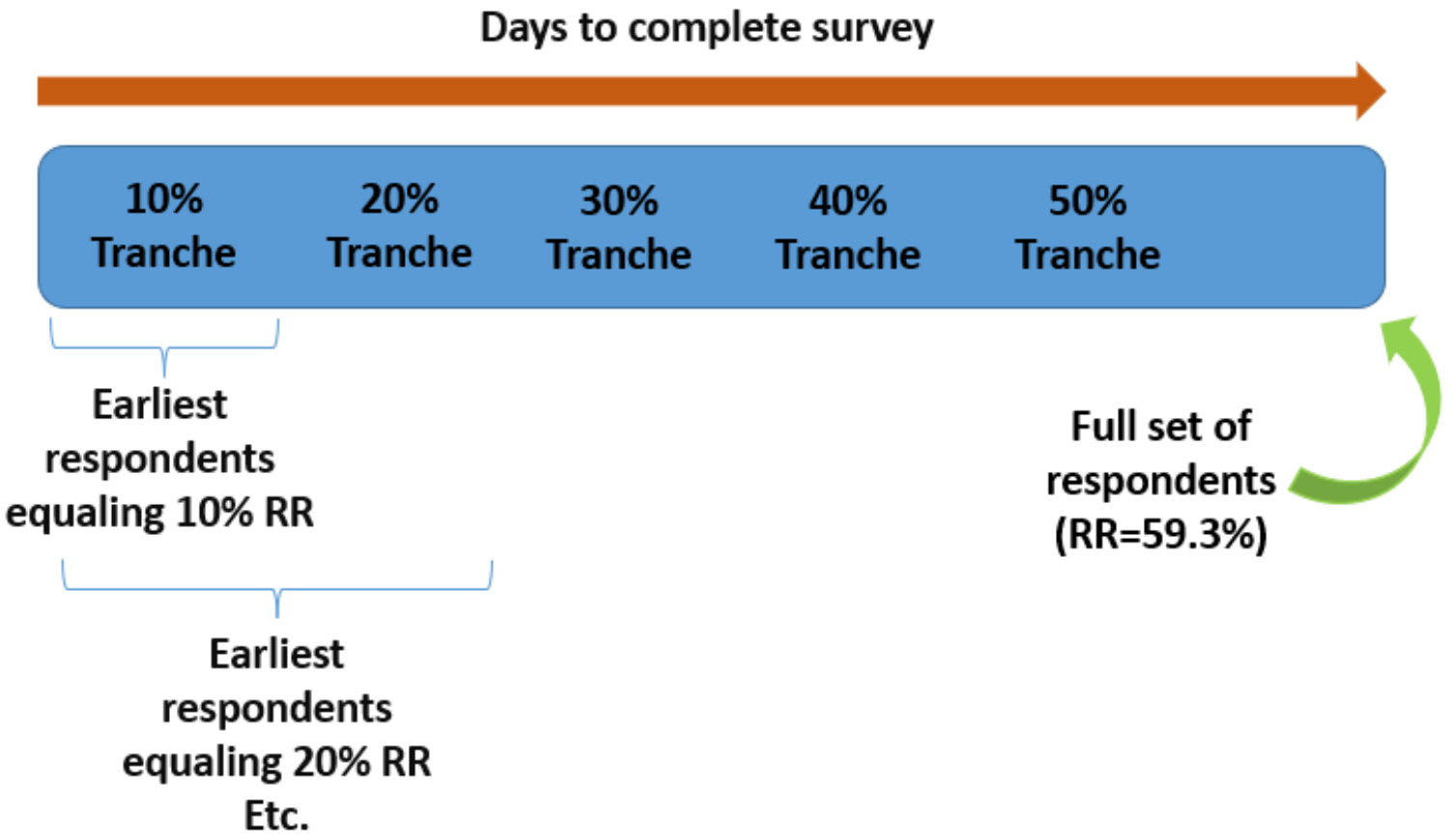
METHODS

- **Assumption: late-respondents are more similar to non-respondents**
- **Tested using 11 birth certificate variables**
  - **E.g., maternal race/ethnicity, maternal education, insurance for birth**
- **Early-respondents: completed survey before or during the first week of phone interview**



METHODS

- Created ‘tranches’ simulating lower RRs
- Earliest respondents comprised lowest RR tranches
  - Ranged from 5% to the full set of respondents
- Tranche data re-weighted with new non-response adjustment
- Example: Illinois 2019



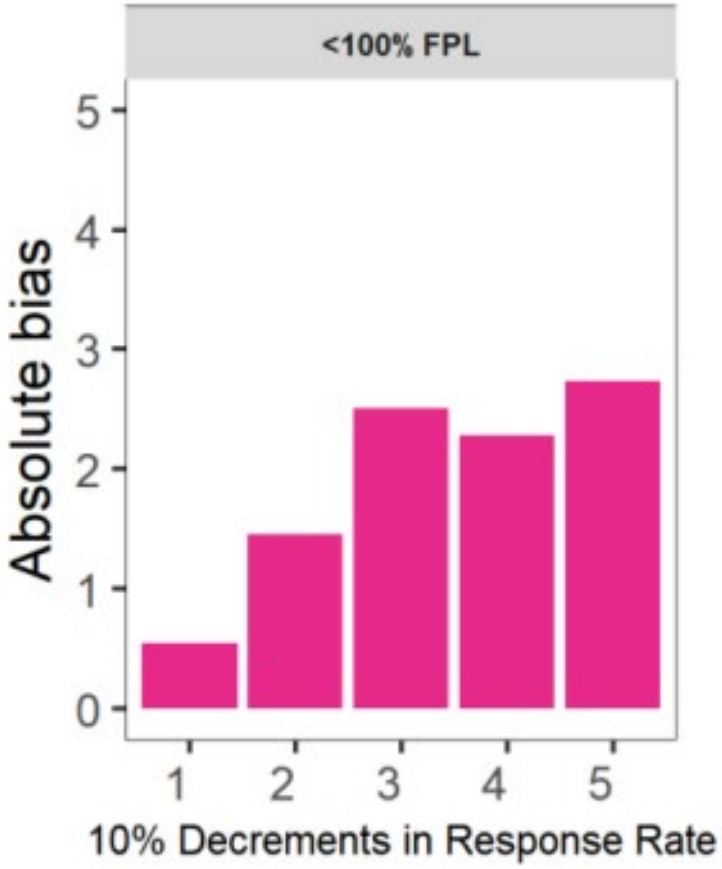
METHODS

- **Statistics calculated:**
  - **Absolute bias: Difference in weighted estimates between each response tranche and the full set of respondents**
  - **Relative bias: Percentage of the weighted estimate; a standard scale when examining multiple survey measures**
  - **Instances where estimated value from a response tranche fell outside the 95% CI of the full response estimate identified**
  - **Incremental bias: Mean absolute difference in estimates across sites as response rates drop in each tranche**

- **Multilevel regression model**
  - **Modeling bias as a function of response rate**
  - **Response rate tranche (level-1) nested within PRAMS site (level-2)**

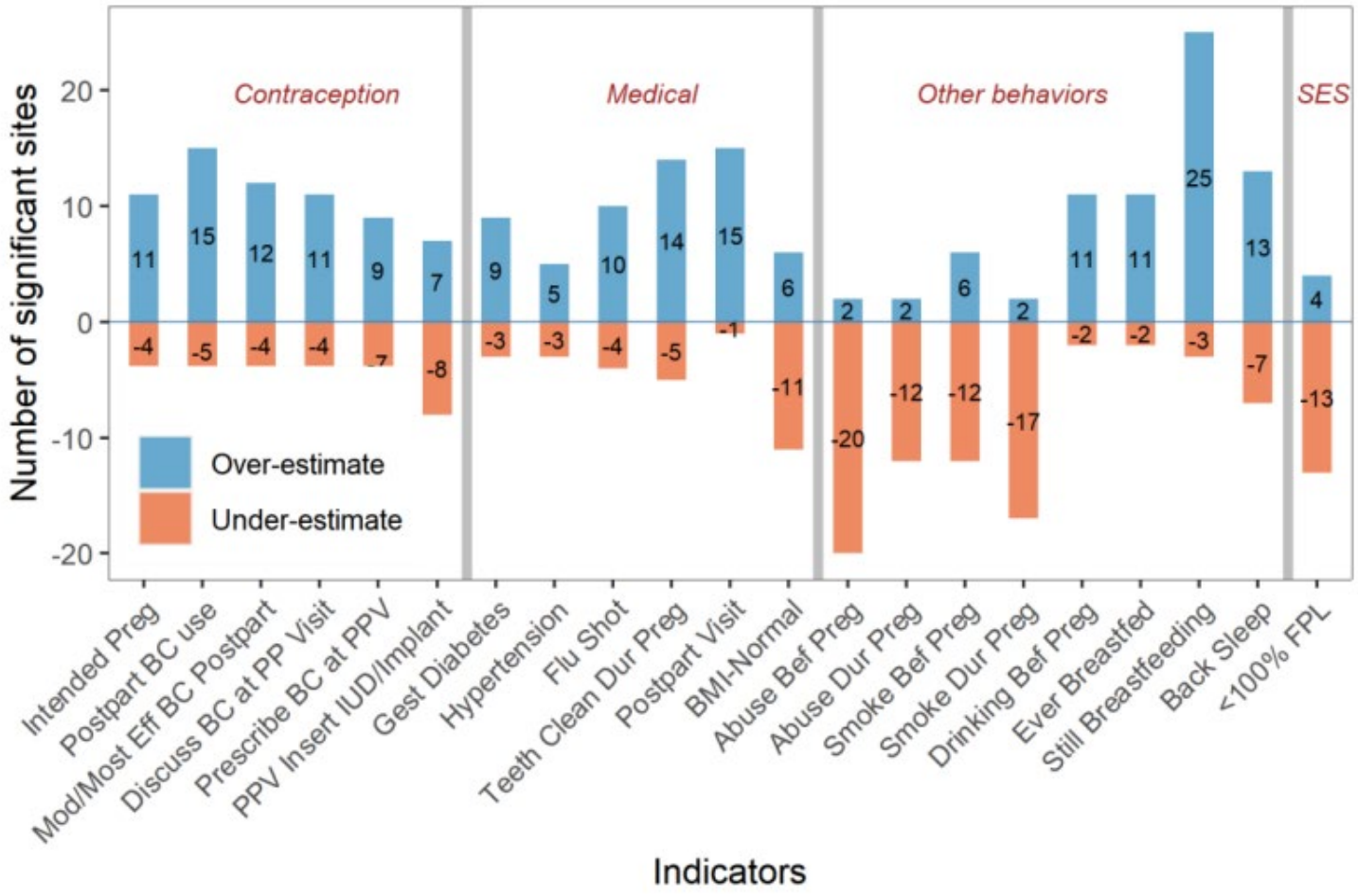
PREVIEW: KEY FINDINGS

- **On average, for every 10% decline in RR, we observed ~0.5% bias in estimation**
- **Bias tends to be in a predictable direction:**
  - **Indicators representing desirable outcomes or positive behaviors tended to be overestimated**
  - **Indicators of adverse outcomes/behaviors (e.g., physical abuse, smoking) tended to be underestimated**



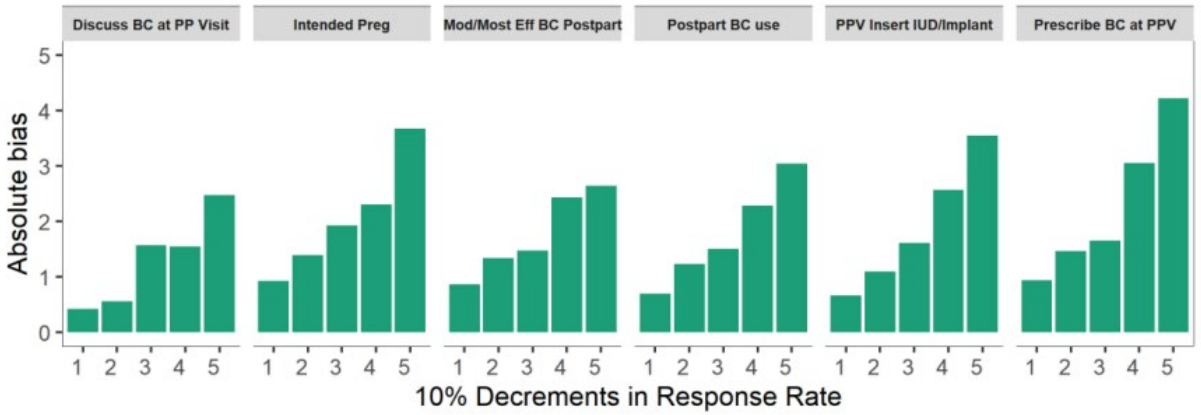
RESULTS

- **Number of significant differences across tranches for 20 sites**
  - **Positive behaviors overestimated when response rates dropped**
  - **Indicators representing less desirable/risky behaviors likely to be underestimated**

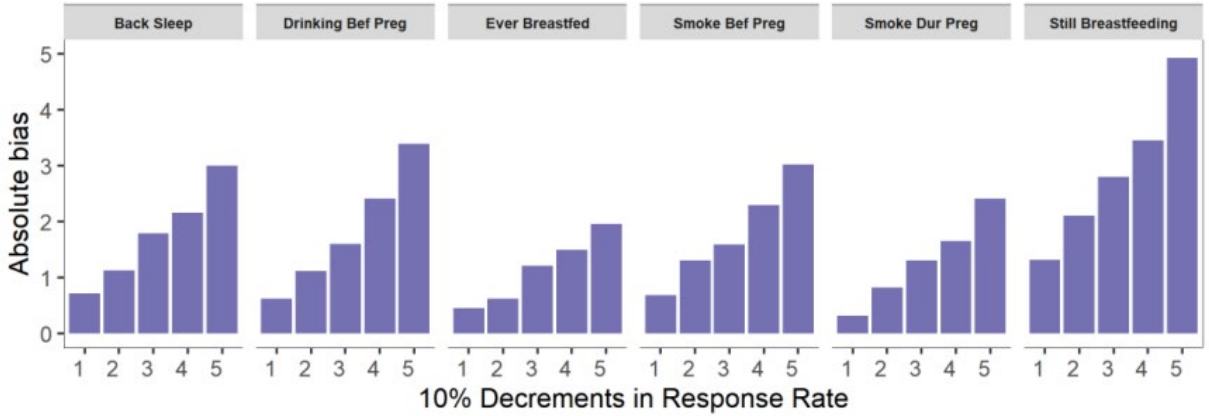


RESULTS

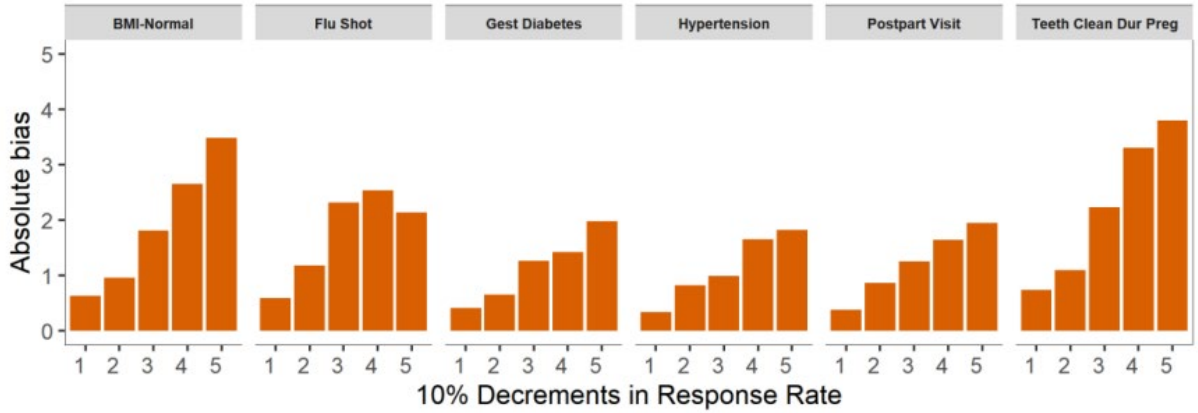
Contraception-Related Indicators



Other Behavioral Indicators

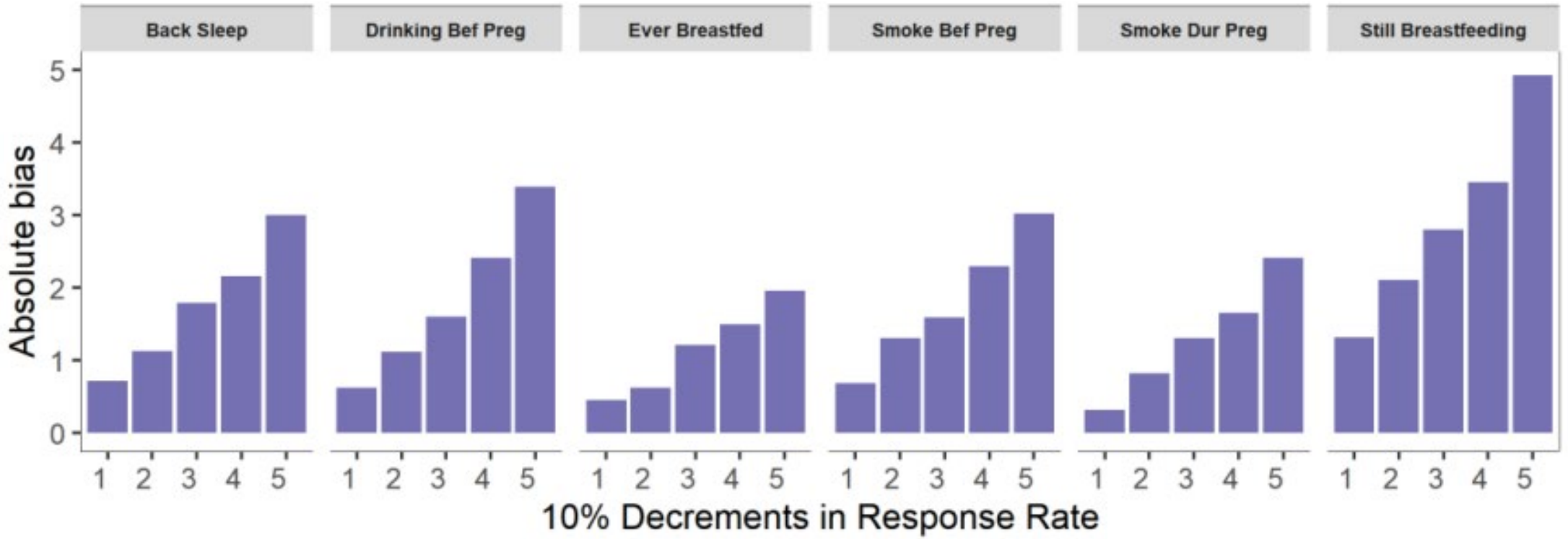


Medical Conditions/Health Indicators



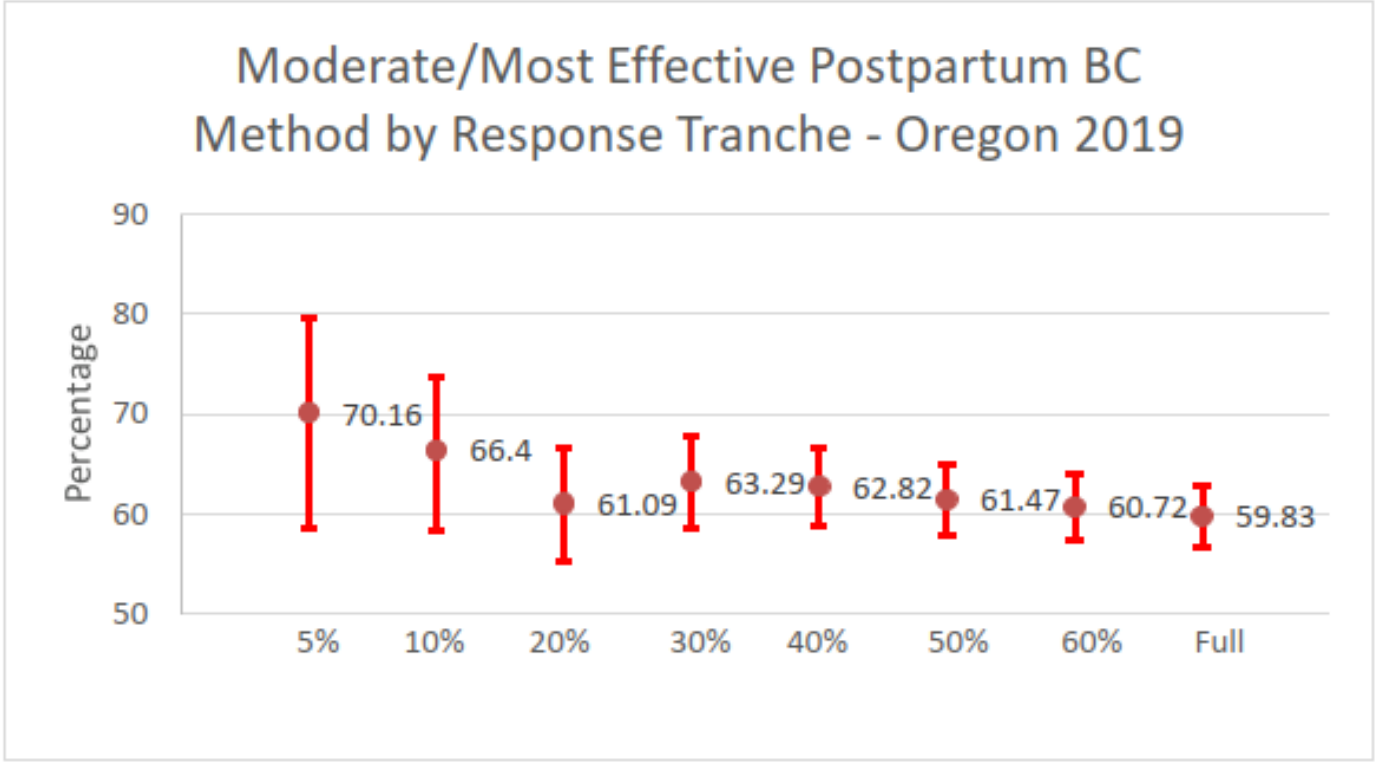
RESULTS

Other Behavioral Indicators



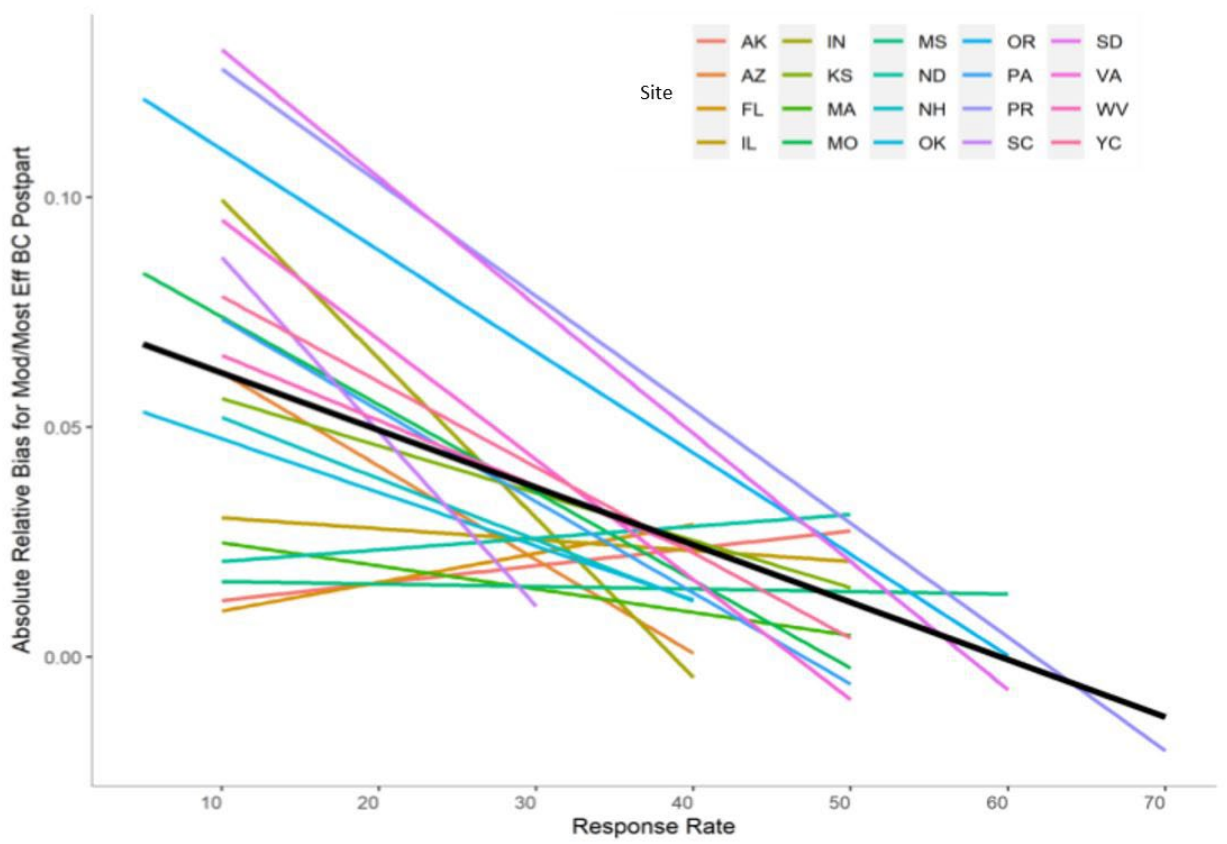
RESULTS

- **Mod/most effective birth control (BC) in Oregon: all tranches overestimate the full estimate**
  - **Estimates from the 5%, 10%, and 30% tranches are outside of the 95% CI around the full estimate**



RESULTS

- **Multilevel regression models: Absolute relative bias for mod/most effective postpartum BC**
  - ***Absolute relative bias*** **decreased by an average of 1.25% for each 10% increase in response rate. (Range = 0.42 – 6.26% across indictors.)**



WRAP-UP

- ***Conclusions***
  - ***On average, we saw ~0.5% absolute bias per 10% decrease in RR***
  - ***Some indicators were differentially prone to over-/under-estimation at lower RR***

- ***Implications:*** **LOE approach allows us to explore nonresponse bias across a range of decreasing response rates**

- ***Limitations:*** **Full response estimates from the lower response rate sites may already have inherent bias**
  - **e.g., estimates from full response estimates in a site with 30% response rate might be different from estimates from the 30% tranche in a site with 70% response rate.**

THANK YOU

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