



Racial and ethnic disparities in fecundability: a North American preconception cohort study

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Background

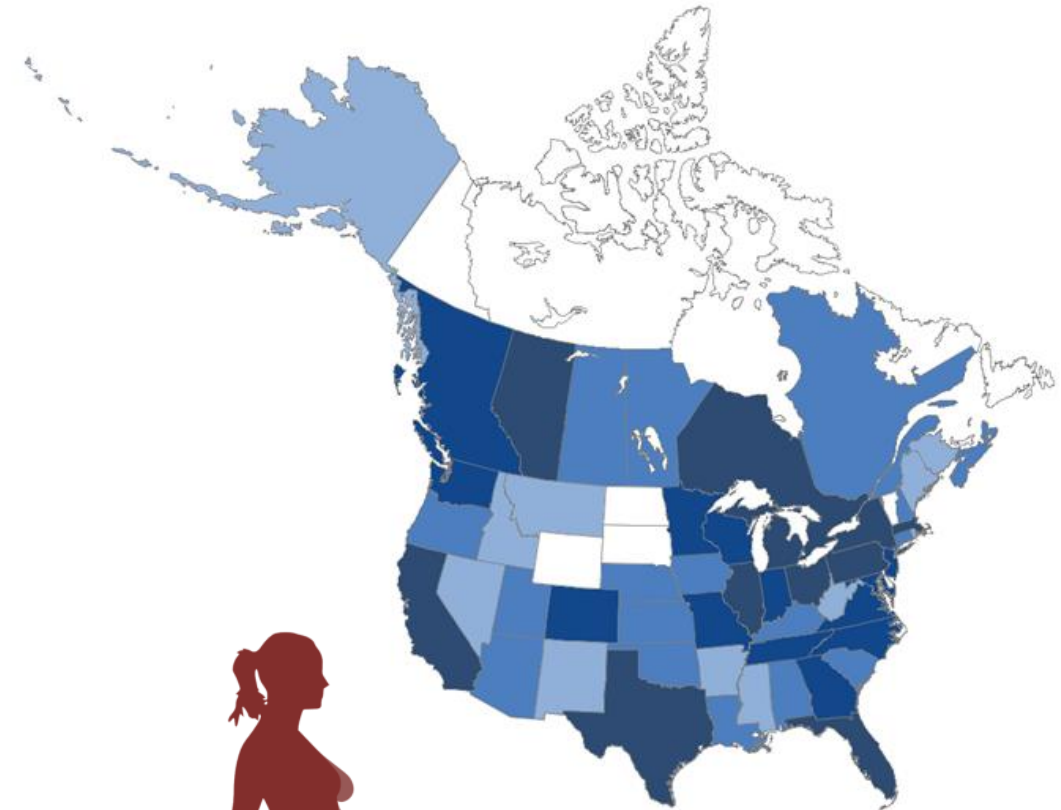
- Black women are less likely to seek medical care for infertility (time-to-pregnancy ≥ 12 months) and tend to wait longer to receive fertility treatment than White women.
- There are also large racial disparities in infertility treatment success rates.
- Studies of racial and ethnic disparities in fecundability (per-cycle probability of conception) are limited and conflicting.

Study Objective: To assess the extent to which there are racial and ethnic disparities in fecundability in the U.S. and Canada

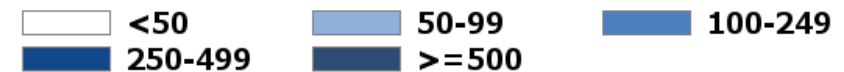
Study Population



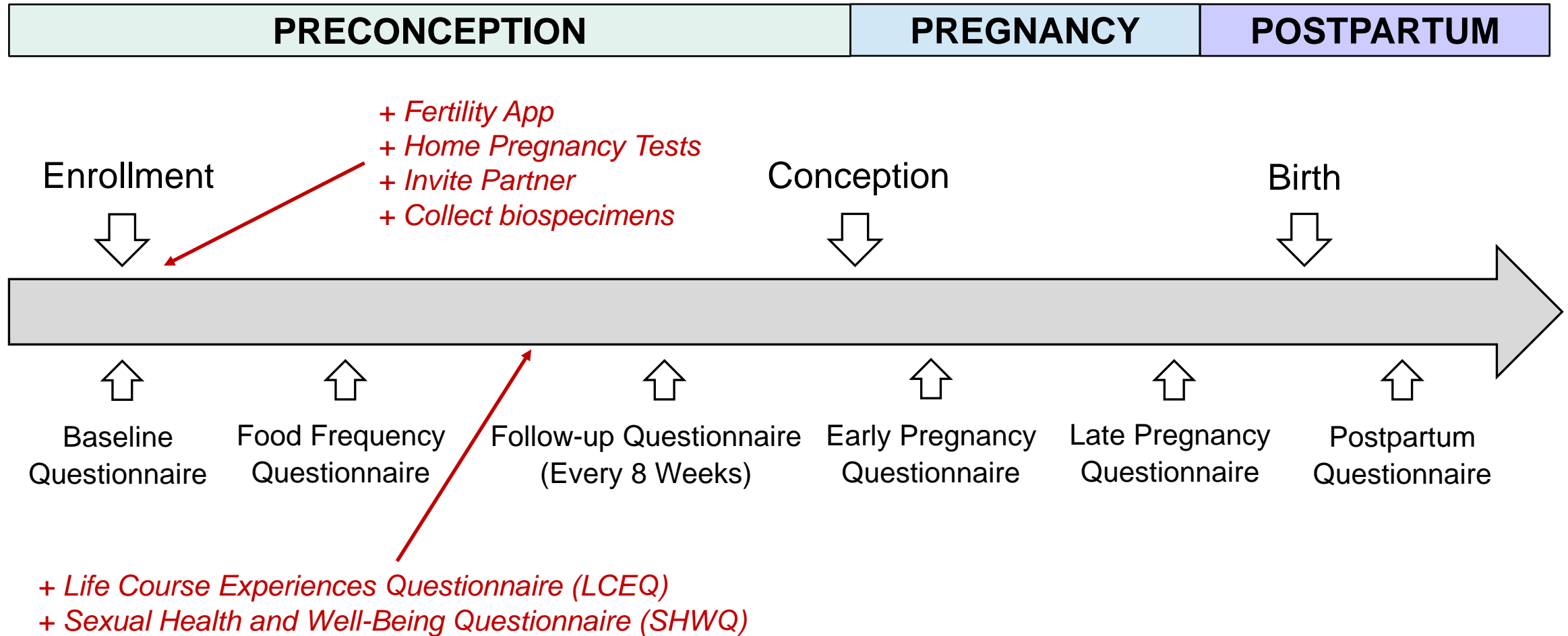
- Pregnancy Study Online (PRESTO): prospective preconception cohort study
 - Residents of U.S. or Canada
 - Aged 21-45 years
 - Female-identified
 - Trying to conceive without fertility treatments
- Recruited primarily via web-based methods



PRESTO



Study Design



Assessment of race and ethnicity

What is your race? (check all that apply)

1. White
2. Black or African American
3. American Indian or Alaskan Native
4. Asian → please specify: Indian; Chinese; Japanese; Korean; Vietnamese; Filipino; Other: _____
5. Middle-Eastern or North African
6. Native Hawaiian or Pacific Islander
9. Some other race: Please specify: _____
88. Don't know
99. Refused

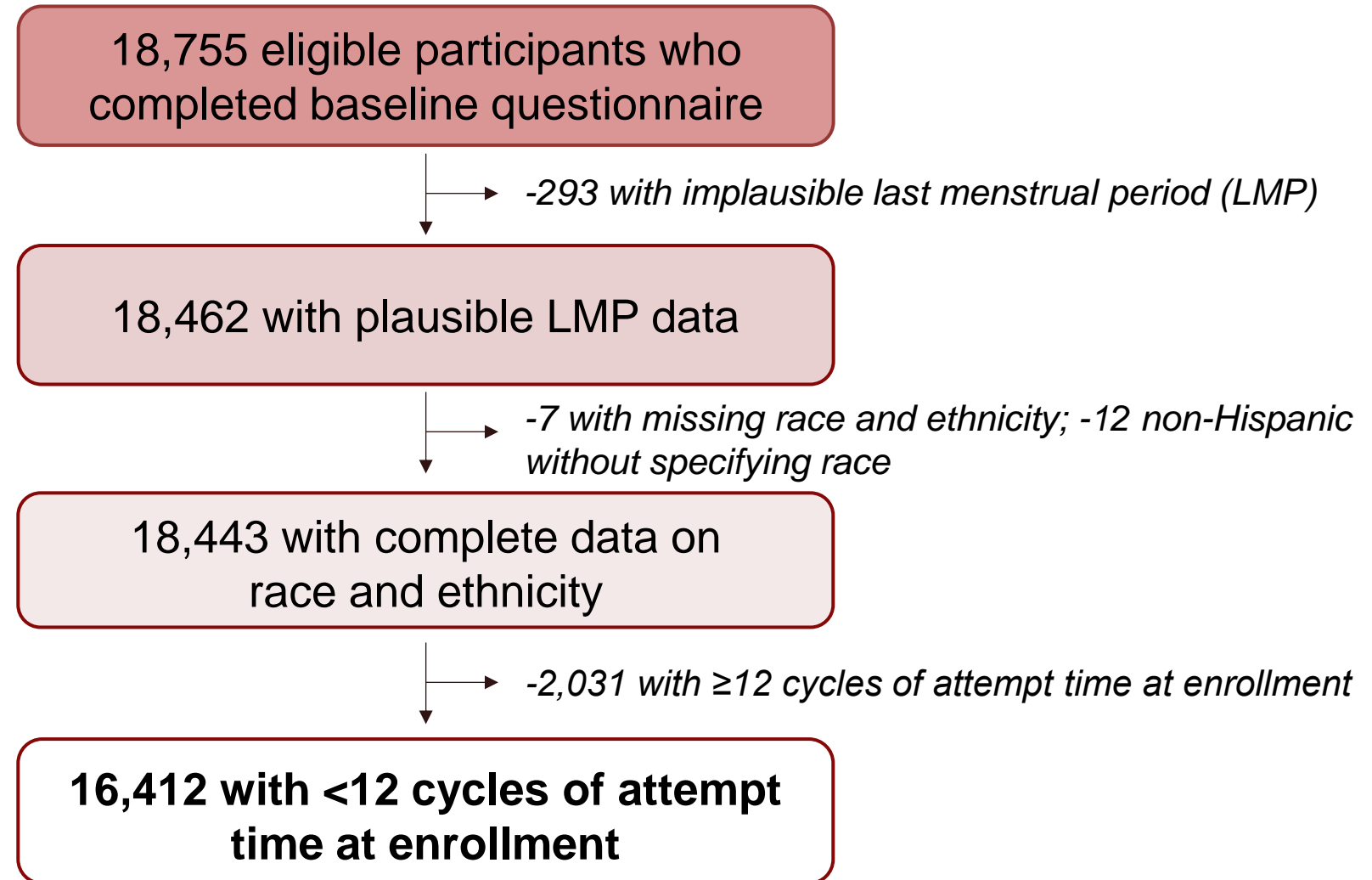
Please feel free to provide additional details about your race/ethnicity: _____

Are you from Hispanic origin or descent, such as Mexican, Puerto Rican, Cuban, or other Spanish background?

1. Yes
2. No
3. Don't Know
4. Refused

Flowchart: analytic sample

(June 2013 - March 2024)



Data analysis



- Prospectively-reported menstrual cycles at risk contributed from enrollment until pregnancy or censoring event (e.g., initiation of fertility treatment)
- Proportional probabilities regression: fecundability ratio (FR) and 95% CI
 - FR = fecundability comparing exposed vs. unexposed
 - FR < 1.0 means exposure is associated with lower fecundability
- Inverse probability weighting to account for differential loss-to-follow-up

Socio-demographic characteristics



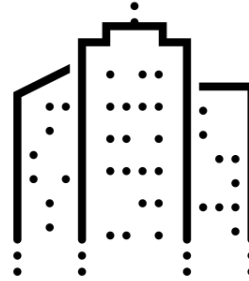
Median age: 30 years
(range: 21-45)



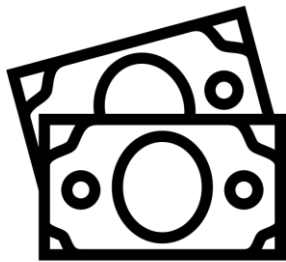
33% parous
25% with history of miscarriage
18% ever had difficulty conceiving



Median education: 16 years
69% with college degree
7% with \leq high school education

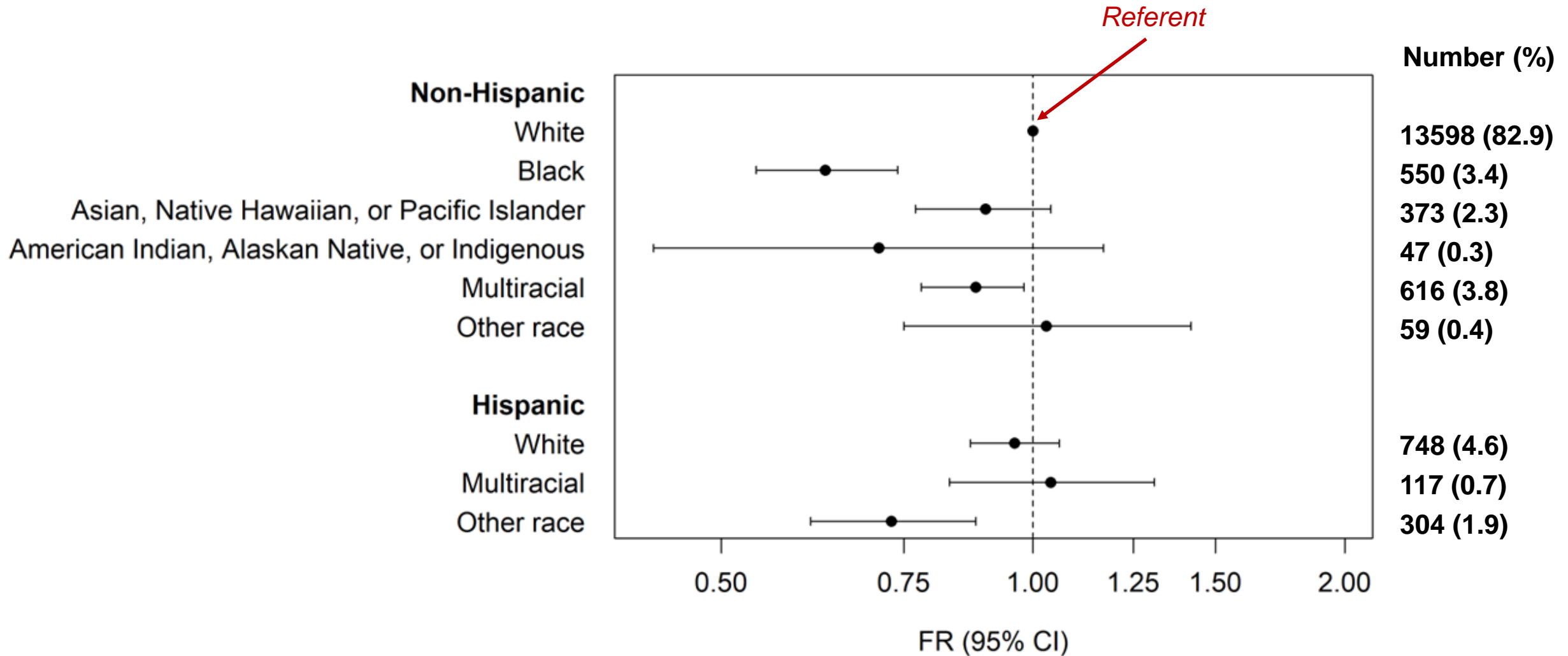


73% reside in urban area

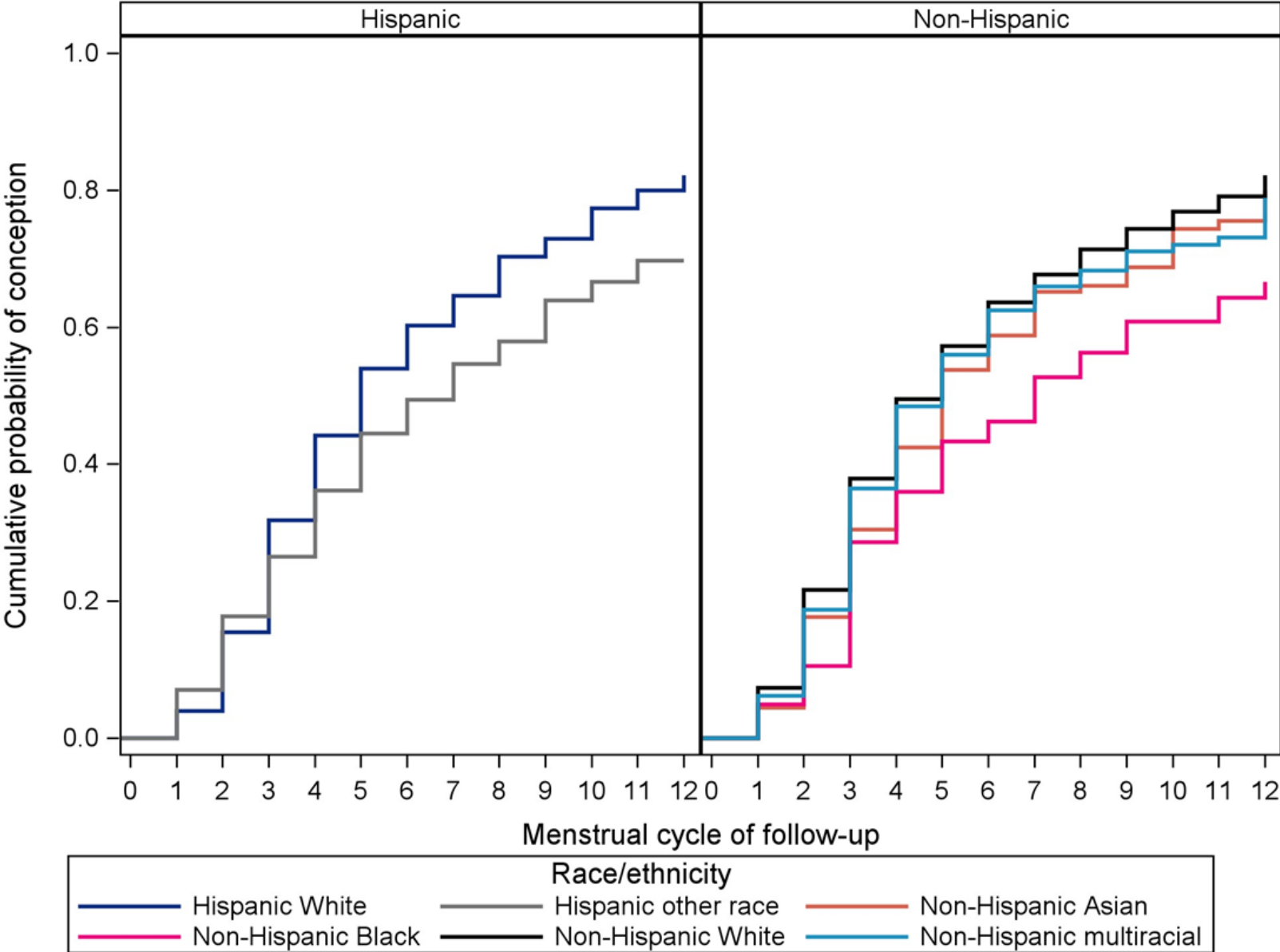


Gross household income (modal): \$75,000-99,999 USD
25% ever on public assistance
32% could stay in home <2 months if lost all sources of income

Associations of race and ethnicity with fecundability, PRESTO, 2013-2024



Cumulative probability of conception by race and ethnicity, PRESTO, 2013-2024*



* Among 9,869 participants with <3 cycles of attempt time at entry

Limitations

- Misclassification:
 - Due to small numbers, we grouped participants into broad racial and ethnic categories, likely obscuring differences in effects within groups.
- Selection bias:
 - Differential participation at cohort entry and differential loss-to-follow-up. Findings were similar after applying inverse probability of continuation weights.
- Generalizability:
 - PRESTO is a web-based convenience sample that likely overrepresents higher-SES individuals; results may not extend to other populations.

Summary

- We found large differences in fecundability across racial and ethnic groups. Results were similar across strata of age and country of residence.
- While we did **not** control for adult SES out of concern for overcontrol, associations were uniform within strata of education.
- These data indicate the need for more studies to investigate mechanisms underlying disparities in fecundability, including structural racism and discrimination, and programs and policies to advance reproductive health equity.

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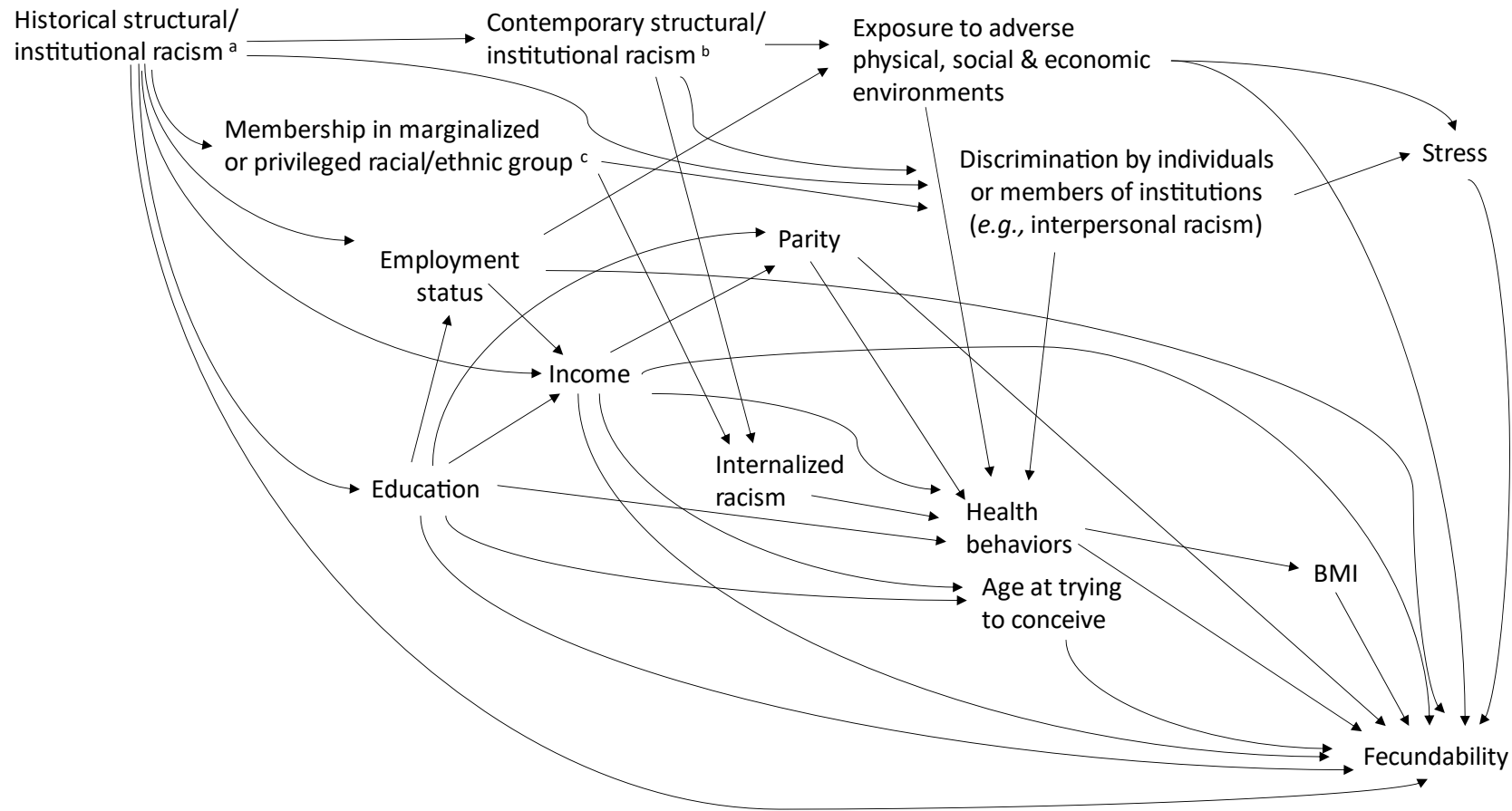
Thank you! Questions?

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Extra slides

Simplified causal diagram for the association of race and ethnicity with fecundability



This directed acyclic graph (DAG) was informed in part by Howe CJ, et al. Recommendations for Using Causal Diagrams to Study Racial Health Disparities. *Am J Epidemiol.* 2022 Nov 19;191(12):1981-1989. ^a Examples of historical structural/institutional racism include racist policies such as slavery and Jim Crow laws. ^b Examples of contemporary structural/institutional racism include discriminatory mortgage lending practices. ^c “Membership in marginalized or privileged racial group” was modeled in regression analyses as self-identified race and ethnicity.

Numbers of participants, pregnancies, and cycles by race and ethnicity

	Participants	Pregnancies	Cycles
Non-Hispanic			
White	13598 (82.9)	7,637	51,249
Black	550 (3.4)	168	1,889
Asian, Native Hawaiian, or Pacific Islander	373 (2.3)	174	1,327
American Indian, Alaskan Native, or Indigenous	47 (0.3)	15	179
Multiracial	616 (3.8)	292	2,360
Other race ^a	59 (0.4)	32	210
Hispanic			
White	748 (4.6)	370	2,646
Multiracial	117 (0.7)	65	396
Other race ^b	304 (1.9)	121	1,138

^a “Non-Hispanic other race” includes Middle Eastern or North African, or some other race.

^b “Hispanic other race” includes Black; American Indian, Alaskan Native, or Indigenous; Asian, Native Hawaiian, or Pacific Islander; Middle Eastern or North African, some other race, or missing race.

Cumulative incidence of infertility during 12 cycles after accounting for censoring, by race and ethnicity

	<2 cycles of pregnancy attempt time at cohort entry (N=7,326 participants)	<3 cycles of pregnancy attempt time at cohort entry (N=9,869 participants)
	% Infertility during 12 cycles (95% CI)	% Infertility during 12 cycles (95% CI)
Non-Hispanic		
White	16.63 (15.99, 17.28)	17.75 (17.17, 18.33)
Black	31.83 (26.46, 37.20)	33.38 (28.85, 37.91)
Asian, Native Hawaiian, or Pacific Islander	17.25 (2.56, 21.94)	20.05 (15.85, 24.25)
American Indian, Alaskan Native, or Indigenous	12.70 (0.94, 24.46)	18.87 (7.00, 30.74)
Multiracial	18.63 (15.14, 22.12)	21.05 (18.00, 24.10)
Other race ^a	19.29 (9.51, 29.07)	22.83 (14.39, 31.27)
Hispanic		
White	14.11 (11.14, 17.08)	17.83 (15.15, 20.51)
Multiracial	17.50 (10.86, 24.14)	16.66 (11.26, 22.06)
Other race ^b	29.95 (24.58, 35.32)	30.30 (25.51, 35.09)

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Associations of race and ethnicity with fecundability stratified by education at study entry, PRESTO, 2013-2024.

Ethnicity, race	Educational attainment								
	<16 years (N=4,187 participants)			16 years (N=5,437 participants)			≥17 years (N=6,788 participants)		
	Pregs	Cycles	Unweighted FR (95% CI)	Pregs	Cycles	Unweighted FR (95% CI)	Pregs	Cycles	Unweighted FR (95% CI)
Non-Hispanic									
White	1,348	11,787	Reference	2,641	17,950	Reference	3,648	21,512	Reference
Black	68	832	0.68 (0.52-0.89)	41	516	0.62 (0.45-0.83)	59	541	0.69 (0.54-0.89)
Asian, Native Hawaiian, or Pacific Islander	9	82	0.95 (0.49-1.81)	57	370	1.04 (0.81-1.34)	108	875	0.77 (0.64-0.92)
American Indian, Alaskan Native, Indigenous	5	74	0.81 (0.35-1.89)	6	74	0.67 (0.31-1.44)	4	31	0.84 (0.34-2.06)
Multiracial	70	795	0.81 (0.64-1.04)	93	745	0.89 (0.73-1.09)	129	820	0.96 (0.82-1.13)
Other race ^a	3	26	0.73 (0.19-2.72)	6	56	0.77 (0.37-1.63)	23	128	1.11 (0.77-1.61)
Hispanic									
White	90	730	1.08 (0.88-1.32)	125	907	1.00 (0.85-1.19)	155	1,009	0.90 (0.78-1.05)
Multiracial	13	113	1.03 (0.60-1.76)	25	111	1.24 (0.84-1.82)	27	172	0.95 (0.67-1.34)
Other race ^b	42	498	0.73 (0.54-1.00)	33	264	0.93 (0.67-1.30)	46	376	0.71 (0.54-0.95)

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Associations of race and ethnicity with fecundability, stratified by country of residence and age, PRESTO, 2013-2024

	Country of residence						Age at enrollment					
	United States (N=13,850 participants)			Canada (N=2,562 participants)			<30 years (N=7,266 participants)			≥30 years (N=9,146 participants)		
	Pregs	Cycles	Unweighted FR (95% CI)	Pregs	Cycles	Unweighted FR (95% CI)	Pregs	Cycles	Unweighted FR (95% CI)	Pregs	Cycles	Unweighted FR (95% CI)
Non-Hispanic												
White	6,344	42,955	Reference	1,293	8,294	Reference	3,438	22,426	Reference	4,199	28,823	Reference
Black	153	1,802	0.61 (0.51-0.72)	15	87	1.18 (0.74-1.88)	70	679	0.71 (0.55-0.90)	98	1,210	0.59 (0.48-0.73)
Asian, Native Hawaiian, or Pacific Islander	135	1,122	0.84 (0.71-0.99)	39	205	1.14 (0.85-1.53)	44	370	0.77 (0.58-1.03)	130	957	0.96 (0.81-1.13)
American Indian, Alaskan Native, Indigenous	8	98	0.68 (0.35-1.33)	7	81	0.72 (0.35-1.47)	7	74	0.75 (0.37-1.52)	8	105	0.68 (0.34-1.35)
Multiracial	239	2,038	0.84 (0.74-0.95)	53	322	1.07 (0.83-1.38)	138	1,030	0.89 (0.75-1.04)	154	1,330	0.87 (0.74-1.01)
Other race ^a	26	159	1.07 (0.75-1.53)	6	51	0.89 (0.43-1.88)	7	54	0.86 (0.43-1.70)	25	156	1.10 (0.77-1.58)
Hispanic												
White	358	2,548	0.97 (0.88-1.07)	12	98	0.79 (0.46-1.38)	164	1,176	0.94 (0.81-1.09)	206	1,470	0.98 (0.86-1.12)
Multiracial	60	373	1.03 (0.81-1.31)	5	23	1.38 (0.64-2.96)	26	176	0.89 (0.61-1.30)	39	220	1.17 (0.87-1.56)
Other race ^b	107	1,000	0.75 (0.62-0.90)	14	138	0.65 (0.39-1.10)	63	580	0.77 (0.61-0.99)	58	558	0.68 (0.53-0.89)

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