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The Interplay of Race, Socioeconomic Status and Neighborhood Upon Birth Outcomes
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CATHERINE KOTHARI PhD
Department of Epidemiology & Biostatistics, WMU Homer Stryker MD School of Medicine

RAJIB PAULPhD
Western Michigan Univ, Statistics Department

JAMES WILEY PhD
University of California, San Francisco, School of Medicine

KATHLEEN BAKER PhD
Western Michigan Univ, Geography Department

ARTHUR JAMES MD
Ohio State University, Dept of Obstetrics & Gynecology

DEB LENZ MPA
Kalamazoo County Health & Community Services

FERNANDO OSPINA MA
Eliminating Racism and Claiming/Celebrating Equality

BEN DORMITORIO PhD student
Western Michigan Univ, School of Medicine

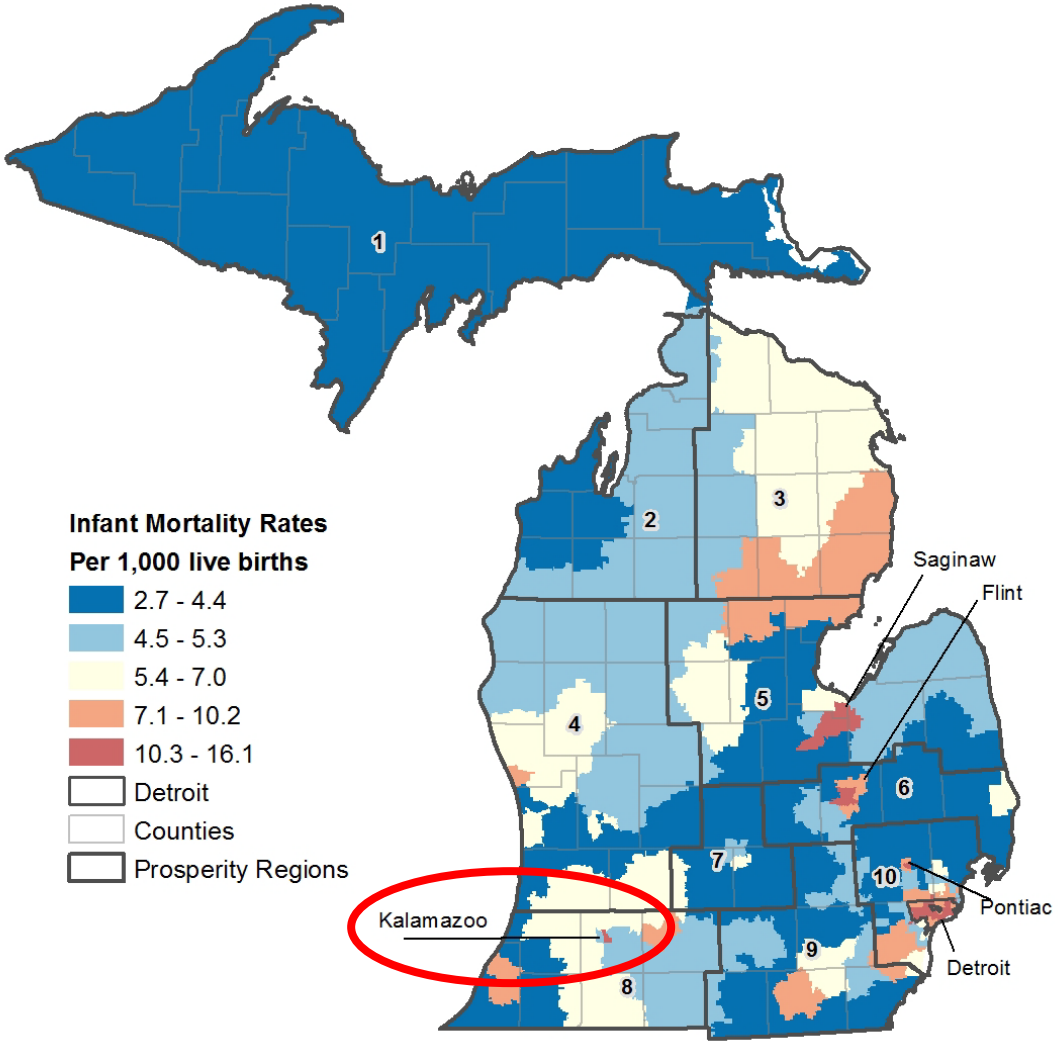
AMY CURTIS PhD MPH
Western Michigan Univ, Interdisciplinary Health Sciences

DISCLOSURE: The authors have no relevant financial relationship or affiliation with any commercial company related to the current study or presentation content.

INFANT MORTALITY: The White-Glove Test

Infant birth weight strongest predictor of infant mortality

Kalamazoo is an Infant Mortality Hot Spot



	No. Zones	No. Deaths	No. Births	% Black	%Medicaid
	27	719	199163	5.5	34.2
	23	636	130452	10.3	43.2
	22	627	104458	11.4	52.0
	25	739	88478	38.6	54.6
	17	639	49570	79.6	54.9
Total	114	3360	572121	19.2	44.5

Kalamazoo County Infant Mortality Trends

Infant Mortality Rates per 1,000 Live Births, Three-year moving Averages

	2002 - 2004	2003 - 2005	2004 - 2006	2005 - 2007	2006 - 2008	2007 - 2009	2008 - 2010	2009 - 2011	2010 - 2012	2011 - 2013	2012 - 2014
KALAMAZOO COUNTY IMR RATE	8.8	7.3	6.4	7.2	7.1	8.4	8.6	7.6	6.4	6.0	6.4

Source: Michigan Department of Community Health, Division for Vital Records and Health Data Development. *Michigan Infant Death Statistics*. March, 2014.

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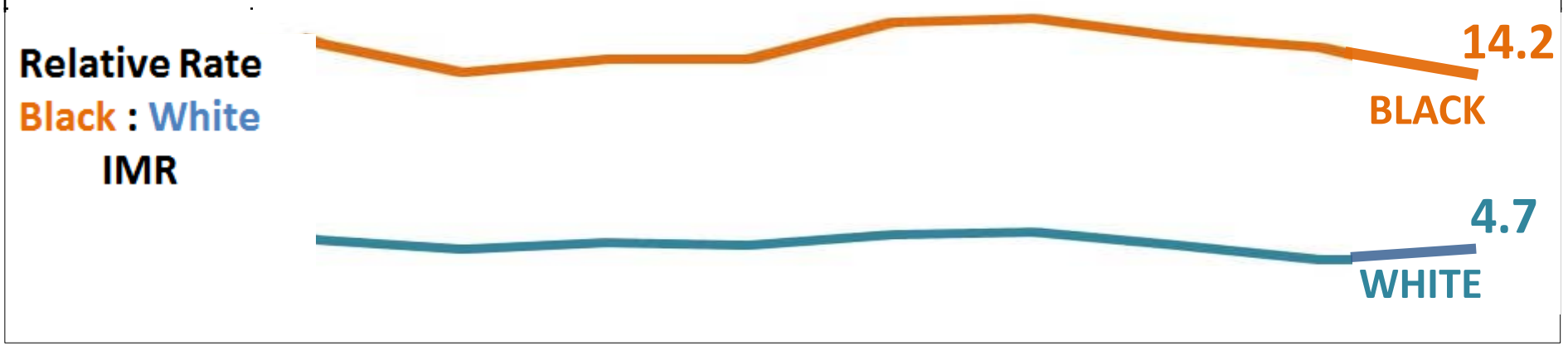


Source: Michigan Department of Community Health, Division for Vital Records and Health Data Development. *Michigan Infant Death Statistics*. March, 2014.

Research Questions

1. Given race, does maternal socioeconomic status further predict infant birth weight?

2. Given individual race and socioeconomic status, does neighborhood racial composition further predict infant birth weight?

Methods

Cross sectional, observational study

Secondary Data Analysis

- Individual-level: 2010 birth certificate data (N=2,861)
- Neighborhood: 2010 U.S. Census data (N=57 census tracts)

ArcGIS 10.0

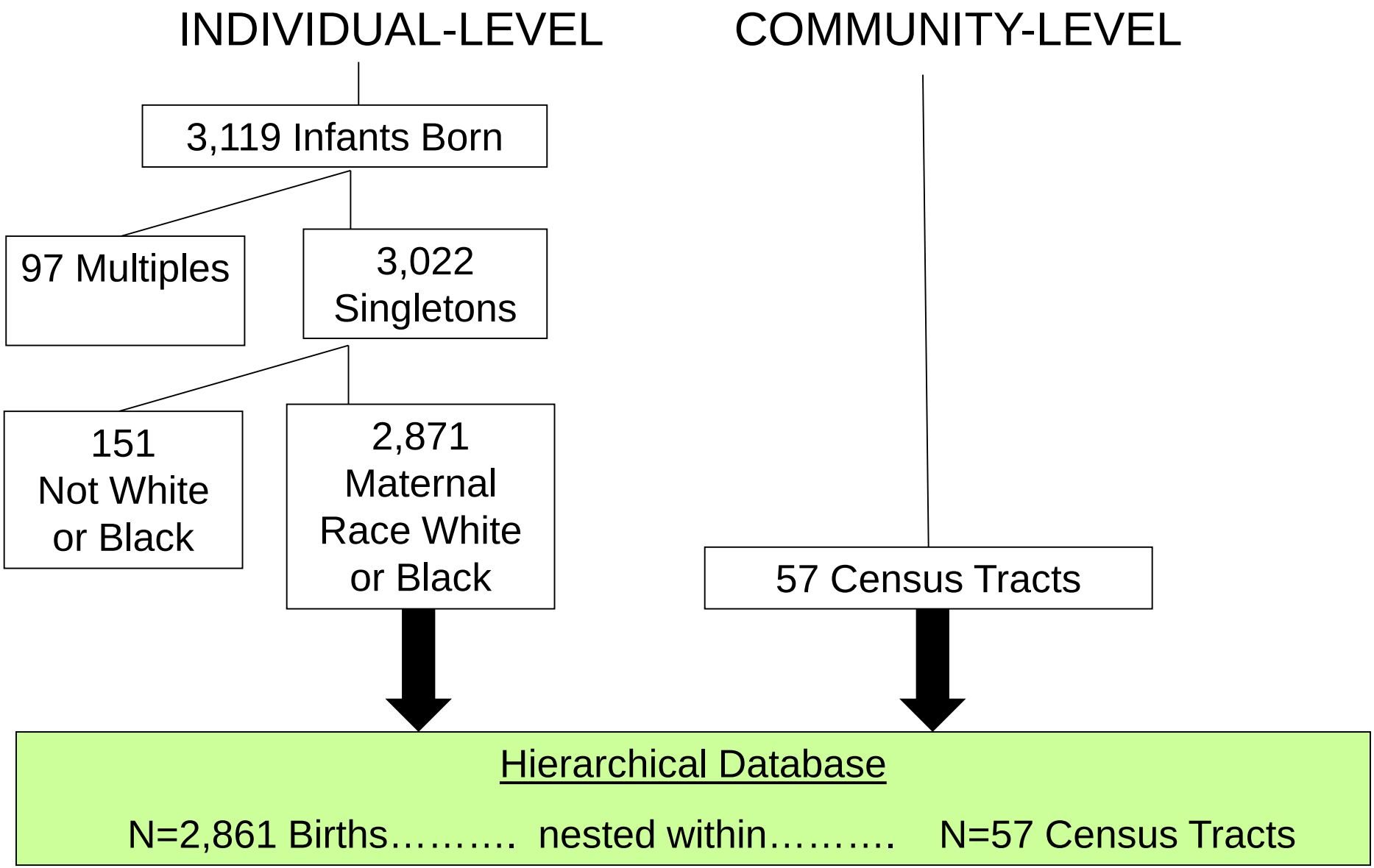
- Geo-coded individual-level birth records using maternal address
- Then linked to census tract data through a spatial join

Measures

- Infant Birth Weight (LBW, <2500 grams) or not

- Race
  - Individual: Self-reported on birth certificate
  - Census tract: 20% + Threshold, Black residents
- Socioeconomic status (SES)
  - Individual: Medicaid-paid or private insurance-paid delivery
  - Census tract: 20% + Threshold, living in poverty

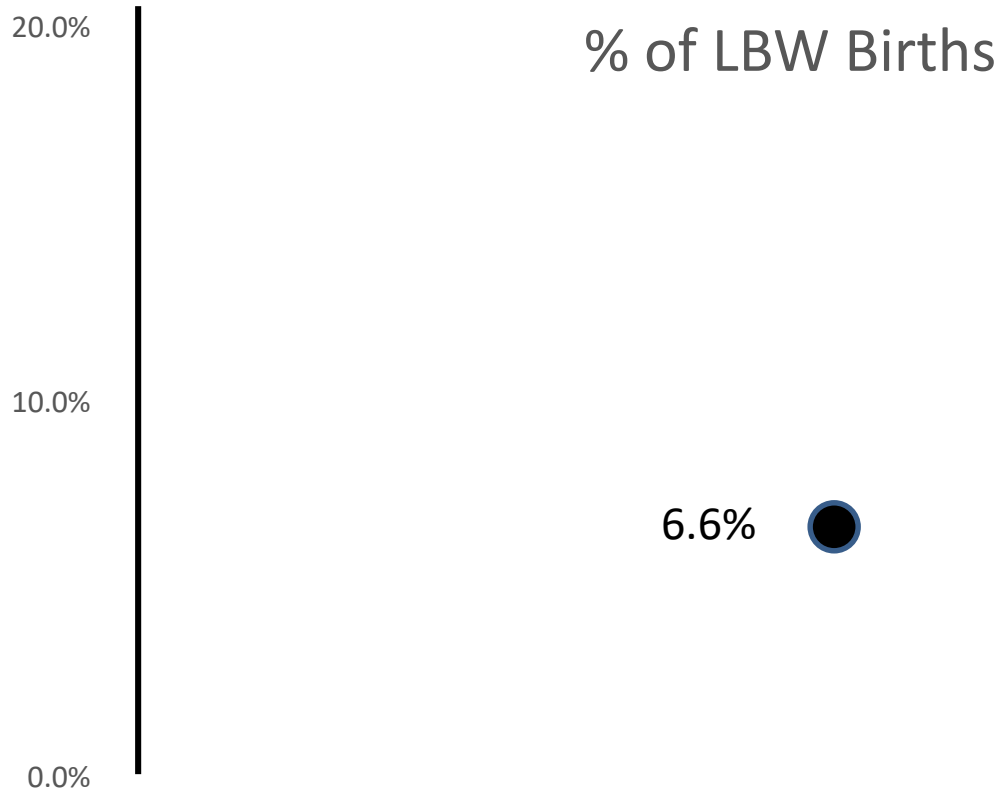
Study Populations



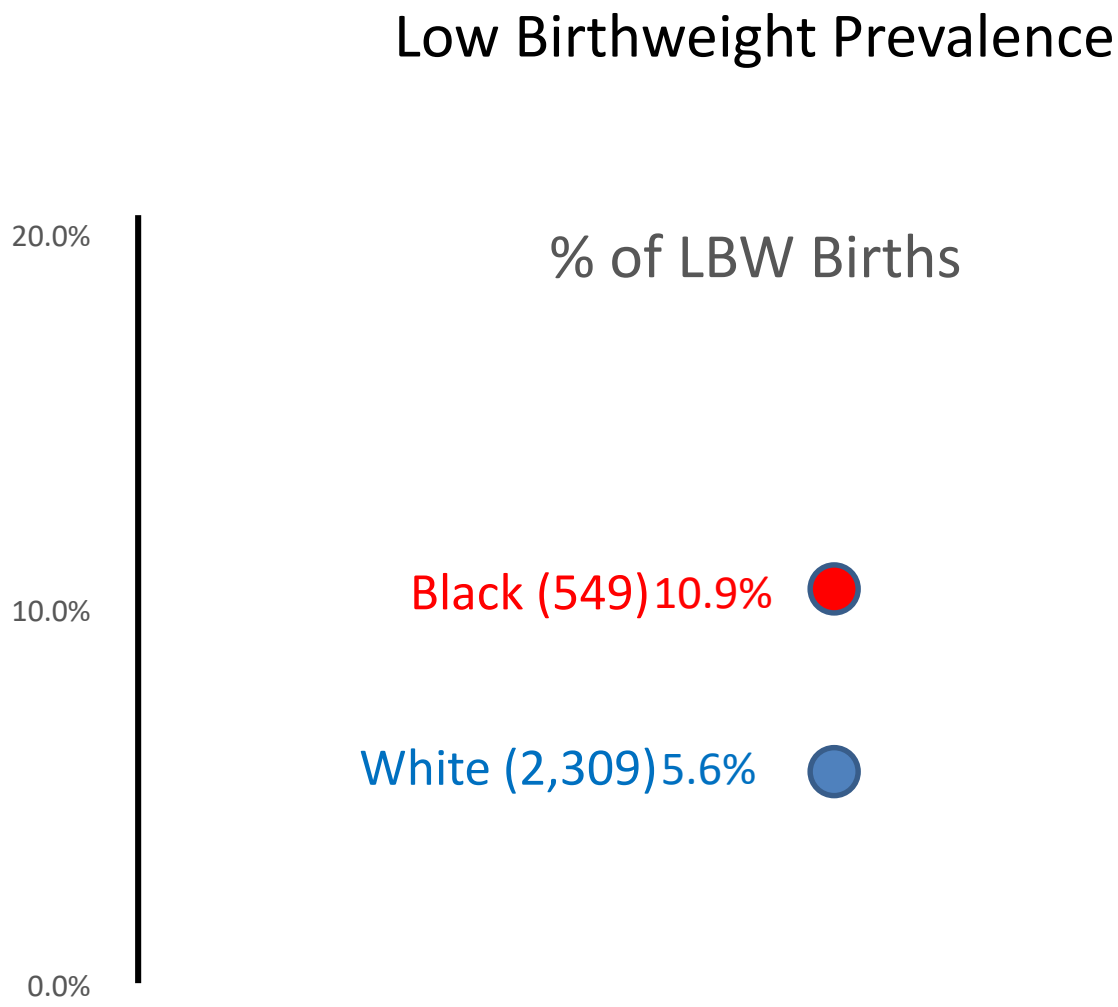
2010 Combined White/Black Birth Population

(N=2,861)

Low Birthweight Prevalence



Black Infants have Worse Birth Outcomes



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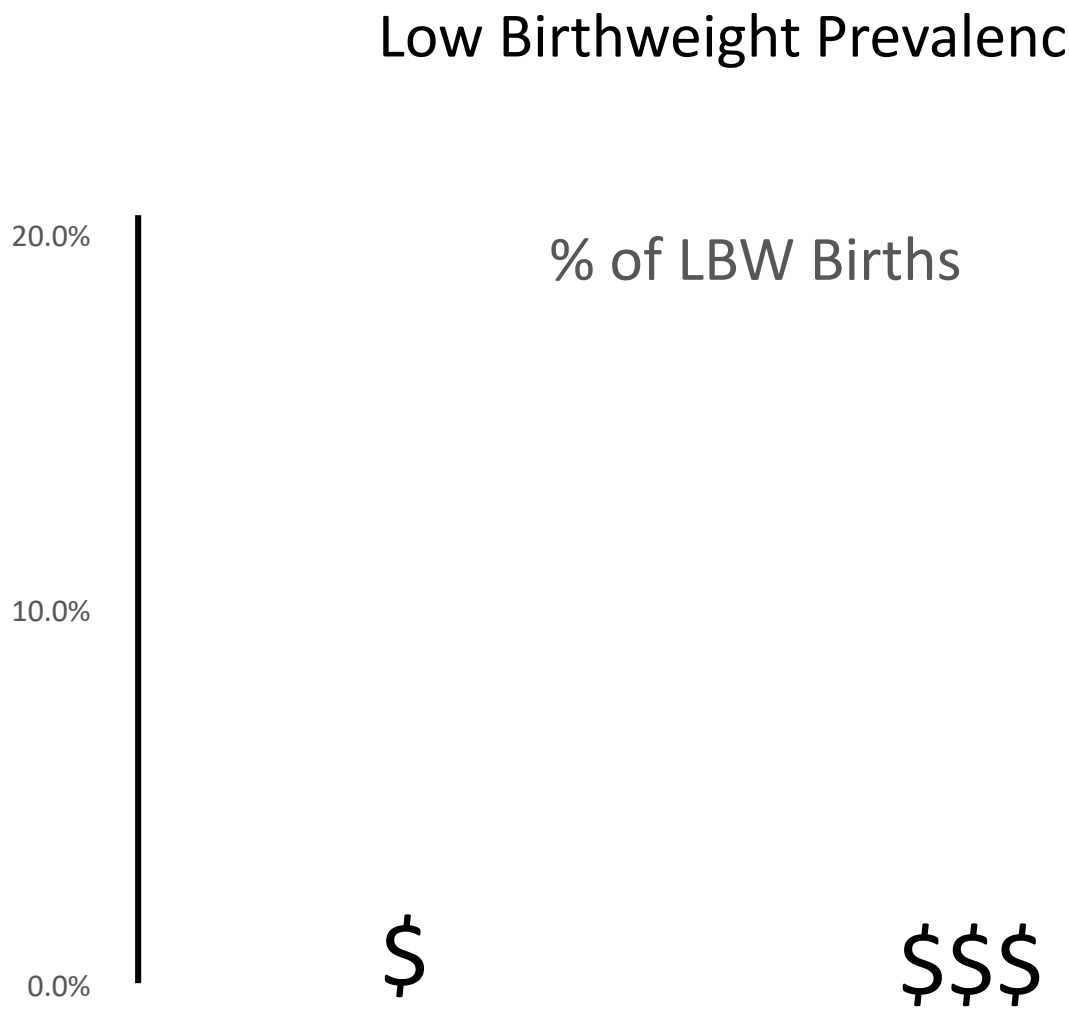
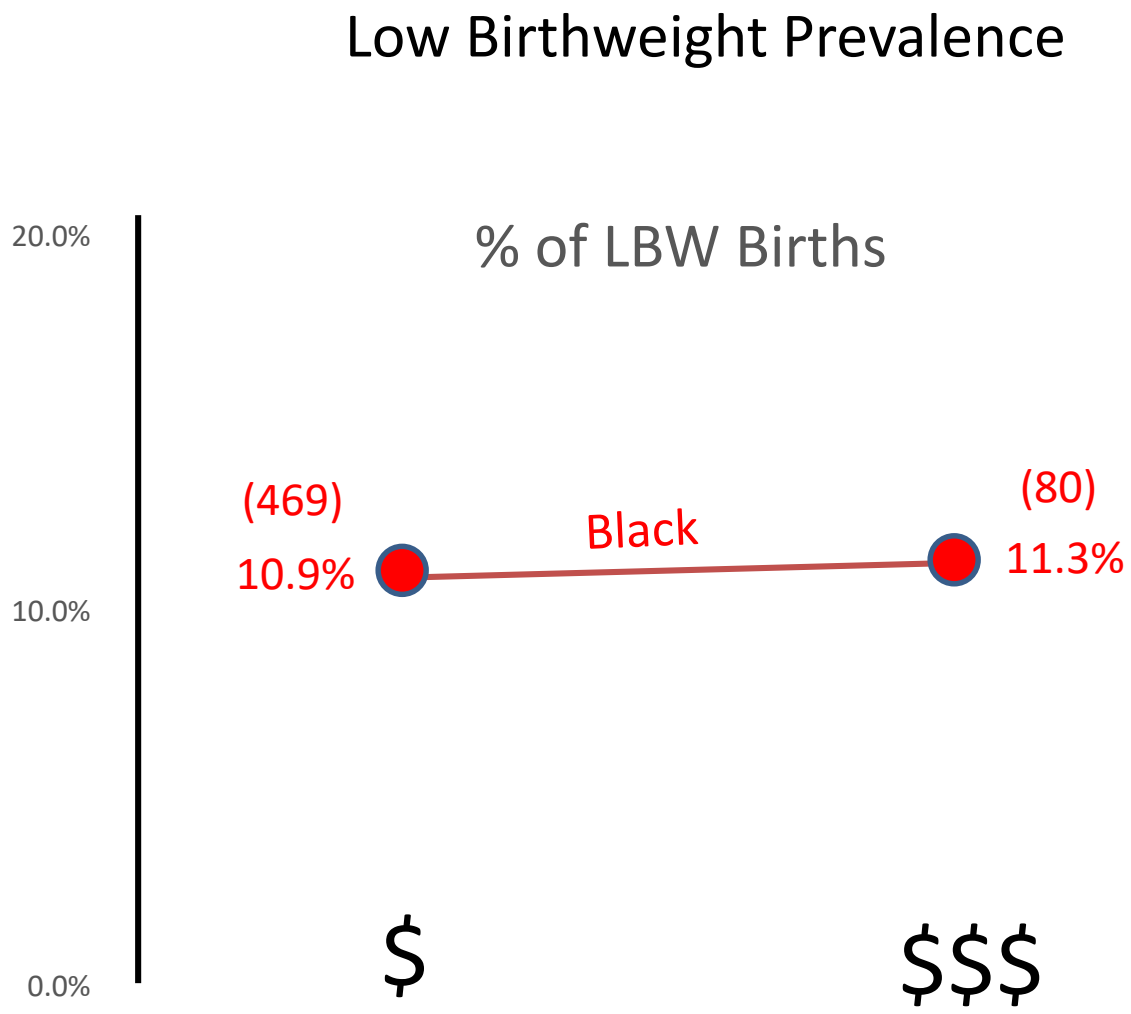
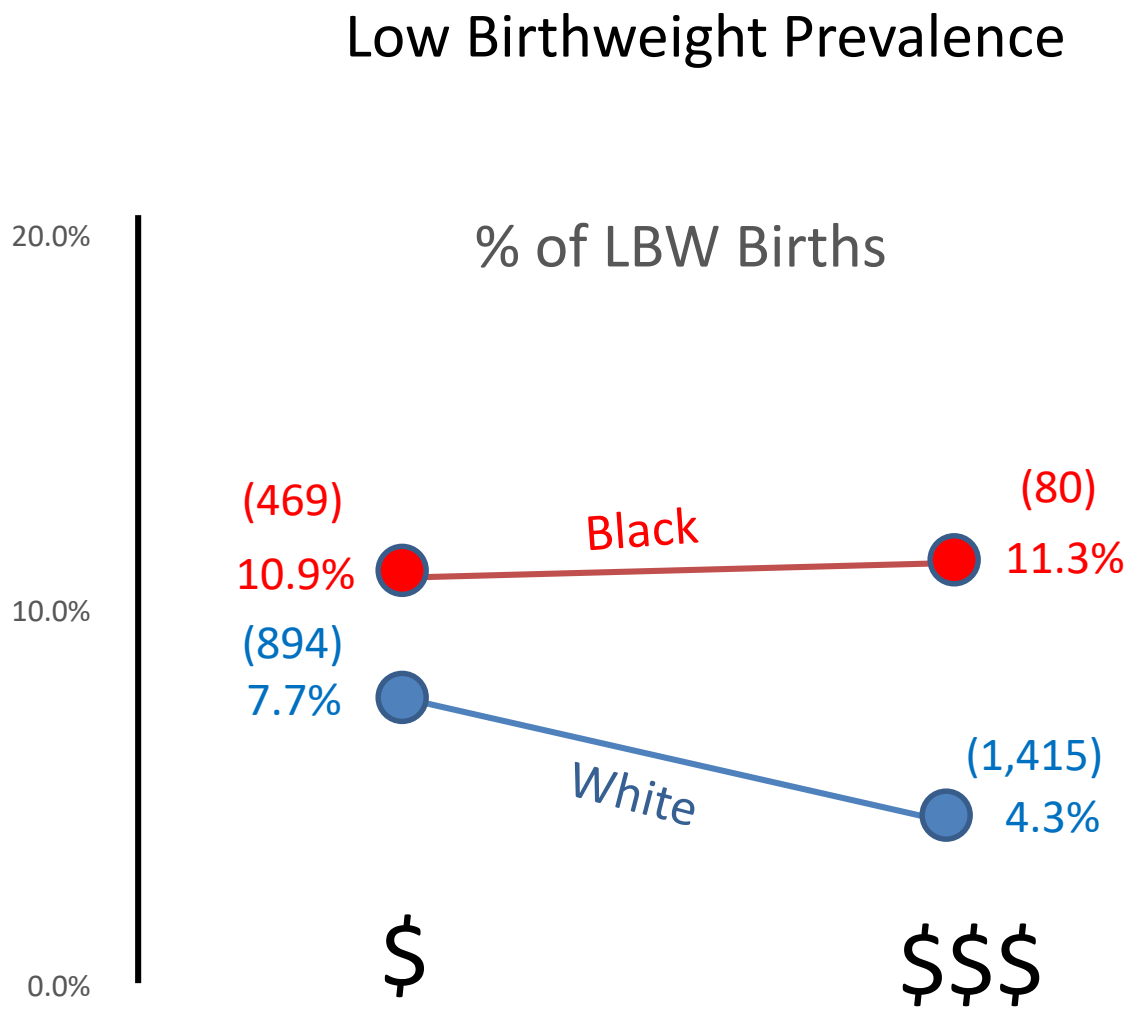


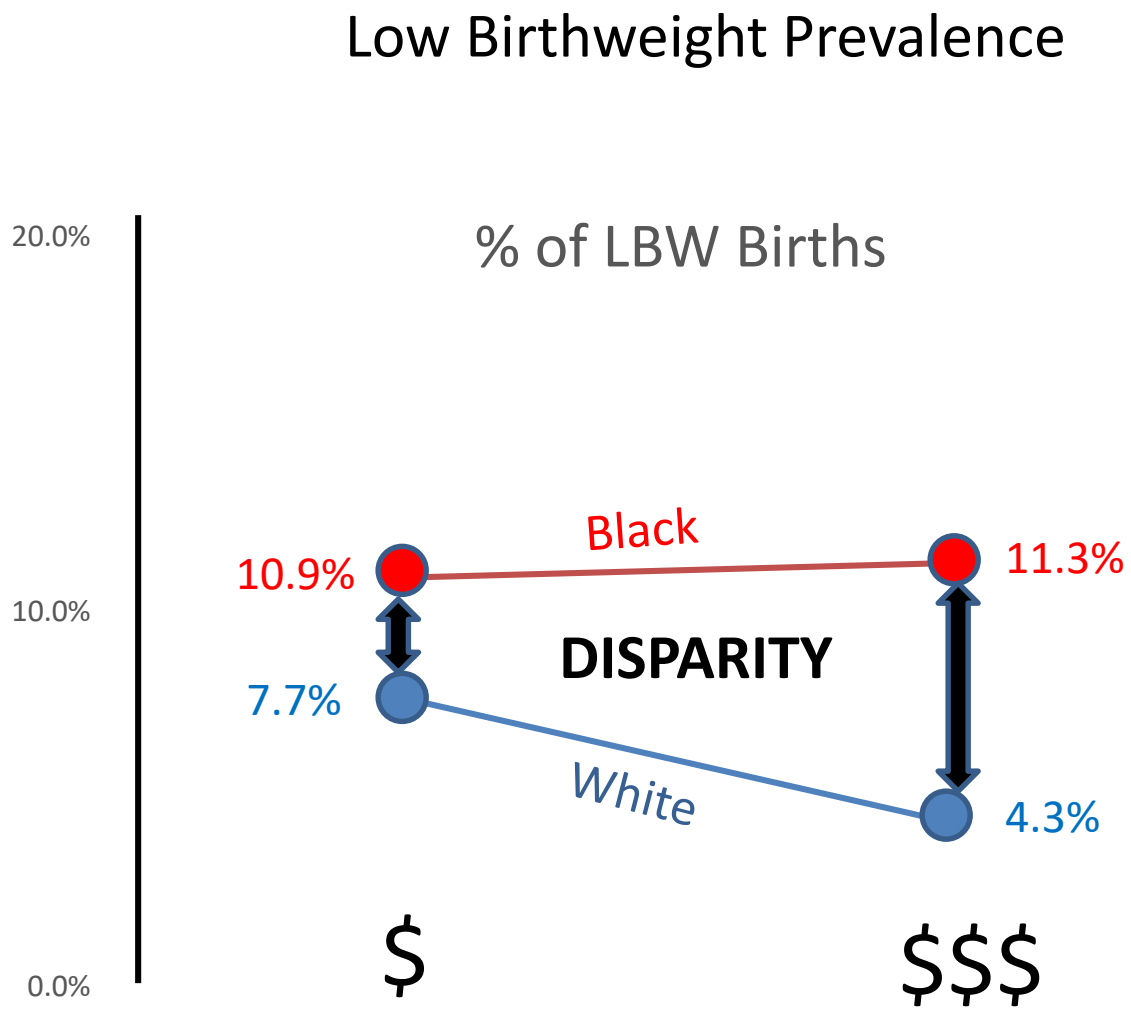
Black Infants have Worse Birth Outcomes Regardless of Income



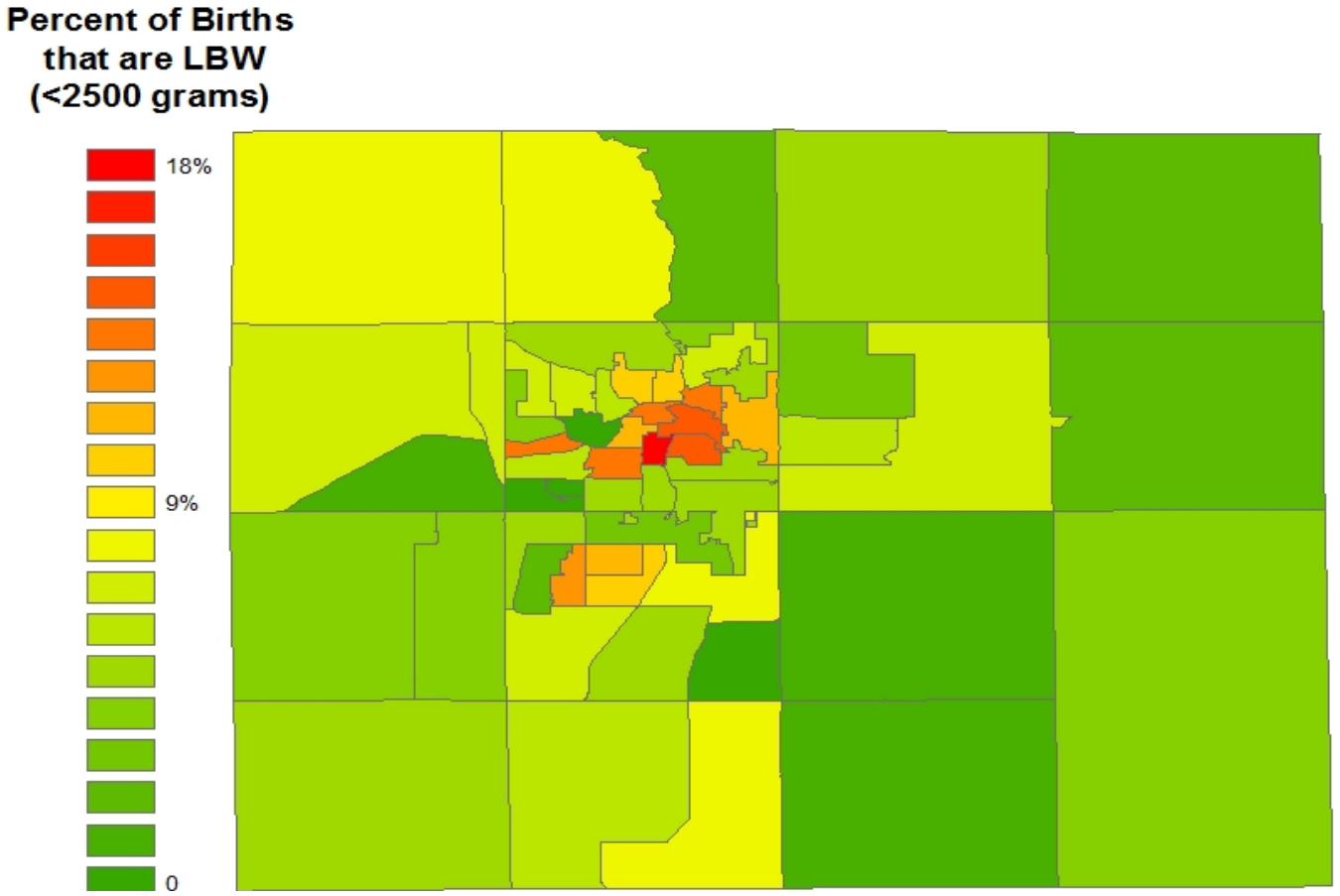
White Infants Benefit from Higher Income



Disparity Increases with Income Level



Place Matters: Hot spots within Kalamazoo



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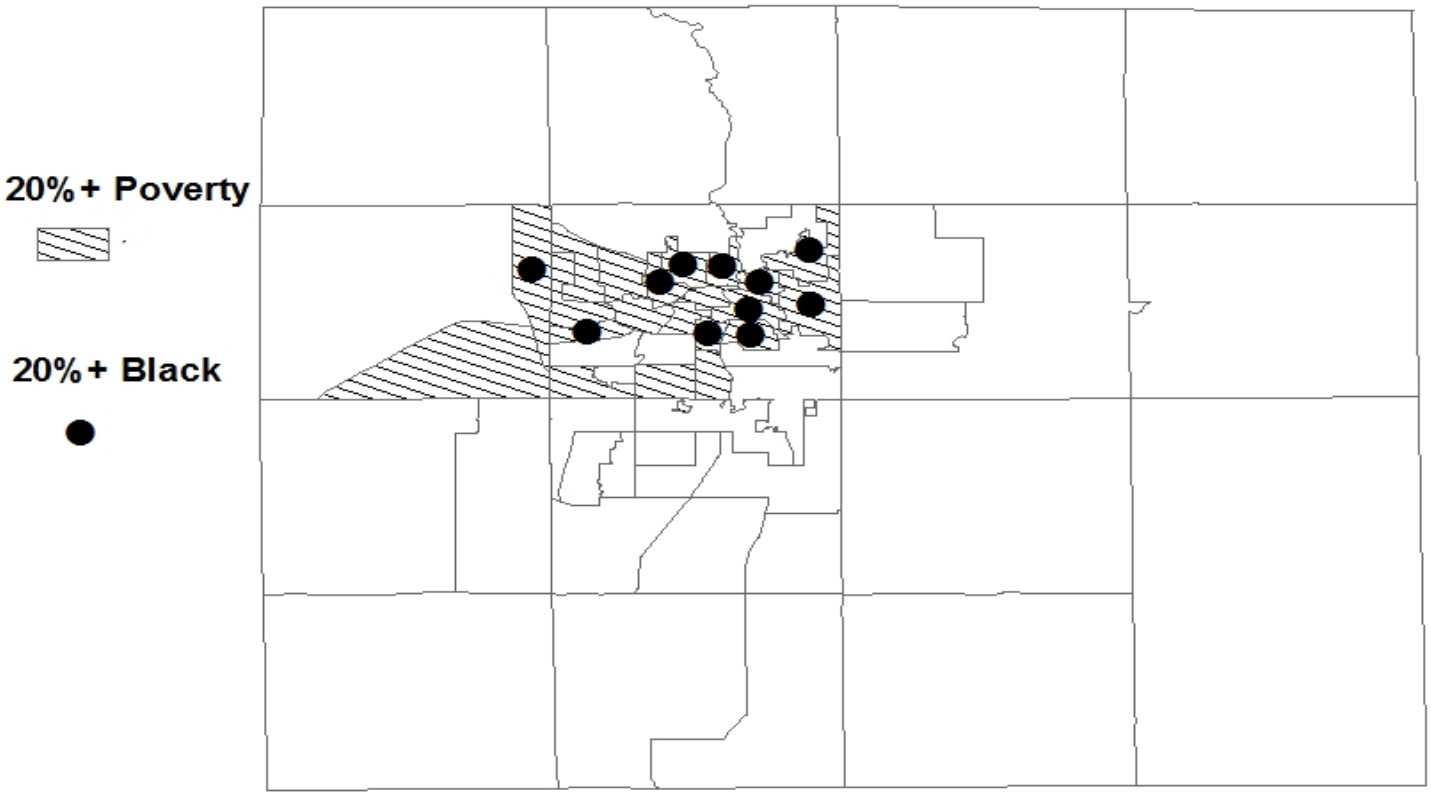

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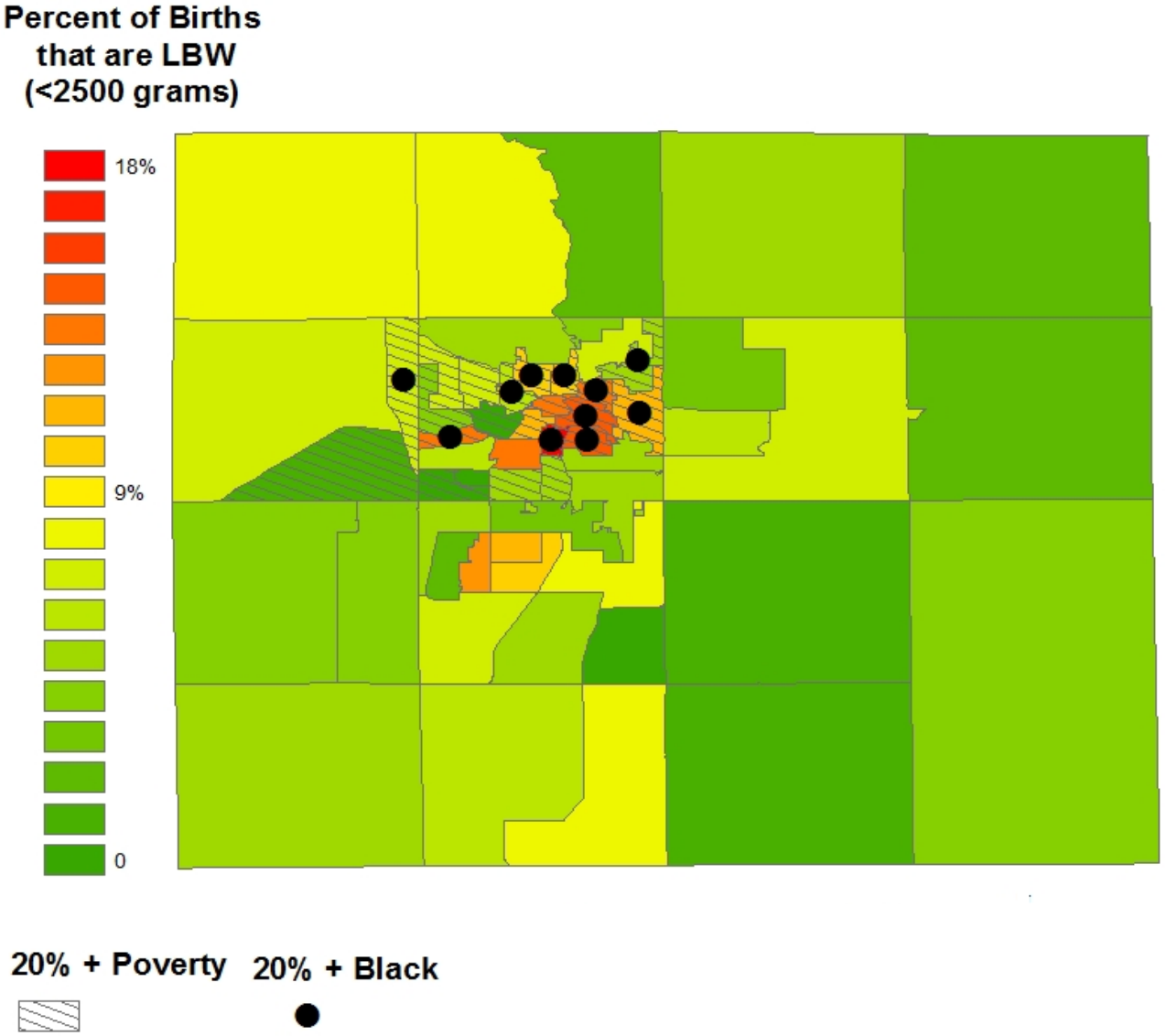
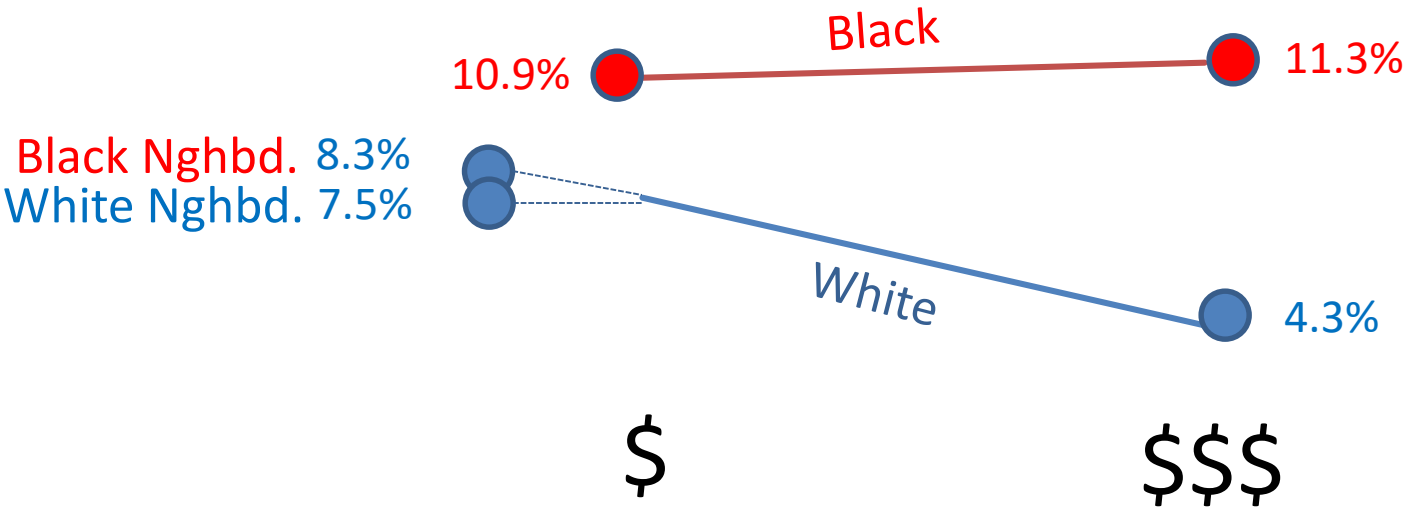


Place: Low Income Whites

Low Birthweight Prevalence

Live in….



Place: Low Income Blacks

Low Birthweight Prevalence

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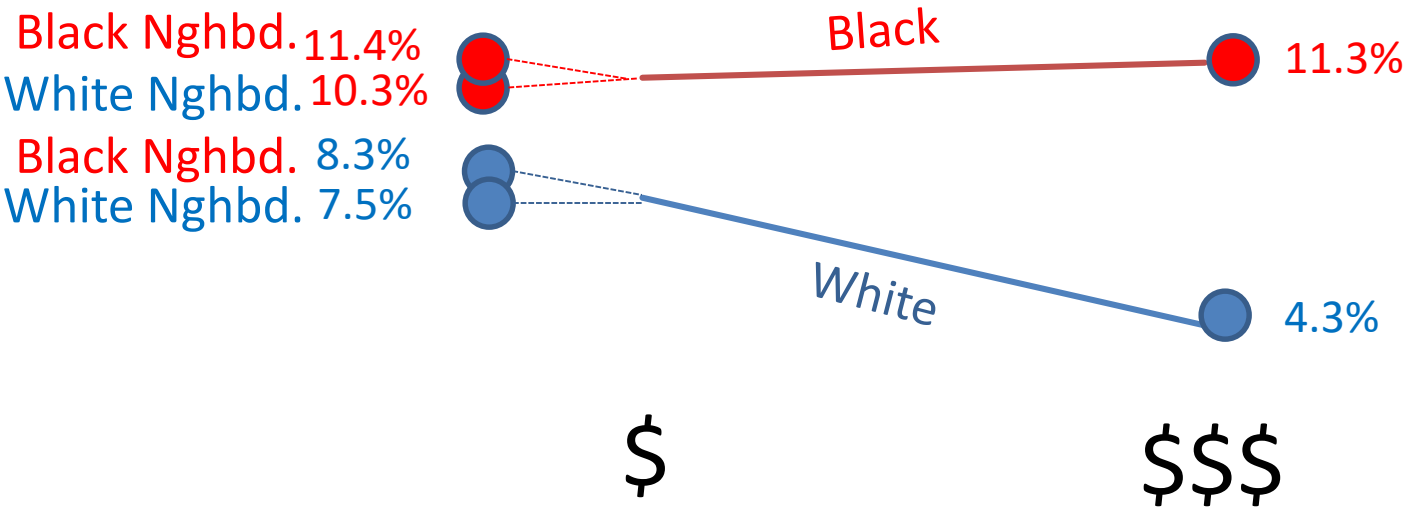
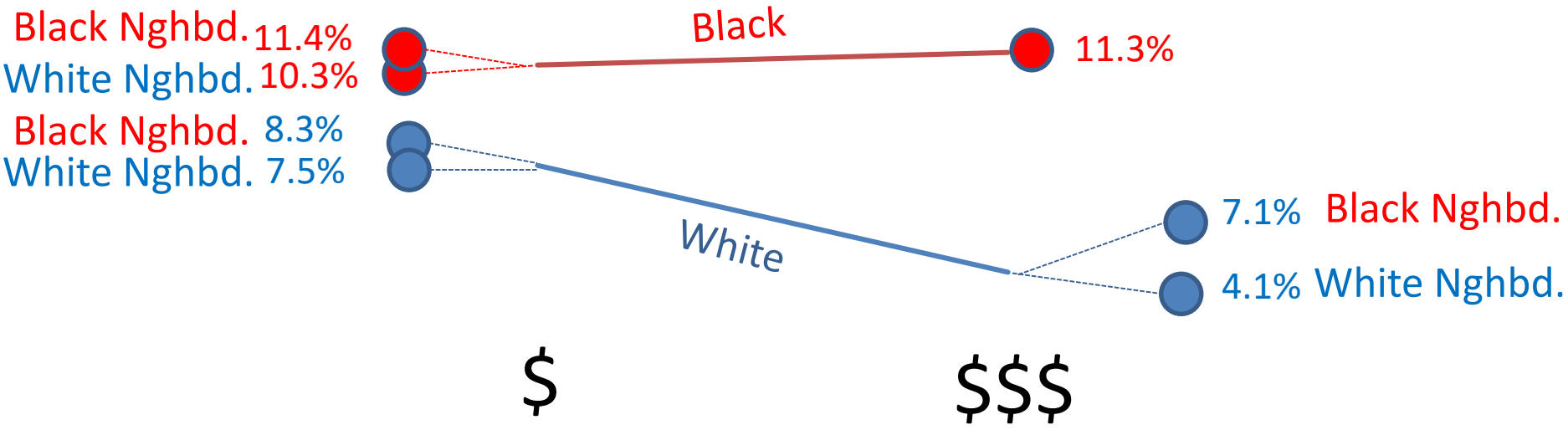


Place: Higher-Income Income Whites

Low Birthweight Prevalence

Live in….



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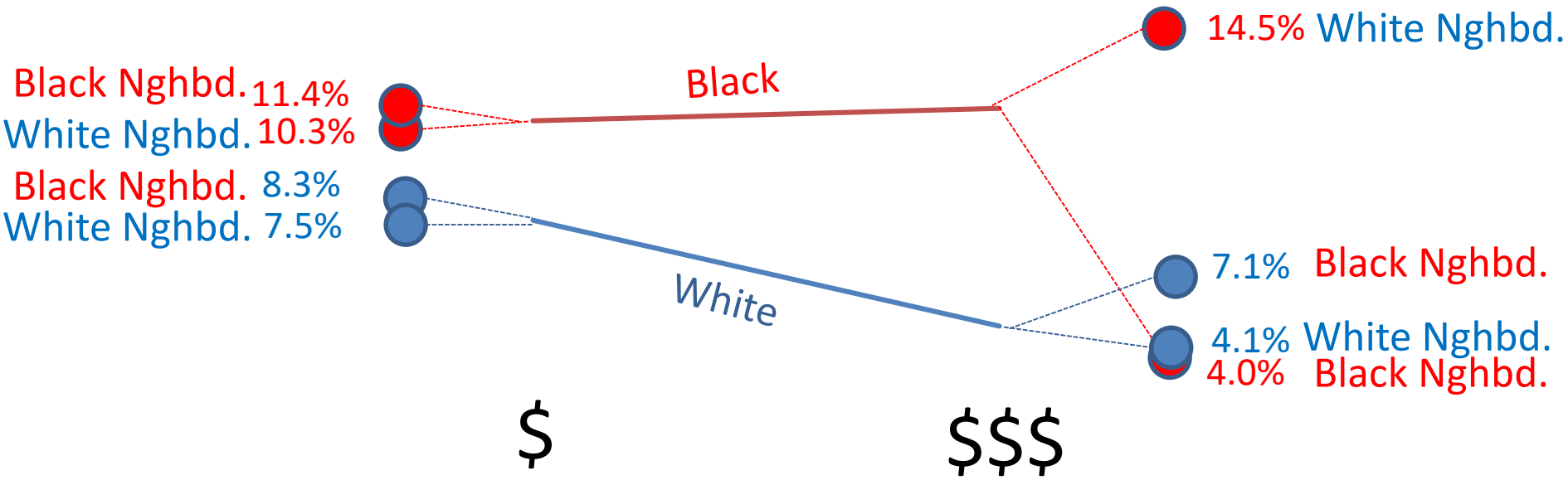
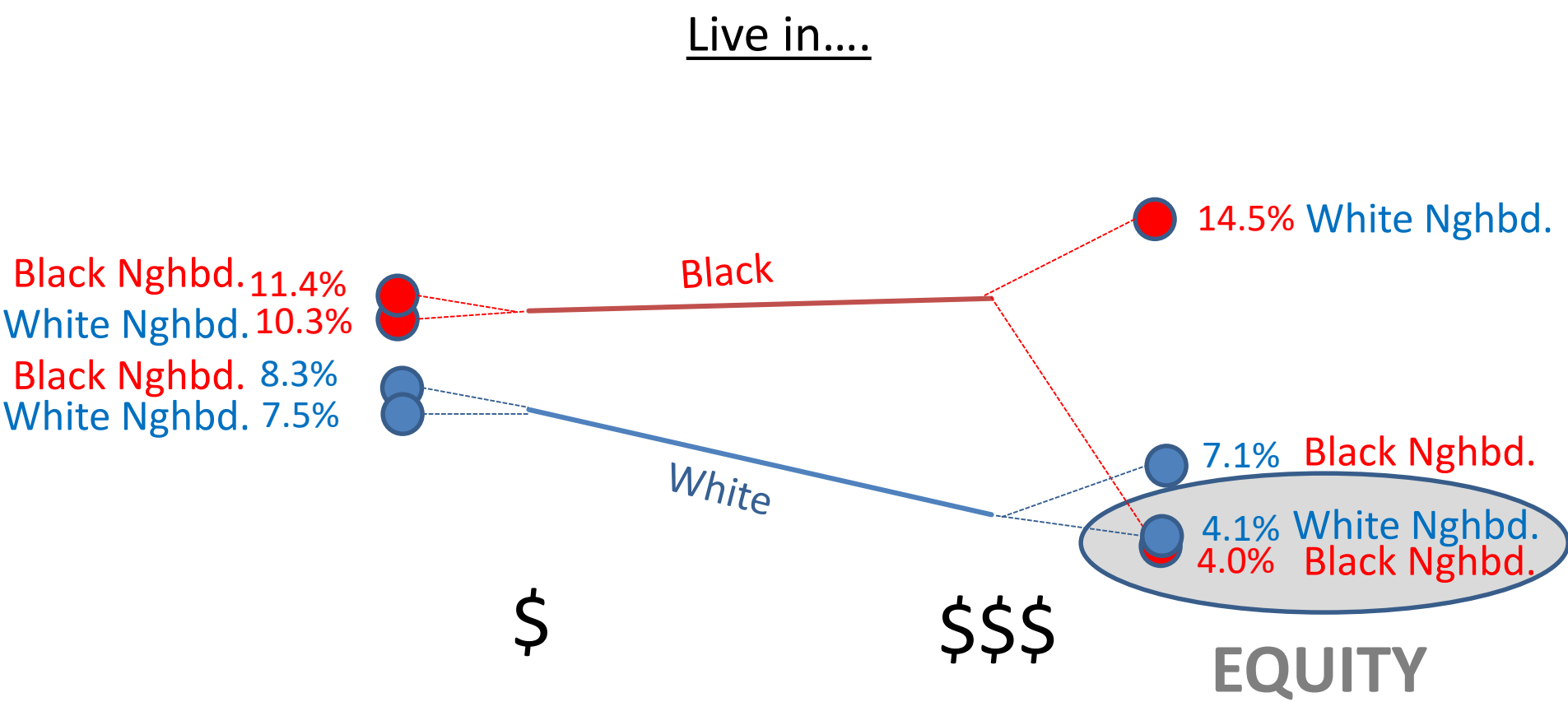


EQUITY: Higher-Income / Living in Racially-Congruous Neighborhoods

Low Birthweight Prevalence



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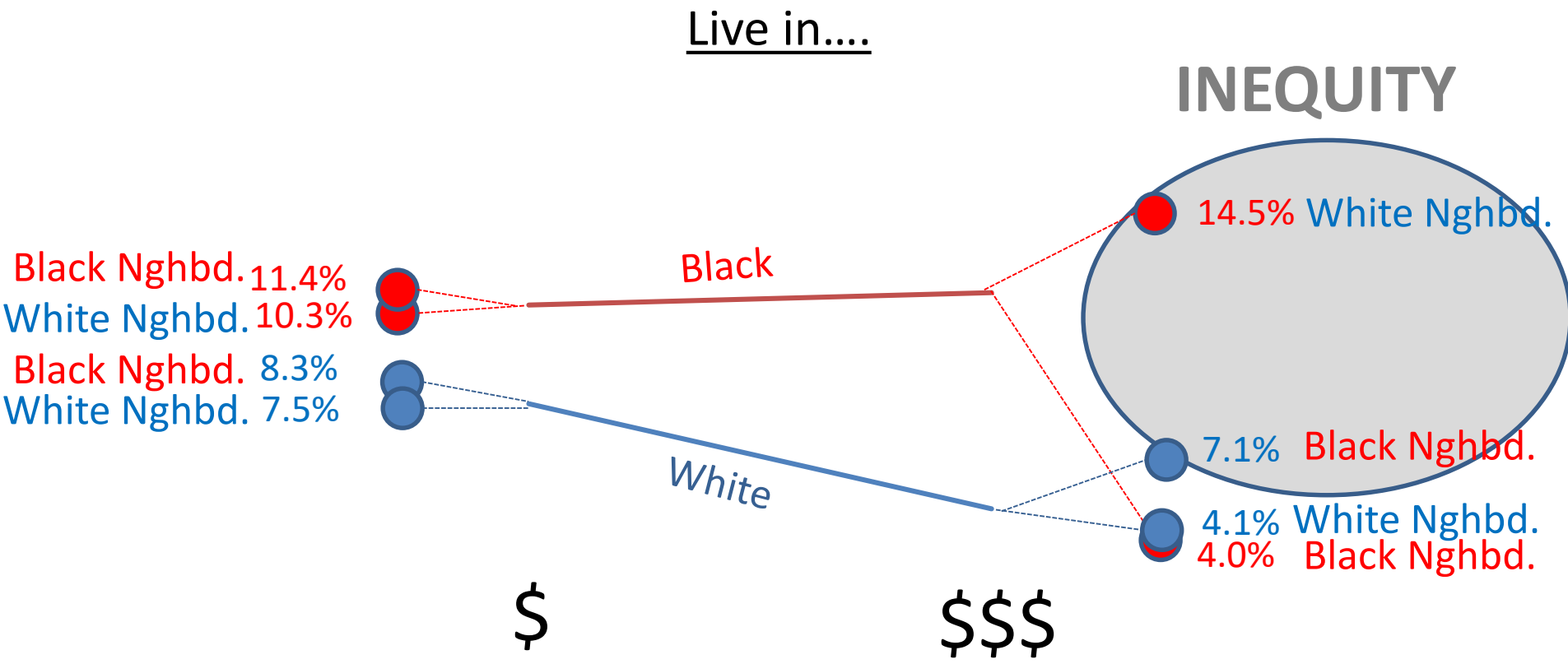
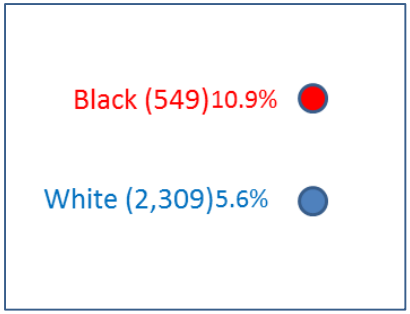


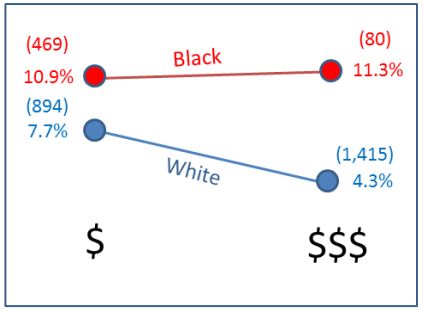
		Model 1
Individual SES	**$$$**	***(ref)***
	$	**1.73 (1.27, 2.40)**
Individual Race	**White Women**	***(ref)***
	Black Women	**1.59 (1.13, 2.22)**



[Model Fit]*	**Posterior predictive distribution capture rate**	**95.27%**

		Model 1	Model 2
Individual SES	$$$	*(ref)*	
	$	1.73 (1.27, 2.40)	
Individual Race	White Women	*(ref)*	
	Black Women	1.59 (1.13, 2.22)	
Community SES	$$$ Neighborhood		*(ref)*
	$ Neighborhood		0.99 (0.62, 1.52)
Community Race	White Neighborhood		*(ref)*
	Black Neighborhood		1.58 (0.97, 2.64)
[Model Fit]*	Posterior predictive distribution capture rate	95.27%	70.55%

		Model 1	Model 2	Model 3
Individual SES	$$$	*(ref)*		
	$	1.73 (1.27, 2.40)		
Individual Race	White Women	*(ref)*		
	Black Women	1.59 (1.13, 2.22)		
Community SES	$$$ Neighborhood		*(ref)*	
	$ Neighborhood		0.99 (0.62, 1.52)	
Community Race	White Neighborhood		*(ref)*	
	Black Neighborhood		1.58 (0.97, 2.64)	
INTERACTION: Individual SES X Individual Race	$$$ White Women			*(ref)*
	$ White Women			1.91 (1.35, 2.74)
	$$$ Black Women			2.67 (1.15, 5.57)
	$ Black Women			2.71 (1.82, 3.97)



[Model Fit]*	Posterior predictive distribution capture rate	95.27%	70.55%	95.01%

		Model 1	Model 2	Model 3	Model 4
Individual SES	$$$	*(ref)*			
	$	1.73 (1.27, 2.40)			
Individual Race	White Women	*(ref)*			
	Black Women	1.59 (1.13, 2.22)			
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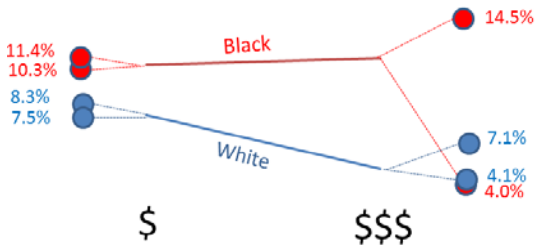
INTERACTION: Individual SES X Individual Race X Community Race	$$$ White Women, in White Neighborhd				*(ref)*
	$ White Women, in White Neighborhd				1.99 (1.34, 2.96)
	$$$ Black Women, in White Neighborhd				3.87 (1.64, 8.27)
	$ Black Women, in White Neighborhd				2.67 (1.59, 4.50)
	$$$ White Women, in Black Neighborhd				1.68 (0.66, 3.75)
	$ White Women, in Black Neighborhd				2.10 (1.17, 3.64)
	$$$ Black Women, in Black Neighborhd				0.57 (0.03, 3.84)
	$ Black Women, in Black Neighborhd				3.01 (1.87, 4.79)
[Model Fit]*	Posterior predictive distribution capture rate	95.27%	70.55%	95.01%	69.58%



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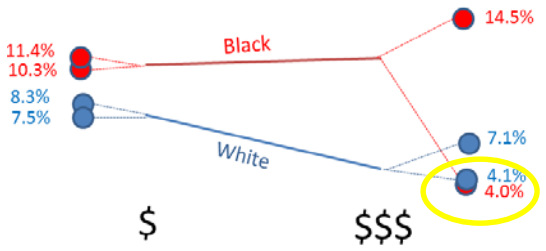

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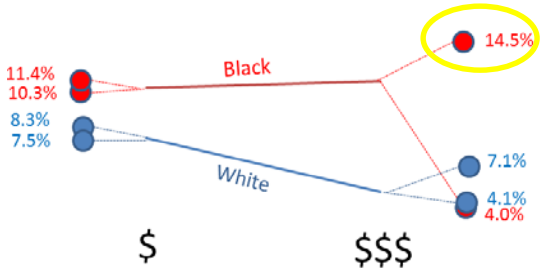

Study Limitations

- Design is observational, cannot infer causation
- Race / Income measures are crude
- Contributors not accounted for
- Small cell sizes limit statistical power

Conclusions

- Race, socioeconomic status and neighborhood together predict health
- Being Black and being poor both associated with poor birth outcomes
- Income appears to benefit Whites but not Blacks
- Among higher-income Black women, neighborhood racial congruity may have a differential effect upon risk:
  - Equity: racially-congruous neighborhood
  - Inequity: racially-incongruous neighborhood

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QUESTIONS,

COMMENTS