

The Influence of Maternal and Neighborhood Factors on Small-For-Gestational Age Births Pinellas County, FL: 2005-07

*Cheryl L. Clark, DrPH, RHIA
Daniel Thompson, MPH
William Sappenfield, MD, MPH
FLORIDA DEPARTMENT OF HEALTH
DIVISION OF FAMILY HEALTH SERVICES*

*ANALYTICAL CONSULTANT
Adam C. Carle, PhD
Cincinnati Children's Hospital Medical Center
University of Cincinnati College of Medicine*



Background

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- **Partnership to Eliminate Disparities**
 - Created by CityMatCH, the Association of MCH Programs and the National Healthy Start Association (NHSA) with funding from the W. K. Kellogg Foundation
 - Initiated the Infant Mortality and Racism Action Learning Collaborative (ALC)
 - ✦ Purpose: to address the influence of racism on disparities in infant mortality
 - ✦ Six metropolitan areas participated
 - Aurora, CO
 - Chicago, IL
 - Columbus, OH
 - Los Angeles, CA
 - Milwaukee, WI
 - Pinellas County, FL

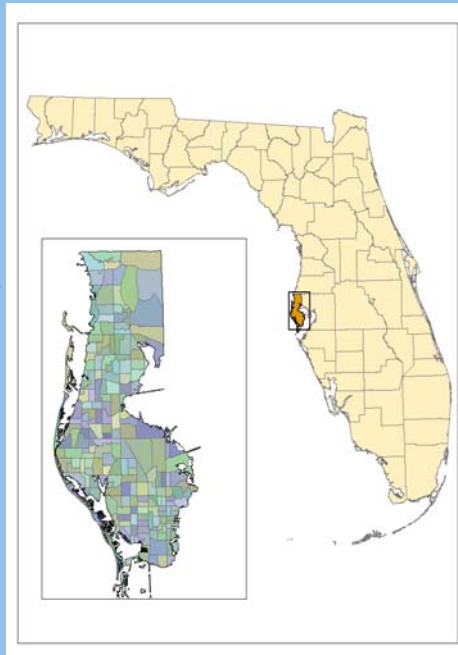
Background

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- **Pinellas County Action Learning Collaborative (PALC)**
 - Formed for Infant Mortality and Racism Action Learning Collaborative
 - PALC Mission: assess impact of racism on perinatal health outcomes from quantitative, qualitative and community engagement perspectives
 - Quantitative assessment: identify maternal and neighborhood factors associated with racial disparities

Pinellas County, FL

- **Location:** FL Central Gulf Coast
- **6th largest county in Florida**
 - 2005-09 population: 915,003
 - 3277.2 persons per sq. mile
- **Cities:** St. Petersburg, Clearwater
- **Significant Demographics**
 - Older population: 20.7% over 65 (v. 17.1% FL & 12.6% US)
 - Race/Ethnicity
 - ✦ 84% White (> FL & US)
 - ✦ 10% Black (<FL & US)
 - ✦ 7% Hispanic (< FL & US)



Racial Disparities in Birth Outcomes

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Pinellas has a history of Black-White disparities in major birth outcomes that are higher than Florida

Birth Outcome	Black-White Rate Ratio 1999-2009	
	Pinellas	Florida
Low Birthweight	2.11	1.84
Preterm	1.69	1.53
Infant Mortality	2.91	2.39

Influences on Health: Example of Nested Relationships

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Neighborhood/Community Factors

- Economic
- Education
- Housing
- Behavioral
- Political
- Governmental
- Psychosocial
- Medical
- Public Health
- Physical Environment
- Transport
- Employment

Personal Factors

- Biological
- Psychosocial
- Social
- Education
- Marital Status
- Behavioral

Individual's Health

Chronic Disease

Acute Illness

Injury

Mental Health

Neighborhood Factors Associated with Infant Health Outcomes

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- Access to health services
- Crowded households
- Neighborhood support
- Pollution exposure
- Neighborhood residents' incomes
- Crime rates
- Racial/Ethnic composition
- Racial residential segregation



Research Question

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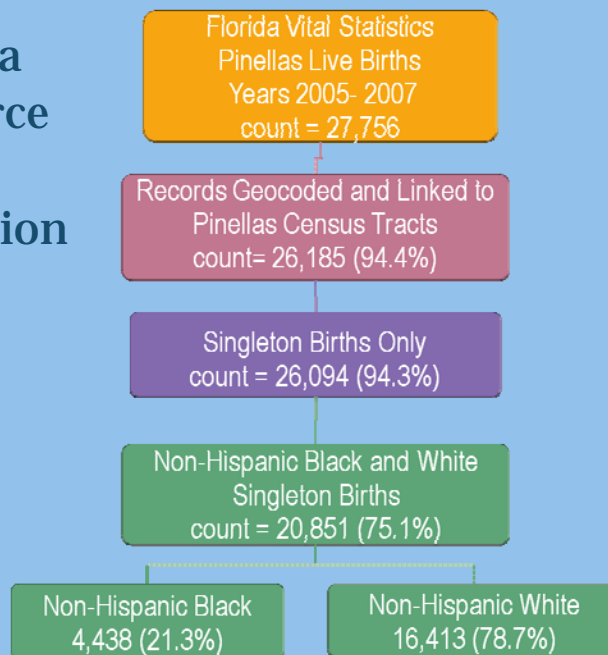
Are maternal and neighborhood factors associated with the delivery of small-for-gestational age (SGA) infants and racial disparity in SGA births?

SGA & Infant Health

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- SGA infants have a higher risk of
 - Infant death
 - Nervous system problems
 - Delays in mental development
 - Delays in physical development
- SGA infants can be
 - Preterm
 - Low birthweight
 - Both preterm or low birthweight
 - Neither preterm or low birthweight

Data Source & Selection



Small-for-Gestational Age Infant (SGA)¹¹

SGA Infant Definition

- An infant with a birthweight less than the lowest 10% of the birthweights of all infants at his/her gestational age
 - Clinical gestational age from birth record used for SGA classification
 - Infants with gestational ages <22 weeks or > 44 weeks were categorized as unknowns

Study Variables: Maternal

Note: For all maternal factors, there were significant distribution differences between Black & White mothers (χ^2 , p-value < .05)	Black	White
< 18 years old	9.3%	2.0%
> 35 years old	5.3%	15.1%
Marital Status: Married	19.2%	64.5%
High School Graduate	76.6%	89.4%
Underweight BMI Category	5.1%	6.7%
Overweight BMI Category	24.0%	20.4%
Obese BMI Category	22.2%	13.7%
Smoked During Pregnancy	7.0%	13.3%
Paternal Information Present on BC	75.0%	93.3%
Late prenatal care	25.5%	15.4%
No prenatal care	3.1%	1.1%
Prenatal WIC	60.1%	25.1%
Delivery Paid by Medicaid	72.5%	35.8%

Study Variables – Neighborhood Factors (1)

- **Education: % Not High School Graduates**



Higher Neighborhood Education → Better Health

- **Behavior: Neighbor Violent Death Ratio**



Higher Neighborhood Crime (Actual/Perceived) → Worse Health

Study Variables – Neighborhood Factors (2)

- **Economic: Median Household Income**



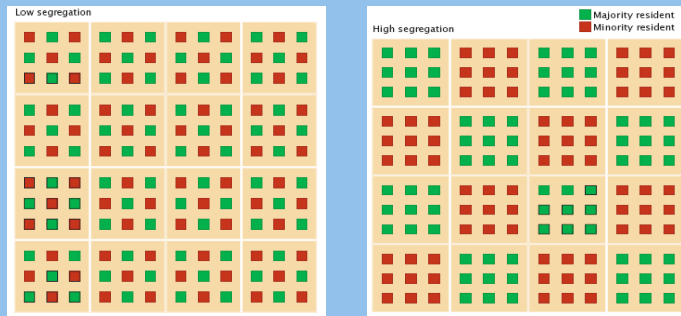
Higher Neighborhood Income → Better Health

- **Housing: Racial Segregation – Isolation Index**



Higher Segregation → Worse Health

Residential Segregation: Isolation Index



- A measure of exposure between two groups
- Measures the extent minority members are only “exposed” to own group
- Index score values can range from 0 to 1 (fully integrated to total segregation)

Graphics from Iceland, J., Weinberg, D. H. & Steinmetz, E. (2002). Racial and Ethnic Residential Segregation in the United States: 1980-2000. U.S. Census Bureau, Series CENSR-3. Washington, DC: U.S. Government Printing Office.

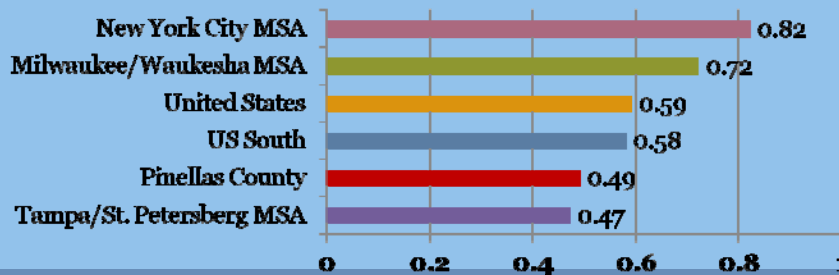
Residential Racial Segregation

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Isolation Index for Pinellas County's Black Population = 0.49

- Interpretation: 49% of Pinellas's Black population have residential exposure only to Black Pinellas residents

Comparative Isolation Indexes



Study Variables – Neighborhood (1)

	Black	White
% Non-High School Graduates*		
1st quartile (lowest = optimal)	10.7%	35.0%
2nd quartile	18.5%	30.2%
3rd quartile	16.6%	22.0%
4th quartile	54.1%	12.7%
Residential Segregation – Isolation*		
1st quartile (lowest = optimal)	4.3%	32.8%
2nd quartile	8.9%	29.7%
3rd quartile	16.0%	23.6%
4th quartile	70.8%	13.9%

*Black-White differences significant at a p-value < 0.05

Study Variables – Neighborhood (2)

	Black	White
Neighbor Violent Death Ratio*		
1st quartile (lowest = optimal)	7.3%	30.5%
2nd quartile	13.4%	27.6%
3rd quartile	18.3%	26.6%
4th quartile	61.0%	15.2%
Median Household Income		
1st quartile*	54.3%	17.5%
2nd quartile	21.7%	23.1%
3rd quartile*	17.1%	28.0%
4th quartile (highest = optimal)*	6.8%	31.4%

*Black-White differences significant at a p-value < 0.05

Analysis Methods

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- **Generalized Estimating Equation (GEE) Logistic Regression**
 - Adjusts for clustering or grouping of people in the same area that share the same environment (i.e., neighborhoods, census tracts)
- **Software Application: STATA v. 10.1 (StataCorp, College Station, TX)**

Results

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- **2,032 infants of 20,851 identified as SGA (9.75%)**
- **Missing SGA status for 71 infants (0.3%)**
 - Less than 22 gestational weeks = 28
 - More than 42 gestational weeks = 5
 - Unknown gestational weeks = 37
 - Missing birthweight = 1
- **SGA by Race**
 - Black = 748 of 4,438 (16.84% of Black infants)
 - White = 1,284 of 16,413 (7.82% of White infants)
- **Racial Disparity**
 - Risk of SGA for Black infants is more than double the risk for White infants (Rate Ratio = 2.15)

Results: Significant Maternal Factors

Maternal Risk Factor	AOR (95% CI)	Black AOR	White AOR
Black race	2.05 (1.76-2.38)*	---	---
Age < 18 years	1.54 (1.16-2.02)*	2.21 (1.56-3.14)*	0.78 (0.50-1.23)
Age > 35 years	1.21 (1.05-1.40)*	---	---
Underweight BMI	1.60 (1.30-1.98)*	---	---
Smoking	2.61 (2.24-3.05)*	1.80 (1.25-2.60)*	2.77 (2.34-3.27)*
Maternal Protective Factor	AOR (95% CI)	Black AOR	White AOR
Married	0.72 (0.63-0.83)*	---	---
Overweight BMI	0.70 (0.61-0.81)*	---	---
Obese BMI	0.74 (0.64-0.86)*	---	---

*Significant at a p-value < 0.05

Results: Significant Neighborhood Factors

Neighborhood Risk Factors	Adjusted Odds Ratio (AOR)
% Non-High School Graduates	
2nd Quartile	1.26 (1.06-1.50)*
3rd Quartile	1.44 (1.17-1.78)*
4th Quartile (Highest)	1.40 (1.10-1.78)*
Median Household Income	
3rd Quartile	1.27 (1.04-1.55)*
4th Quartile (Highest)	1.36 (1.07-1.74)*
Residential Racial Segregation	
3rd/4th Quartile (Upper 50 th percentile)	1.20 (1.05-1.37)*

*Significant at a p-value < 0.05

Summary: SGA & Maternal Factors

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- **Maternal Risk Factors**
 - Black race
 - Age < 18
 - Age >35
 - Pre-pregnancy BMI Category: Underweight
 - Smoking during pregnancy
- **Maternal Protective Factors**
 - Marital Status: Married
 - Pre-pregnancy BMI Category: Overweight
 - Pre-pregnancy BMI Category: Obese

Summary: SGA & Neighborhood Factors

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- **Risk Factors**
 - Low education or high % of non-high school graduates
 - High residential racial segregation
 - High median household income
 - ✦ Significant in overall and White-only models
 - ✦ Not significant in maternal-only and neighborhood household income model

Other Notable Findings

- Increased risk for Black mothers < 18 years old
- Decreased risk of Black mothers who smoke during pregnancy
- No significant interactions between Black maternal race and neighborhood variables
- Strength of Black maternal race association not affected by including neighborhood variables

Study Limitations

- Low numbers for Black population in some census tracts
- Possible missing analysis factors that have influence over outcomes
- Possible misclassified and missing information
- Length of neighborhood residence varies
- Limited number of neighborhood factors
- Most neighborhood variables based on 2000 census

Benefits of Analysis

- Studied the relationship between race, racial segregation and Pinellas infant health outcomes
- Provides evidence that both maternal and neighborhood factors influence delivery of a SGA infant

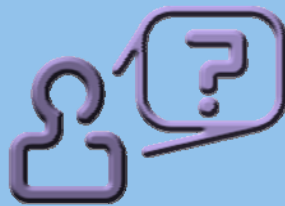
Recommendations

- For future study
 - Repeat analysis using 2010 census or American Community Survey data
 - Assess possible interaction of household income, education and SGA
- For MCH-related programs
 - Address community factors when planning interventions and policy
 - Promote community involvement and engagement, especially the Black community, when planning for optimal individual and community health

Acknowledgments

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Questions?



Thank You!