Health Effects of Racial Residential Segregation on Older Adults

Joseph J. Sudano, Jr., PhD [1,2]
David Litaker, MD, PhD [1,3,4]
Natalie Colabianchi, PhD [4]

[1] Department of Medicine, Case Western Reserve University
[2] Center for Health Care Research and Policy, MetroHealth Medical Center, Cleveland Ohio
[3] University Hospital Health Systems, Cleveland Ohio
[4] Department of Epidemiology and Biostatistics, Case Western Reserve University

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Presentation Overview

- Racial/ethnic disparities
- Factors affecting disparities
  - Racial Residential Segregation (RRS)
- Conceptual framework and aims
- Methods
- Limitations
- Future extensions of this work

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Objectives

- Assess clarity in presentation of
  - innovation
  - significance
  - approach (is integration of aims, methods with conceptual model apparent?)
- Identify
  - conceptual, methodological weak spots
  - policy implications

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Background

- *Healthy People 2010* establishes elimination of racial disparities in health as a major objective
- Effective reduction presupposes knowledge of determinants
- Traditional focus on individual characteristics (insurance, risk behaviors)

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Background

- Effects of environment under-examined but intuitively important (availability of health care, economic resources)
- Resources differentially distributed for social and economic reasons
- Understanding importance of underlying causes of health disparities informs policy

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## Conceptual Model
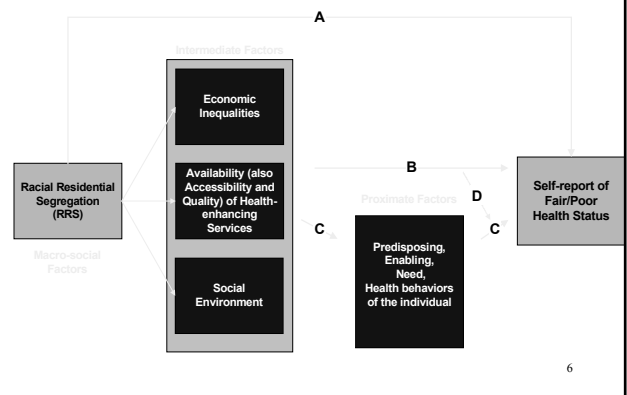
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Aims 1 and 2

- Separately for Blacks and Hispanics:
  - Examine association between RRS and health (3 inter-related health outcomes).
    - Declines in self-reports of general health over a 10 year period.
    - Includes examining validity of RRS measures.
    - Path A in the conceptual model.

  - Determine independent effect of RRS, net of community level effects.
    - Is path A still significant after adding community characteristics and examining path B?

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Conceptual Model
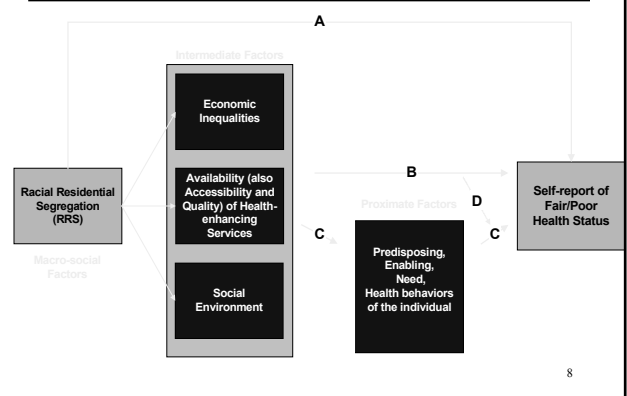
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Aims 3 - 4

–Specify pathways and mechanisms by which RRS affects health status.
  • Test paths A, B, and C. Are A and B still significant after individual levels variables are added?

–Assess cross-level interactions.
  • Path D, where effects of community mechanisms may modify--or be modified by-- individual level characteristics.

Evolution of Residential Segregation among African Americans

• Cheaper land available in surrounding rural areas
• Highway system and transportation networks expand
• Availability of economic resources at baseline varies by race
• Discrimination affects ability of minority members with resources to integrate

Consequences for Those Left Behind

• Dwindling economic resources
• Decay of community service infrastructure
  – Greater competition as need becomes more concentrated
• Reduced options and opportunities

Black and White Differences in Economic Outcomes

Indicator	Black	White
Percent of population below poverty level	26.1	10.5
Percent of population $\geq$16 years old unemployed	8.9	3.9
Median income, high school graduate, male 25-64 years	$22,099	$29,789
Median income, college graduate, male 25-64 years	$39,278	$53,158
Median net worth	$7,073	$49,030

Black and White Differences in Health Outcomes by SES

Household income	Percent reporting fair or poor health	
	Black	White
Poor	25.6	20.6
Near poor	19.5	14.1
Non-poor	9.6	5.7
Total	15.8	8.0

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Determinants of Health Status

- *Proximate* (individual) effects
  - Chronic medical conditions
  - Health behaviors
  - Availability of resources to obtain care
- *Intermediate* (other environmental/contextual) effects
  - Health care delivery infrastructure (Capacity, market features)
  - Economic inequality (Economic vitality, employment opportunities)
  - Social & Cultural (Urbanization, female family headship)
- *Fundamental* (macrosocial) effects
  - Structure (Racial residential segregation)

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The Evidence: RRS Effects on Health

- Greater segregation correlated with higher rates of
  - infant mortality
  - Adult mortality
  - Black homicide
  - Cardiovascular disease
  - Tuberculosis infection
- Association inconsistent for other racial/ethnic groups - "Hispanic Paradox"

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The Evidence: RRS and Community

- Greater segregation associated with
  - Fewer educational opportunities
  - Low levels of employment
  - Exposure to toxic air pollutants
  - Fewer resources/opportunities to engage in healthy behaviors

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Are Health Effects of RRS Race-Specific?

- Segregation exists on a spectrum
- Ethnic groups may prefer to live together / remain segregated
- Segregation diminishes differentially with cultural assimilation
- "Hypersegregation" an experience unique to African Americans

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Background Summary

- Greater segregation associated with higher mortality rates among blacks (?other racial/ethnic groups)
  - Cross-sectional data
  - Unclear if associated with individual outcomes
 - Incomplete control of confounders (i.e., SES)

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Background Summary

- RRS associated with environmental factors having negative health effects
- To reduce disparities, need better understanding of
  - independent association
  - causality
  - mediating mechanisms
  - association with morbidity rather than mortality
  - health effects in other racial/ethnic groups

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Conceptual Model
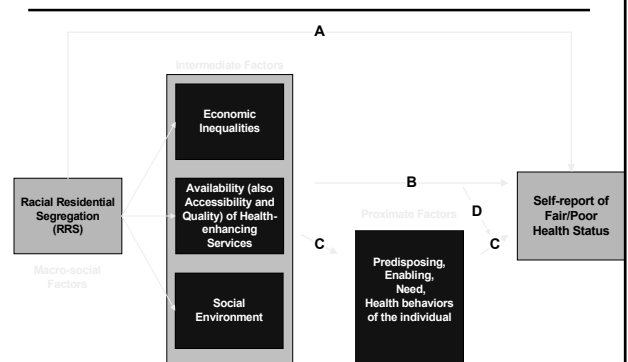
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Focal Relationship:
RRS and Health Status Outcomes

- Measures of RRS:
  - Five dimensions (Massey and Denton 1988)
    - Evenness
    - Exposure
    - Concentration
    - Centralization
    - Clustering
  - Evenness (S) and Concentration (C).

Focal Relationship:
RRS and Health Status Outcomes

- Traditional Measure of Evenness:
  - "D" or dissimilarity index

$$D = .5\sum |(x_i \, / \, X) - (y_i \, / \, Y)|$$

  - where x=minority pop in tract, y=majority pop in tract comparison group, X= minority pop in city or MSA, Y=majority pop in same. 0-1 scale (0-100 also), interpreted as the proportion (or %) of minority members that would have to change tracts to achieve an even distribution.
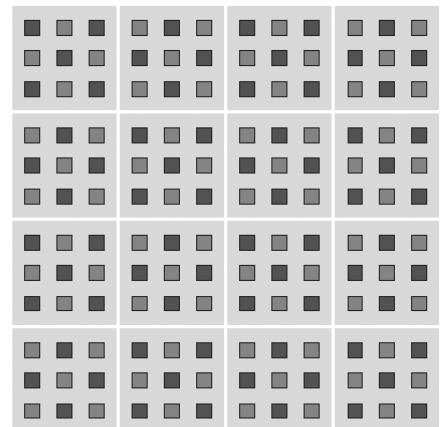
High segregation
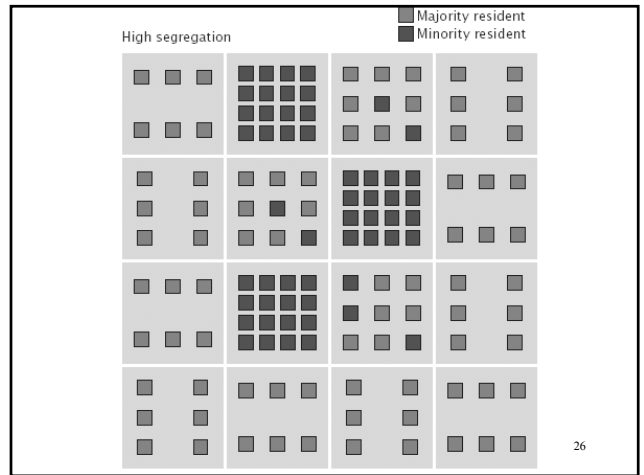
Majority resident
Minority resident
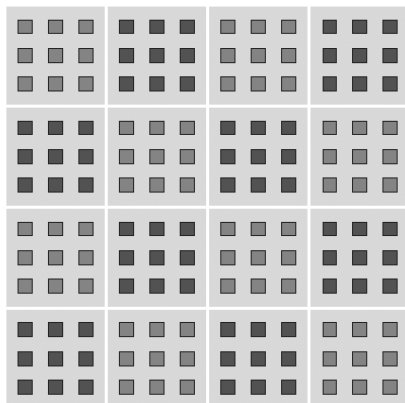
Low segregation

Limitations and Problems With "D"

- Aggregate measure at the city/MSA level
- No information regarding the tracts themselves
- Doesn't reflect other dimensions of distribution
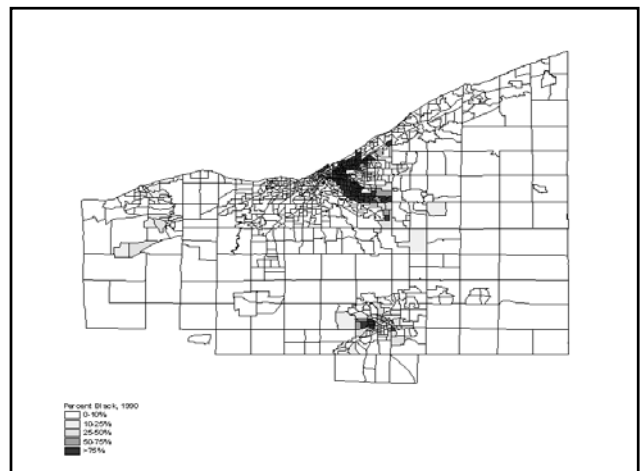 - concentration of minority population

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High segregation

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Traditional Measures of Segregation: Cleveland-Lorain-Elyria MSA

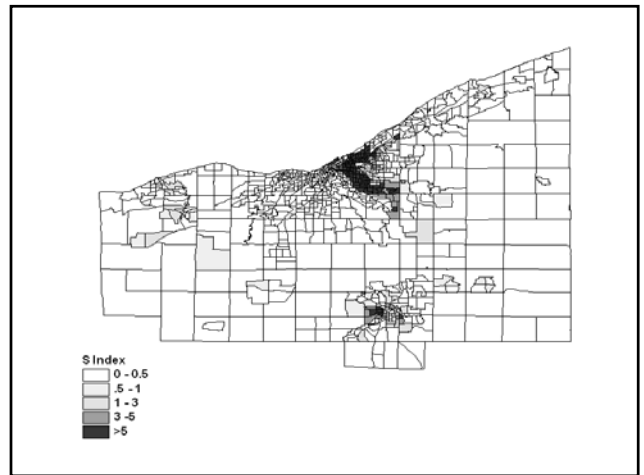- D index (Even-ness)=82.7
- Concentration=58.5 blacks/km^2

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Percent Black, 1990
0-10%
10-25%
25-50%
50-75%
>75%

Small Area Dissimilarity ("S" index)

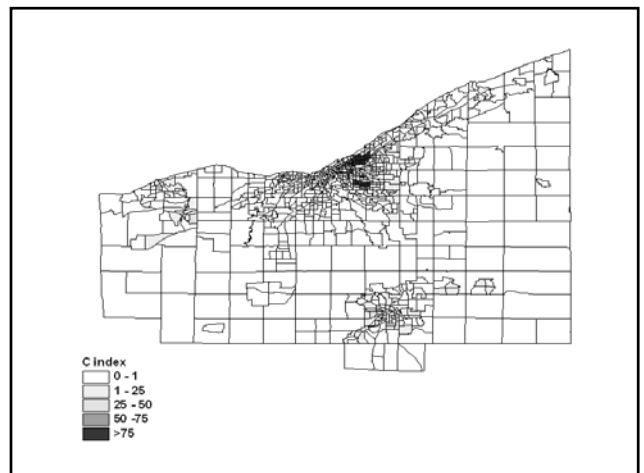$$S_{ijm} = (x_{ijm}/X_{ij})/(X_{jm}/X_j)$$

S Index
- 0 - 0.5
- .5 - 1
- 1 - 3
- 3 - 5
- >5

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Small Area Concentration ("C" index)
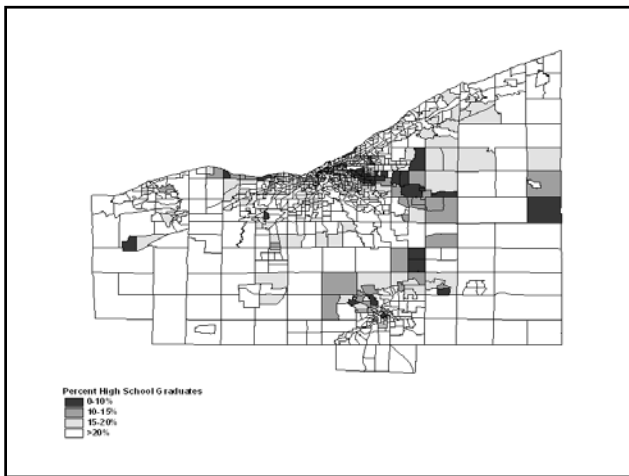
$$C_{ijm} = (x_{ijm}/Tract\_Area_{ij})/(X_{jm}/MSA\_Area_j)$$

C Index
- 0 - 1
- 1 - 25
- 25 - 50
- 50 - 75
- >75

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Infant mortality rates 1997-2000
- 0 - 5
- 5 - 10
- 10 - 25
- 25 - 50
- >50

Percent Unemployed, 1990
- 0-2%
- 2-5%
- 5-10%
- >10%

Percent High School Graduates
- 0-10%
- 10-15%
- 15-20%
- >20%

Percent Under Poverty Level
- 0-10%
- 10-25%
- 25-40%
- 40-50%
- >50%

Percent Vacant Housing
- 0-5%
- 5-10%
- 10- 20%
- >20%
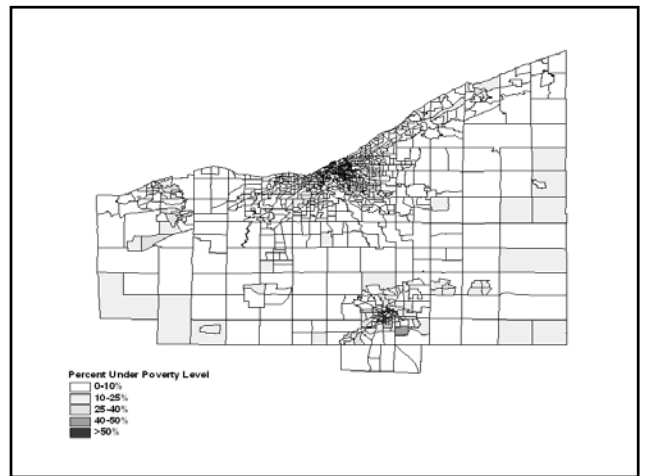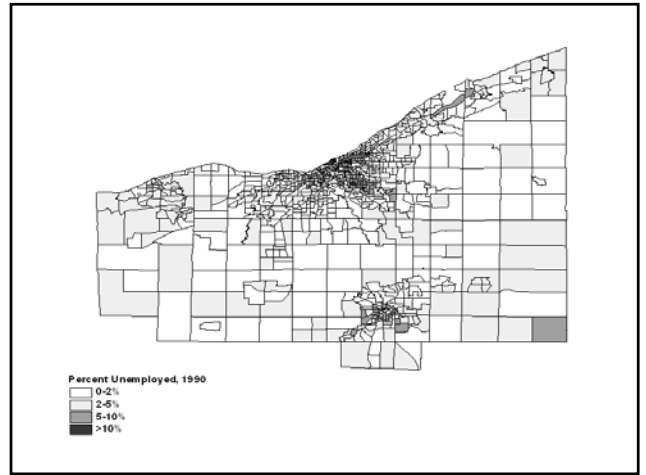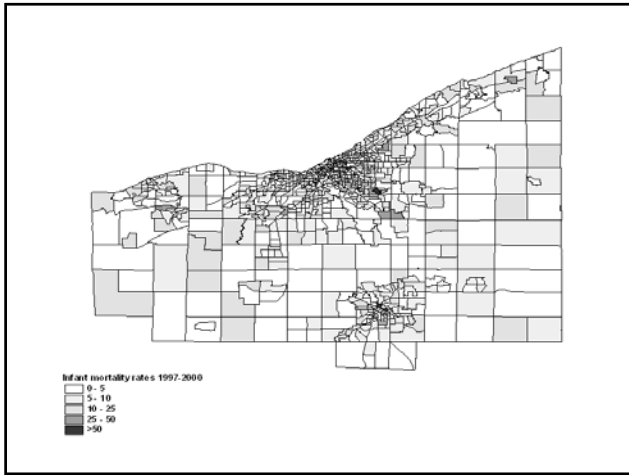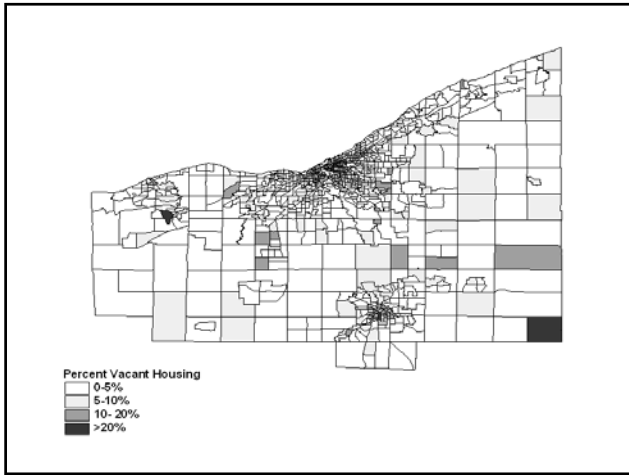
Methods

- Link HRS restricted data with community level variables (CLVs) at census tract level with:
  - 1990 Census
    - Most community level variables
  - Area Resource file
    - Health system variables

Study Sample

- Data from 5 waves of Health and Retirement Study (1992-2002)
  - 51-61 at time of 1992 interview (n=9759)
  - 1523 (15.6%) lost to follow up or had incomplete records
- Cohort of 8236 individuals (includes 853 deaths)

Study Dependent Variables: Health Status

- Major decline in self-reported overall health (SROH) 1992-2002.
  - Dichotomous
- Combined major decline in SROH or death
  - Dichotomous
  - Q: Separate death (survival) analysis
- SROH status in 2002 controlling for 1992 health status (includes death)
  - Continuous measure

Community Level Variables (CLVs)

- "S" and "C" for B/W and H/W
- Economic inequalities:
  - Percent unemployed
  - Community SES
    - Percent below poverty
    - Composite measure
      - Median income, % below poverty, % white collar workers, % HSG over 25 yrs.

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Community Level Variables

- Community Infrastructure
  - Home ownership
  - Housing unit vacancy
  - Price of housing
  - Crowding
  - Age of housing

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Community Level Variables

- Health Care Infrastructure
  - Primary Care Providers
  - HMO Penetration

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Community Level Variables

- Social Environment
  - Percent female headed households
  - % rural
  - Suburban residence
  - Proportion native born

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Individual Level Variables-ILVs

- Follows Andersen model (predisposing, enabling, and need)
- Age, sex, race/ethnicity
- Education, income, wealth, marital status
- Insurance status
  - Private, public, uninsured
  - Episodes without insurance

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Individual Level Variables

- Health behaviors:
  - Smoking (current, past, never)
  - History of problem drinking (CAGE score)
  - Alcohol consumption pattern (moderate, never, heavy)
  - Obesity (BMI categories, quintiles, continuous)
  - Exercise patterns (????)

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Individual Level Variables

- Health status:
  - SROH 1992
  - SROH change in health in year prior to 1992 (worse, same, better)
  - Number of physical limitations 1992: 10 items assessing mobility and agility
  - Number of chronic conditions 1992: HTN, DM, Heart Disease, A/COPD, cancer, stroke, very poor vision.

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Study Sample Characteristics

Feature	Whites (n=6151)	Blacks (n=1378)	Hispanic (n=707)
Age, mean yrs	56.0	55.9	55.9
Female, %	51.4	56.9***	51.3
Education, mean yrs	12.8	11.3***	8.8***
Net worth quintile, mean	3.3	2.1***	2.2***
Episodes uninsurance 1992-2000, mean	0.5	0.7***	1.2***
Report overall health as poor, %	6.4	14.0***	11.7***

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Aims 1 and 2

- Examine association between RRS and health (3 inter-related health outcomes).
  - Hypothesis: Residence in an area with high S and C indices are associated with greater decline in health status, higher mortality, and greater decline in health status adjusting for baseline health status for Blacks; not for Hispanics

- Determine independent effect of RRS, net of community level effects.
  - Hypothesis: Net of community level effects, a significant association between RRS (measured by S and C indices) and health status outcomes remains for Blacks; not for Hispanics

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Aims 3 - 4

- 3: Specify pathways and mechanisms by which RRS affects health status.

- 4: Assess cross-level interactions.
  - Hypothesis: The health effects of higher levels of segregation are greater for Blacks with low SES compared with other groups.

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Summary Analytic Methods

	Aim 1	Aim 2	Aim 3	Aim 4
RRS	X	X	X	X
CLVs		X	X	X
ILVs			X	X
CLV*ILV				X
Major Decline	Logistic	Logistic	___	Logistic
Decline/Death	Logistic	Logistic	___	Logistic
10 yr change	OLS	OLS	SEM	OLS/SEM

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Limitations and Extensions

- Dependent variable is self-reported
- Focus on two dimensions of a multidimensional construct (distributional equality/evenness and concentration)
- Duration of exposure and change over time in RRS may have greater effects on health
  - Level of environmental "exposure" may also vary due to respondent migration

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Limitations and Extensions

- Does not consider personal experience with discrimination
- Limited age group
- Explore threshold effects on health status
- Rural versus urban issues
  - We don't have that information yet—restricted data

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Questions/Comments?

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