



Utilization of American Community Survey and Other Federal Data to Address Health Disparities in a Federally Designated Region

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OBJECTIVE

To describe how American Community Survey data can be used in combination with other federal data to assess health disparities in a federally designated region such as the Delta Regional Authority.



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DELTA REGIONAL AUTHORITY

- The Delta Region was designated in 2000 to improve socioeconomic opportunity in within its geographic boundaries.
- Mission: “work to improve regional economic opportunity by helping to create jobs, build communities, and improve the lives of the 10 million people who reside in the 252 counties and parishes of the eight-state Delta region.”



DELTA REGIONAL AUTHORITY DEMOGRAPHICS



	Delta Region	United States
% Black	32.4%	13.2%
% of Adults 25+ Years of Age with a High School Degree	81.7%	85.7%
% of Population Living below Poverty Level	20.6%	14.9%
% of Counties in Persistent Poverty	43.3%	11.2%
Median Household Income	\$40,427	\$53,046
Unemployment Rate	8.0%	7.4%
Population per square mile	64.0	89.5

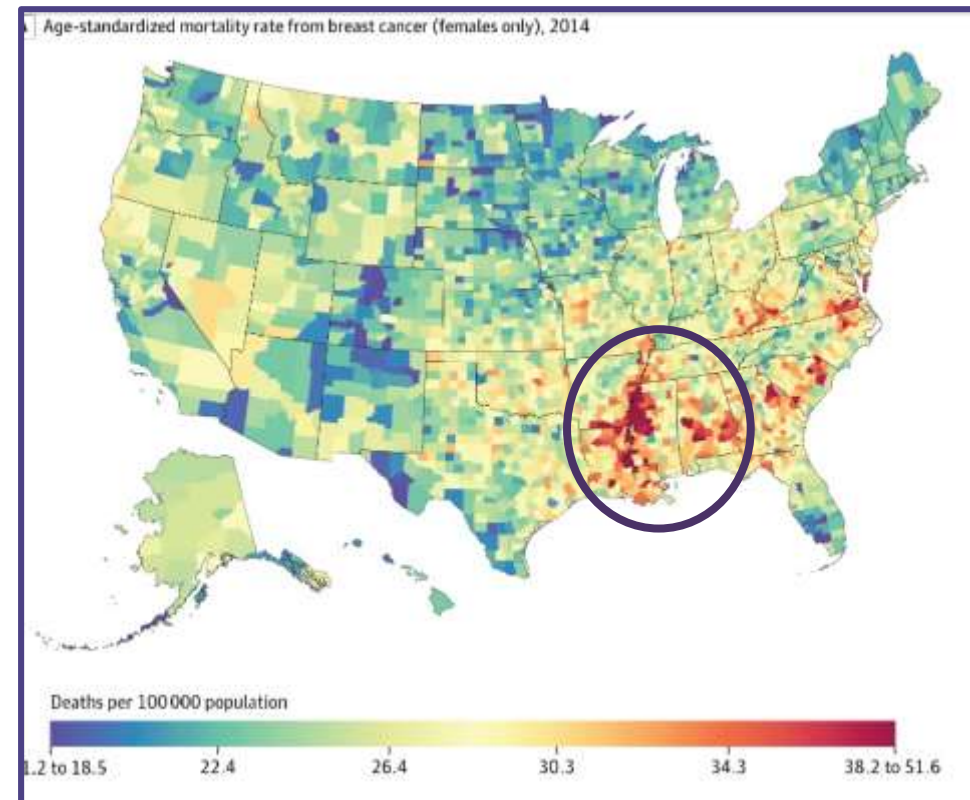
Source: Delta Regional Authority; derived from 2010 Census data



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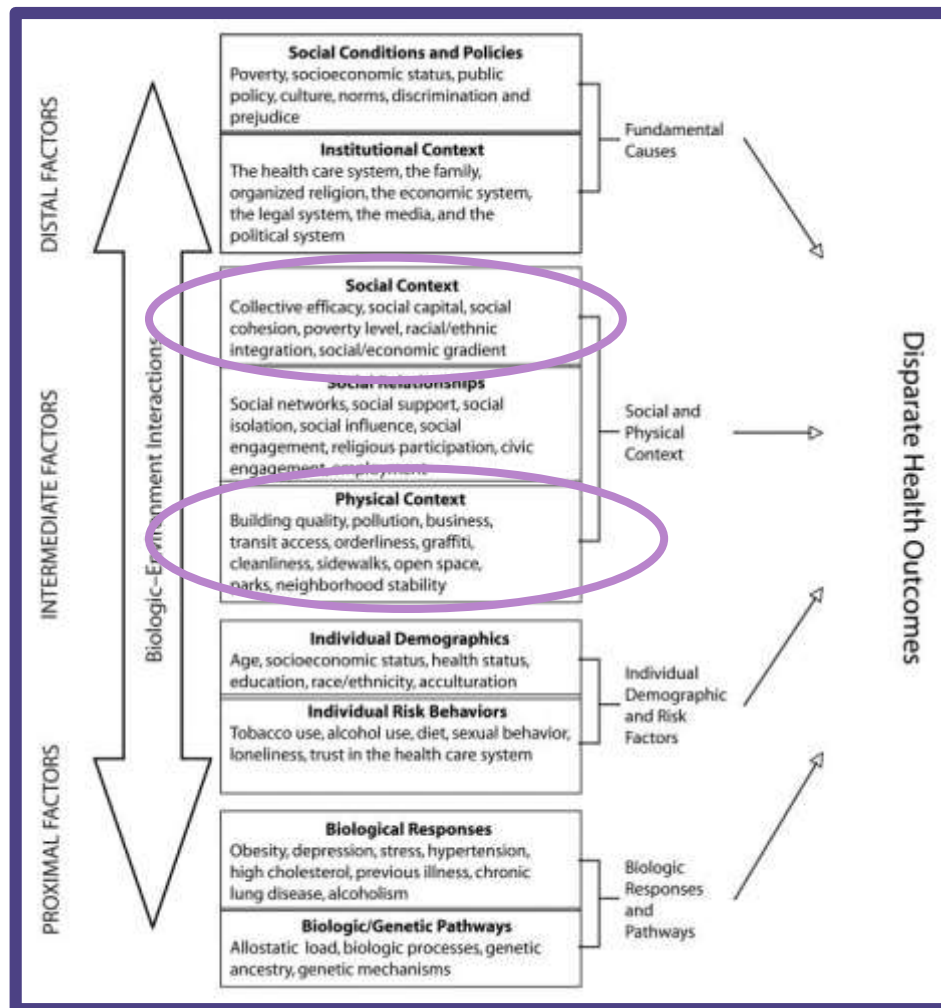
DELTA REGIONAL AUTHORITY DISPARITIES

- Less access to care:
 - 42.14 primary care physicians per 100,000 in the Delta Region (55.24 per 100,000 nationally)
 - 91% of counties are health professional shortage areas
 - 38% of counties do not have a federally qualified health center
- Poorer health behaviors, such as higher smoking and obesity rates
- Higher all-cause and cancer mortality rates



Source: Gennuso et al, 2016; Delta Regional Authority; Cosby et al, 2008; Mokdad et al, 2017

MODEL FOR ANALYSIS OF POPULATION HEALTH AND HEALTH DISPARITIES



Source: Warnecke et al, 2008



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AMERICAN COMMUNITY SURVEY DATA

Social Context

- Examples: “neighborhood or community poverty level, extent of residential segregation, median income and education”
- ACS County data (5 yr. estimates; 2011-2015)
 - Poverty
 - Unemployment
 - Median Household Income
 - Education

Physical Context

- Examples: “availability and accessibility of local health care resources to the public; availability of transportation, quality air and water, etc.”
- ACS County and Census Tract data (5 yr. estimates; 2011-2015)
 - Population estimates as a denominator in combination with other data sources to estimate access to health care services

Source: Warnecke et al, 2008

OTHER FEDERAL DATA-DESCRIBING SOCIAL AND PHYSICAL CONTEXT



- United States Department of Agriculture Rural-Urban Continuum Codes
 - A continuum of 1 to 9 based upon population size and proximity to metro area
 - 1-3=Urban (or Metro)
 - 4-9=Rural (or Non-Metro)
 - 4,6,8= Adjacent to a Metro Area
 - 5,7,9=Not-Adjacent to a Metro Area
- Health Resources & Services Administration's Area Health Resource File
 - Includes data on health care professions and facilities, populations, environment, and other factors
 - These data can be used in conjunction with ACS or other data
 - Example: a primary care provider-to-population ratio can be calculated using ARHF and ACS data as the numerator and denominator, respectively
- Food and Drug Administration data on approved mammography facilities



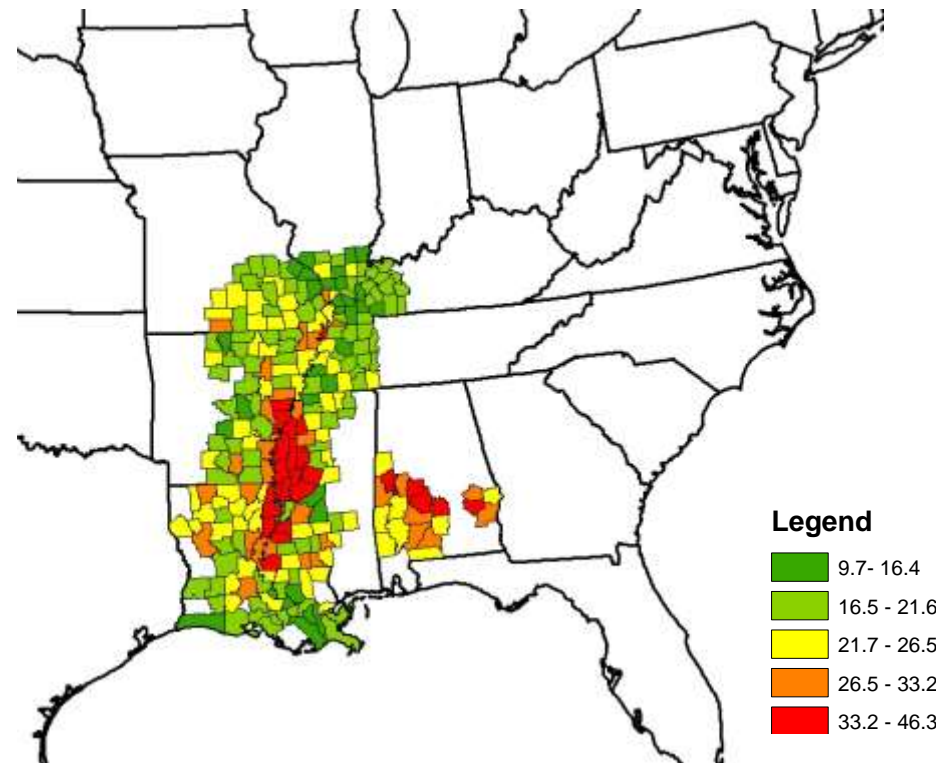
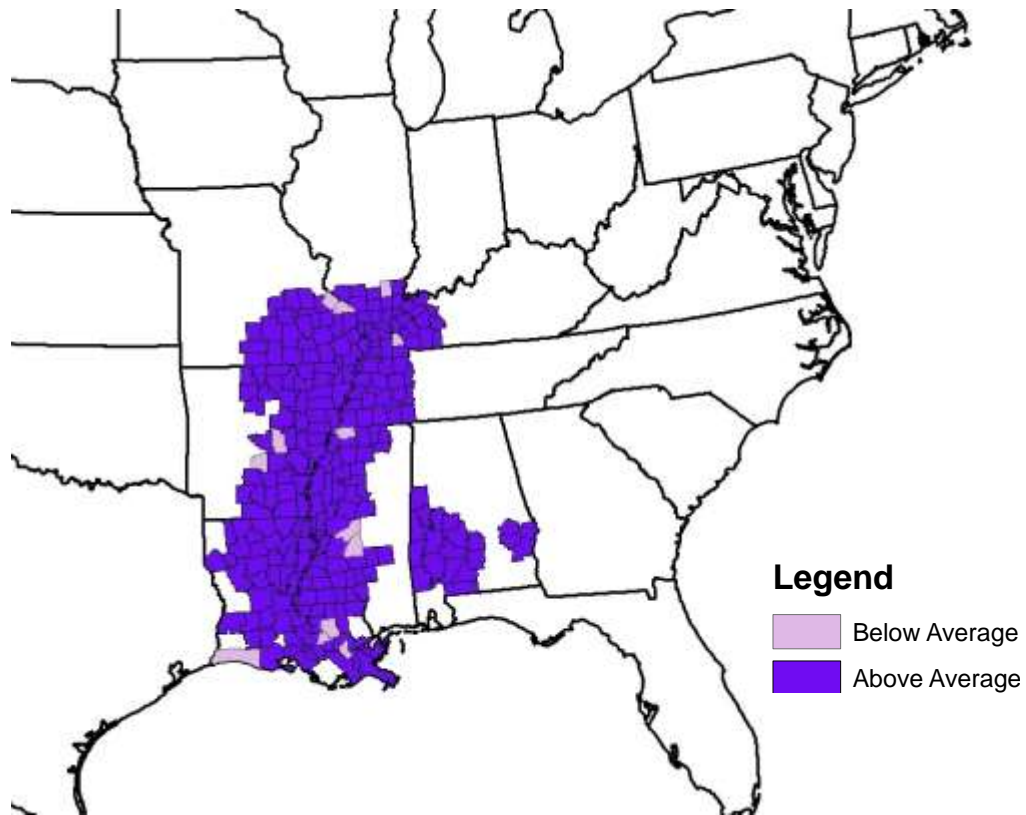
APPLICATIONS OF ACS DATA



- 1) Creation of choropleth maps to visually display the social and physical context of the DRA
- 2) Construction of multilevel regression models to consider how neighborhood level social and physical context affect health outcomes such as cancer
- 3) Utilization of Geographic Information System (GIS) methods such as the two step floating catchment area to evaluate access to health care services



APPLICATION #1- POVERTY CHOROPLETH MAPS



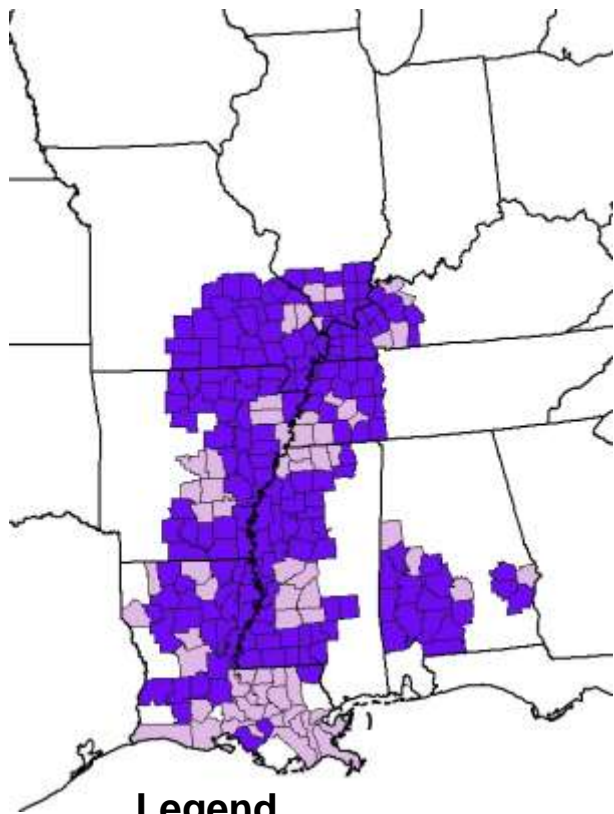
Display of the Small Area Income and Poverty Estimates from the American Community Survey



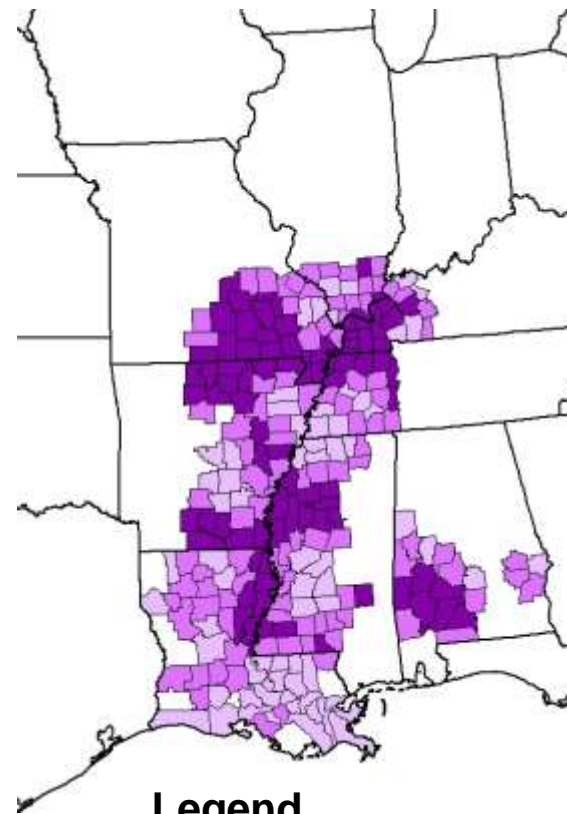
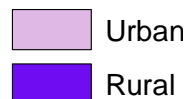
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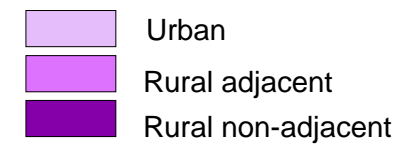
APPLICATION #1- RURAL-URBAN CHOROPLETH MAPS



Legend



Legend

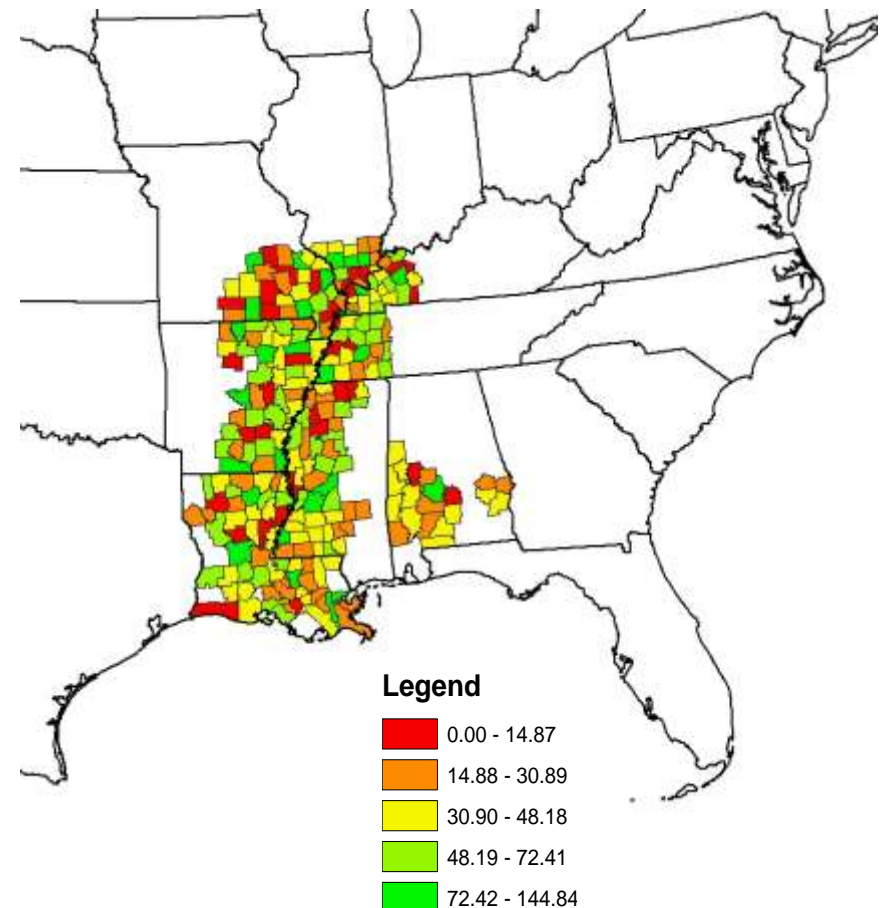
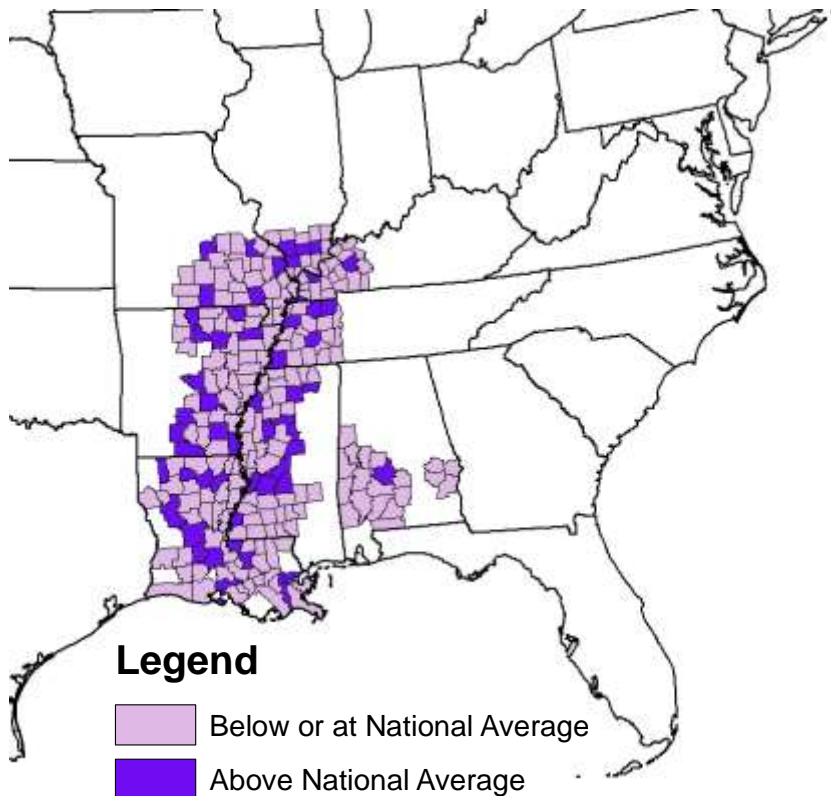


Using the Rural Urban Continuum Codes from the U.S. Dept. of Agriculture



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APPLICATION #1-PRIMARY CARE PHYSICIAN DENSITY CHOROPLETH MAPS

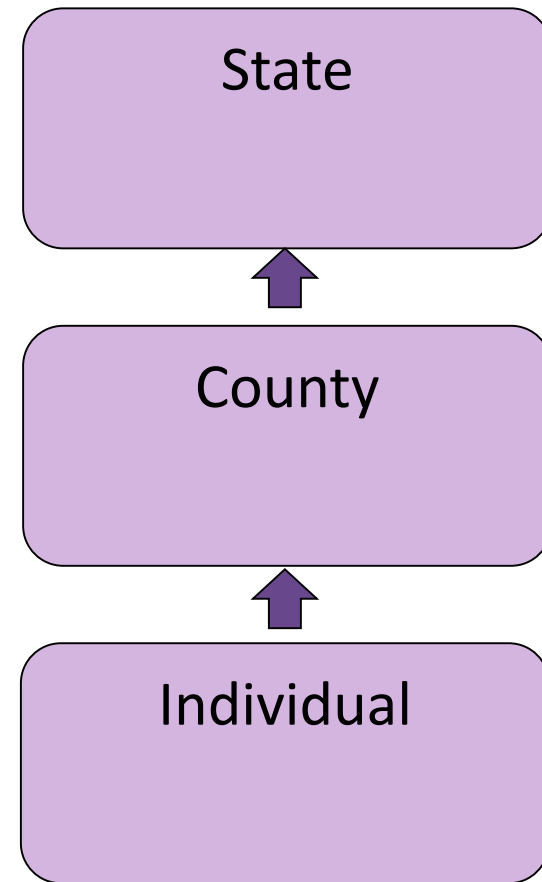


- Physician Density is the number of primary care physicians per 100,000 people within a county.
- Data on physicians come from the Area Health Resource File.
- Data on populations estimates come from the American Community Survey.

Source: Gennuso et al, 2016

APPLICATION #2- MULTILEVEL MODELING

- Use county-level ACS data on social and physical context in conjunction with health outcome data
 - Example: Breast cancer subtype and staging data from the North American Association of Central Cancer Registries
- Multilevel modeling is “an ideal statistical approach to [social geographies] studies in which individuals are nested within a smaller number of geographic areas.” – Meilleur et al, 2013



APPLICATION #3-SPATIAL ACCESSIBILITY



- Use the Two-Step Floating Catchment Area Method to evaluate access to health care services in the Delta Region
 - Accounts for population within a given catchment area for a health care service
 - Accounts for the access to a health care service within a given catchment area for a population, such as those in a census tract
- Example:
 - Food and Drug Administration data on approved mammography facilities (health care service)
 - ACS population estimates of women of recommended breast cancer screening age in a census tract (population)
- Other health service locations to which you can apply this method: physicians, federally qualified health centers, local health departments, etc. (i.e. any service with comprehensive data availability and addresses)

Source: Luo and Wang,
2003



APPLICATION #3-SPATIAL ACCESSIBILITY



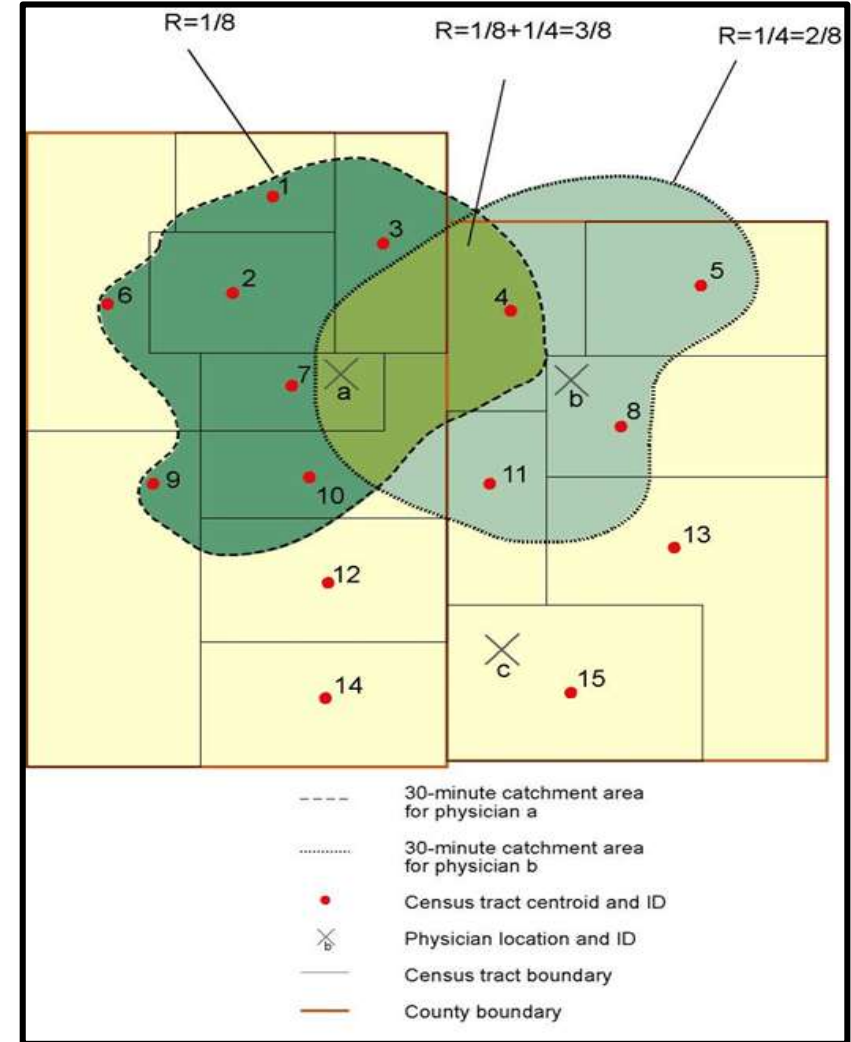
- Step #1: Construct a catchment area around a provider/facility and calculate a provider-population ratio w/in the catchment area.

$$R_j = S_j / \sum_{k \in C_j} P_k$$

- Step #2: For each population center (e.g. census tract), sum the provider-population ratio for providers within the catchment area.

$$A_i = \sum_{j \in Z_i} R_j = \sum_{j \in Z_i} (S_j / \sum_{k \in C_j} P_k)$$

- These two steps generate a spatial accessibility score for each census tract (or chosen geographic unit).



Source: Luo and Wang, 2003; Wang, 2015



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STRENGTHS AND LIMITATIONS



- Strengths

- ACS data are available at different geographic scales and can be applied across a wide geographic area
- 5 year estimates are most reliable, have largest sample size
- A wide range of variables can describe social context
- Intra-census data collection is more temporally congruent with outcomes data

- Limitations

- Large standard errors for ACS population estimates
- Sampling and non-sampling errors
- Modifiable Areal Unit Problem- findings may be different based upon geographic scale



SUMMARY



- ACS data are flexible and can be applied across large geographic regions and using different geographic scales
- There are three uses for ACS data that we propose to assess health disparities:
 - To visually display the distribution of ACS measures of social or physical context or use of ACS measures to determine physical context
 - To provide measures of social and physical context in multilevel modeling to evaluate health outcomes across a large region
 - To apply to spatial methods as a population denominator to assess access to health care services



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Questions?

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