Spatial and socio-demographic disparities in late-stage breast cancer diagnosis

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Outline

1. Research Motivation & Framework
2. Methods & Materials
3. Results
4. Conclusions & Next Steps

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Research Motivation

- 230,000+ individuals are diagnosed with breast cancer each year
- Access to timely, evidence-based healthcare is key → delays in diagnosis and treatment initiation negatively impact overall survival
- Great disparities exist in both access to treatment and outcomes, particularly for vulnerable populations (i.e. racial/ethnic minorities and low-income individuals)

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Vulnerable Populations

"Vulnerable populations are defined as those at greater risk for poor health status and health care access. [...] Regardless of how they are categorized, vulnerable populations generally include racial and ethnic minorities, low SES populations, and those without adequate potential access to care..."

Shi L, Stevens GD. Vulnerability and unmet health care needs. The influence of multiple risk factors. J Gen Intern Med. 2005 Feb;20(2):148-54.

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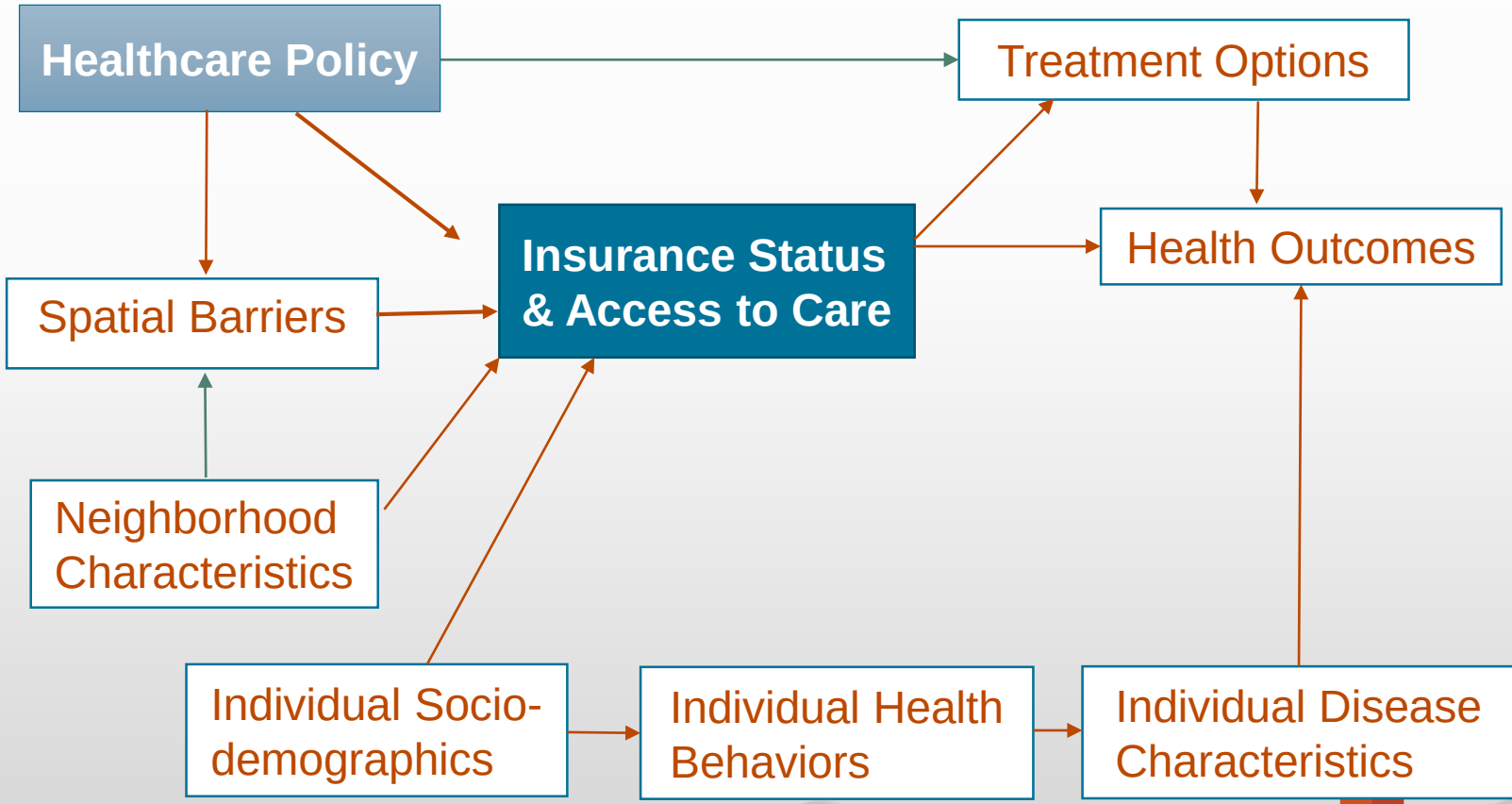
Framework for Studying the Health Disparities



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Methods and Materials

Data:

Individual Level:

2000 – 2013 Surveillance, Epidemiology, and End Results (SEER) cancer registry data for female breast cancer patients 18 years and older (n= 804,633 patients)

County Level:

2015-2016 Area Health Resource File for US counties (2005, 2010-2013) (https://ahrf.hrsa.gov/download.htm)

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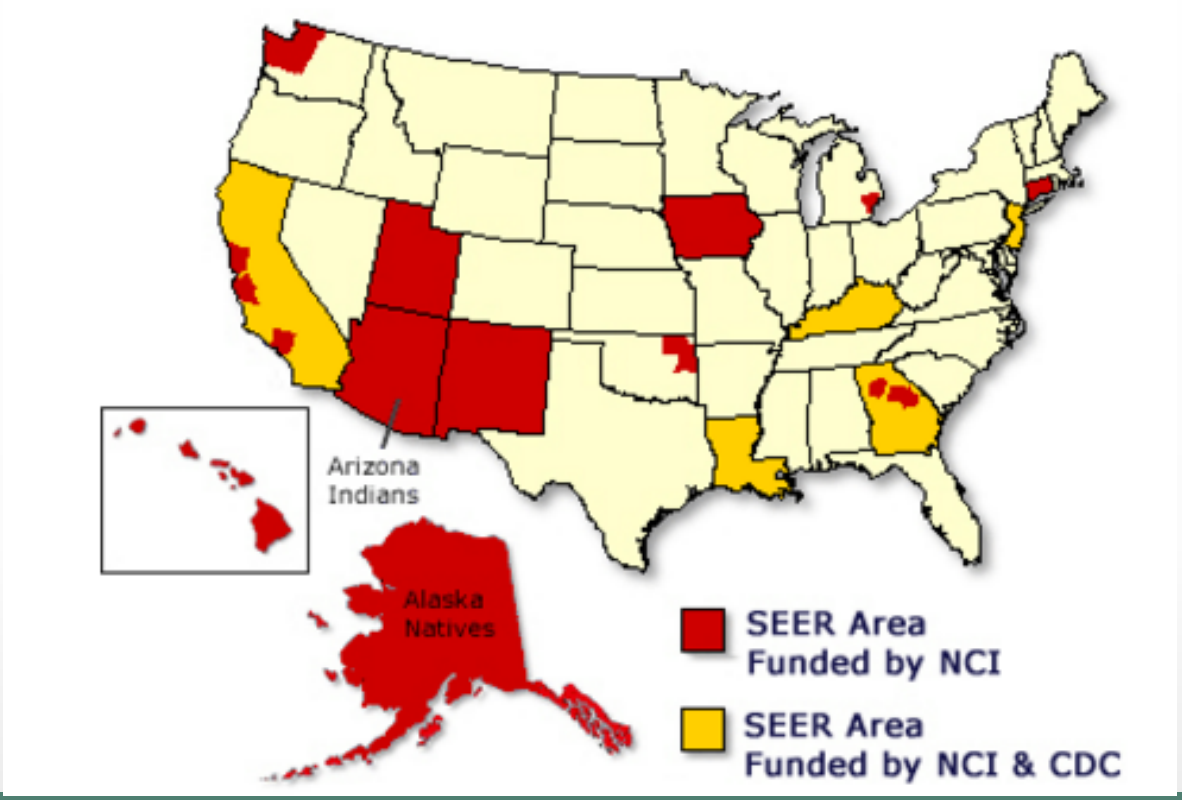

SEER Registries
http://seer.cancer.gov/registries/

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Methods and Materials – Cont.

Outcome:

Late Stage Breast Cancer Diagnosis (distant disease)

Stage at DX	Percent
In situ	18.8%
Localized	49.4%
Regional	24.9%
Distant	5.4%
Unstaged/unknown	1.5%

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Methods and Materials – Cont.

Statistical Approach:

- Bivariate Statistics
- Trend in Late-Stage diagnosis
- Random intercept model for counties and year of diagnosis (PROC GLIMMIX)

All analysis were performed using SAS 9.4

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Methods and Materials – Cont.

Individual Level Variables

- Age dx
- Race/Ethnicity
- Marital Status

County Level Variable

- Non-metro status
- HPSA
- Does county have at least 1 hospital with breast cancer screening services
- % females uninsured
- % minority females
- % unemployment
- % in poverty

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Results

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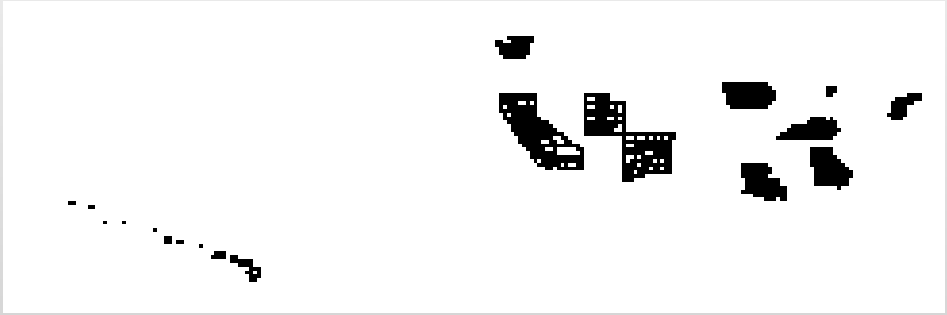
Patient Characteristics

- Mean age at diagnosis: 61.1 years
- 71.3% non-Hispanic White
- 56% married



- 9.8% non-metro counties
- 7.1% lived in counties w/o a hospital with breast cancer screening/ mammography services
- 50.6% in health professional shortage area (2010)

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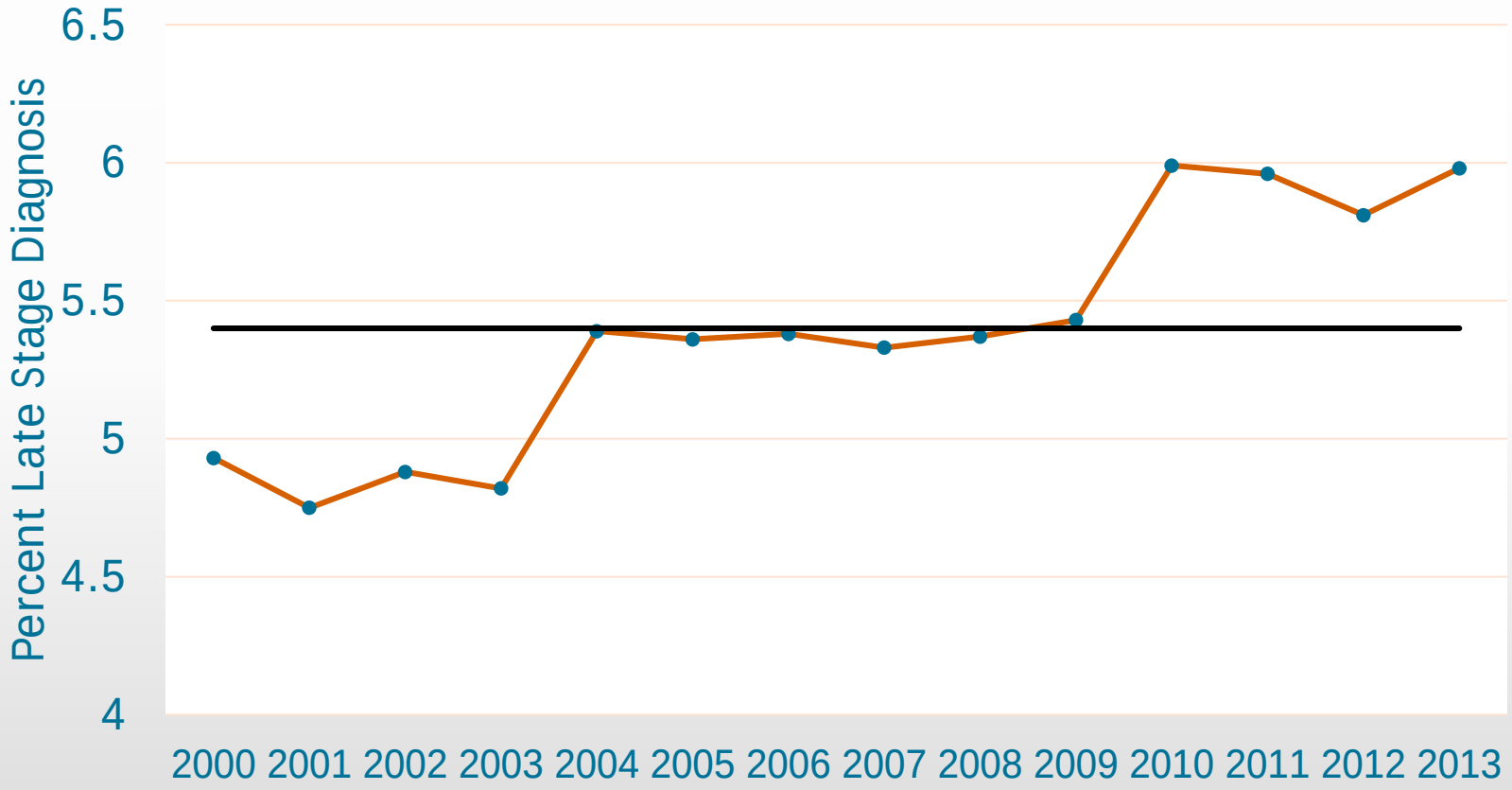
Percent Late-Stage Breast Cancer Diagnosis 2000-2013, SEER



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Who is more likely to be diagnosed with distant disease?

- Overall: 5.4%
- Non-Hispanic Blacks (8.4% vs. NH Whites 5.0%)
- Not married (6.9% vs. married 4.2%)
- Non-metro (6.0% vs. metro 5.3%)
- Hospitals w/o breast cancer screening services (6.0% vs. 5.4%)

- No difference in HPSA

Unadjusted bivariate statistics

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Results from the Multilevel Model

Negative Effect

- Younger and older age (OR: 1.06 and 1.26; p<0.01)
- non-Hispanic Black and Hispanic (OR:1.55 and 1.20; p<0.01)
- Living in counties with higher unemployment and poverty (OR: 1.06 and 1.05; p<0.01)

Protective Effect

- Married (OR: 0.65; p<0.01)
- Non-Hispanic Other (OR: 0.9; p<0.01)
- Living in counties with higher % minority women

NS: non-metro status, hospital with screening facility, HPSA, % females uninsured

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Conclusions

- Late-stage breast cancer diagnosis (distant disease) is a small but increasing portion of all breast cancer cases (mean: 5.4%; 4.9% in 2000 & 6% in 2013).
- Differences exist in *who* is first diagnosed with metastasized disease (minorities and women living in disadvantaged counties).
- Interestingly, HPSA status and lack of hospital-based screening facilities did not affect individual level late-stage diagnosis.

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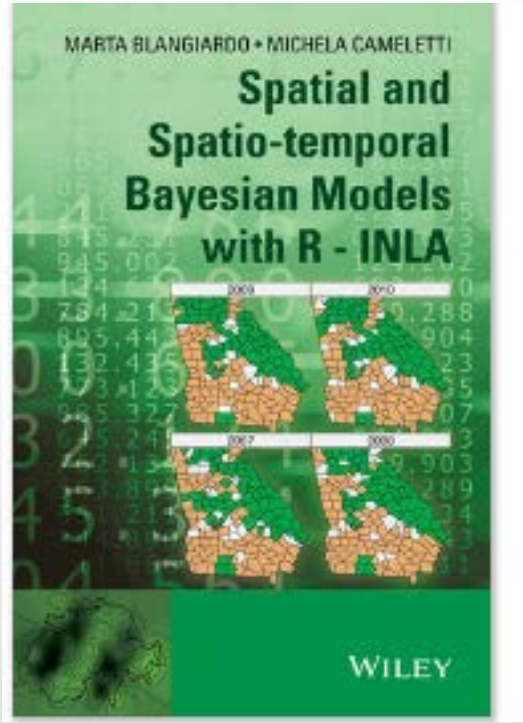
Next Steps

- Sensitivity Analyses
- Include other years of the AHRF

- Use INLA to repeat analysis with spatial and temporal dependencies



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We will always care for San Antonio. We will always educate healers. We will always search for answers.

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