

Community Social Organization and Inequalities in U.S. Counties Breast Cancer Mortality

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Outline

1. Distinguish between individual and ecological risk
2. Evidence for associations between social factors and health
3. Theoretical framework and underlying assumptions
4. Social indicator variables
5. Data/Findings
 - Descriptive
 - Bivariate and Multivariate Weighted Least Squares (WLS) regression
6. Discussion
 - Limitations and future work

Population Mortality Rates



Average annual age adjusted mortality rates for breast cancer deaths per 100,000 women, 1996-2000

■ US/National	27.7
■ Maryland	29.6
■ Virginia	28.6
■ DC	37.6

DC Dept of Health Campaign



“If you live in DC, you have a greater chance of dying from breast cancer than if you lived in Maryland or Virginia.”

Intervention: Advocate mammography screening

Entangling Individual-level & Area-level (Community) Factors

- Individual-level
 - Downstream
 - Micro-level
- Area (Community)-level
 - Upstream
 - Macro-level

Individual-level Factors



- Physiological
 - ER receptor status
 - Parity
 - Age at menarche
- Genetic
 - Gene mutations
 - Family history
- Behavioral
 - Diet and exercise patterns
 - Screening behavior

Area-level/Ecological Factors



Structural Dimensions of Communities

- Social/Cultural
 - Racial/ethnic concentration
 - Crime rates
- Institutional
 - Availability of health and social services
- Political
 - Expenditures
 - Commitment of resources

Associations between Social Factors and Health Outcomes

- Late 1600's
 - Infectious diseases
- Past three decades
 - Respiratory diseases (asthma)
 - Cardiovascular/heart disease
 - Traffic accidents
 - Suicides
 - Violence
- Recently
 - Obesity
 - Malignant Neoplasms/Cancer

Community Social Structure and Health Effects

- | | |
|-------------------------------------------------|-----------------------------------|
| ■ Protective Factors | ■ Risk Factors |
| – Economic and social stability | – Economic and social instability |
| – Racial/ethnic diversity | – Racial/ethnic segregation |
| – Social interaction and trusting relationships | – Social isolation |
| – Quality physical environment | – Mistrust or fearful relations |
| – Political/civic engagement | – Poor physical environment |
| | – Political/civic disengagement |

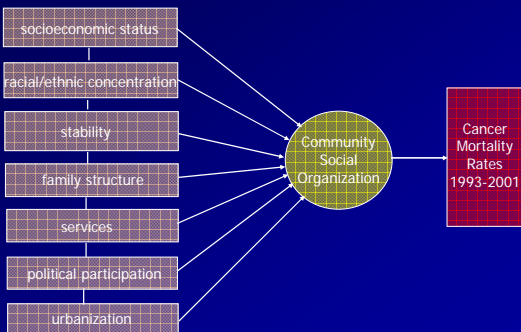
Research Question

- To what extent can variations in county-specific **cancer mortality** be explained by variations in levels of indicators of **community social organization**?

Ecological Study Design

- Developed a community social organization framework
- Investigated associations between indicators of social organization & cancer mortality
- Breast cancer mortality

Community Social Organization Framework



Community Social Organization

- Communities are structured in a manner to mobilize key resources to achieve certain common values and goals
 - Values (e.g. Health, safe and orderly environments, quality service institutions...)
 - Mutually desired of membership
 - Voluntary *NOT* 'Forced' or 'Imposed'
 - Differential ability: Disparities

Defining Community Social Organization

- Example—Value: "safety/crime-free environment"
 - **Political resources** to secure increased physical police protection, increased "voluntary" surveillance of community by police
 - **Economic resources** to increase property values and taxes or excluded unwanted elements and services from community (liquor stores, check-cashing establishments, public transportation)
 - **Social resources** to develop neighborhood watch programs, community members take responsibility for one another's property

Underlying Assumptions

- Area-level cancer mortality rates are not simply an aggregate of individual risk
- The structural (social, cultural, institutional, and political) characteristics of communities [where people live] exert an influence on health, independent of the individual (physical, genetic, and behavioral) characteristics of the people themselves
- Inequities in resources leads to disparities in health outcomes

Social Indicator Database

- Approximately 77 variables
- Correlational analyses
- 8 variables in this analysis

Community Social Organization Domain Variables

1. SES
 - Education
 - percent of persons 25+ HS graduate education
 - Family Income
 - median family income all households
2. Racial and Ethnic Concentration
 - Percent black
 - Percent of all persons black
3. Stability
 - Unemployment
 - Percent of persons age 16+ unemployed

Community Social Organization Domain Variables

4. Family Structure
 - Isolation
 - percent of individuals living alone
5. Services
 - Health and Welfare
 - amount of expenditures (\$) on public welfare (cash assistance to poor/indigent elderly, blind & disabled persons and other welfare programs)

Community Social Organization Domain Variables

6. Political Participation
 - Voting
 - percent of persons voting in 1992 presidential election
7. Urbanization
 - Rural/Urban
 - percent persons in a county residing in an urban area

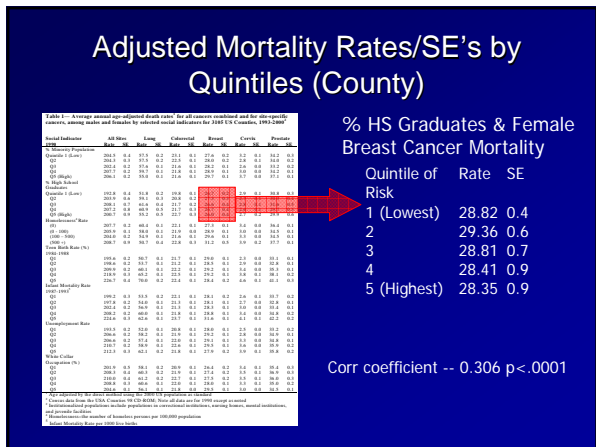
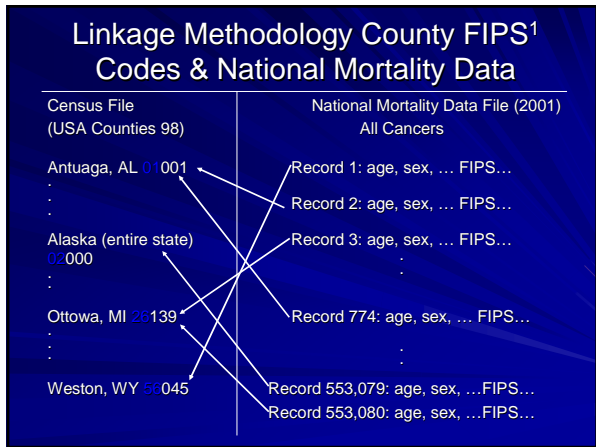
Methods

- To compute stable rates, nine years of mortality data from 1993 to 2001 were used
- Age-adjusted mortality rates were calculated by the direct method using the 2000 US standard population.
- We obtained age, sex, and county deaths for all cancers combined and for lung, breast, cervical, and prostate cancers.

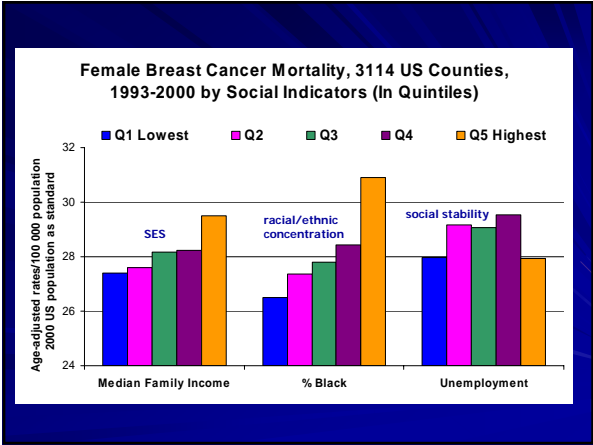
Rank Ordered Counties by Quintiles

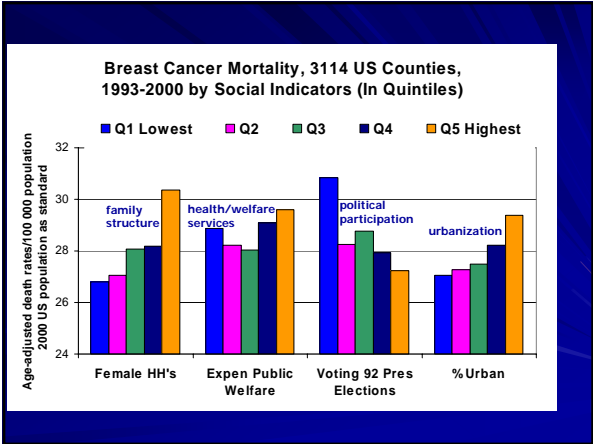
USA Counties (n=3114)	Variable—Percent HS Graduates 1990
Q1 1 st 20%	0 – 59.75 %
Q2 2 nd 20%	59.78 - 68.05 %
Q3 3 rd 20%	68.06 - 73.70 %
Q4 4 th 20%	73.72 - 78.33 %
Q5 5 th 20%	78.34 - 95.54 %

Five Quintiles—Approximately 623 Counties per Quintile.



Results of Data Analyses





Multivariate Analyses

Weighted Least Squares Regression of Social Organization Indicators on Female Breast Cancer Mortality, Social Organization Characteristics: Based on Area-level Data for 3114 US Counties, 1993-2001

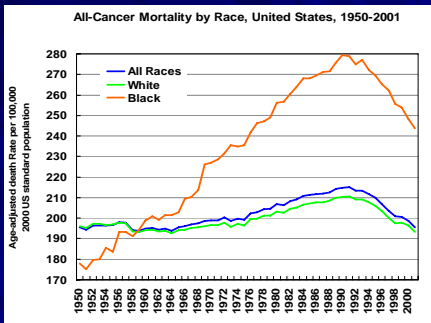
Independent Variable (7 Domains)	b	SE	B	P
Proportion of persons 25+ HS graduate, 1990 (SES)	-0.00066	0.02	-0.00	0.9683
Median family income 1990 (1000\$) (SES)	0.12	0.00	0.22	<0.0001
Percent Black, 1990 (racial/ethnic)	0.13	0.01	0.34	<0.0001
Unemployment rate, 1990 (stability)	0.18	0.05	0.08	0.0004
Persons living alone, 1990 (family structure)	0.16	0.02	0.15	<0.0001
Expend public welfare (\$) per capita, FY 1992 (services)	0.38	0.00	-0.02	0.2445
Proportion persons voting 1992 presidential elections (political part)	-0.00079	0.00	-0.05	<0.0071
% Urban, 1990 (urbanization)	-0.01	0.00	-3.61	0.0003
% Variance Explained (R ²)	15.7			
df	8			

Summary of Model Findings

- Highest breast cancer mortality rates in counties characterized as:
 - Higher SES
 - Increased racial and ethnic segregation
 - Increased community instability
 - Increased proportions of individuals living alone
 - Lower rates of political participation
 - Less urban

Summary of Model Findings

- Lowest breast cancer mortality rates in counties characterized as:
 - Lower SES
 - Decreased racial and ethnic segregation (culturally diverse communities)
 - Increased community stability (less in/out migration)
 - Lower proportions of individuals living alone (decreased isolation)
 - Increased political participation
 - More urban



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Implications for Cancer Prevention and Public Health

Social Indicators may be used to:

- Provide **descriptive information** concerning levels of well-being in various social areas
- Conduct **analytical studies** of social change
- Design and evaluate the **effectiveness** of social programs and services
- Inform programmatic and research **goals and priorities**
- Create a system of **social accounts** analogous to the nation's economic indicators

Ross RJ, Gilmartin, KJ. Uses of Social Indicators. In: Ross RJ, Gilmartin, KJ. Handbook of Social Indicators: Sources, Characteristics, and Analysis. New York: Garland STPM Press; 1980

Data Limitations

- **Data Availability**
 - Limited data to accurately identify and measure social factors
 - Limits our ability to accurately capture structural domains

Future Work

- Define/refine better models and theories about how communities may influence health
 - Most appropriate area scale
 - Types of area influences for measurement

Acknowledgments

- Gopal K. Singh, PhD MS, MSc
 - Social Epidemiologist, Health Resources Services Administration (HRSA); previously Surveillance Research Program (SEER Program), NCI