

Using The American Community Survey and GIS in Breast Cancer Screening

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Sponsored by the US Census Bureau



Who are we?

Springfield is a medium-sized city located at the crossroads of New England

Serves a metropolitan area of more than 500,000 residents

Major urban center for employment, culture, commerce and government in Western Massachusetts.



Springfield, Massachusetts

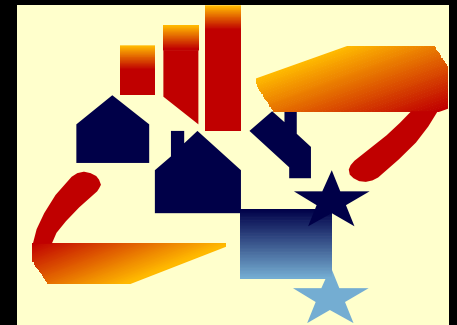


How ACS data can be used to help address health problems with GIS?



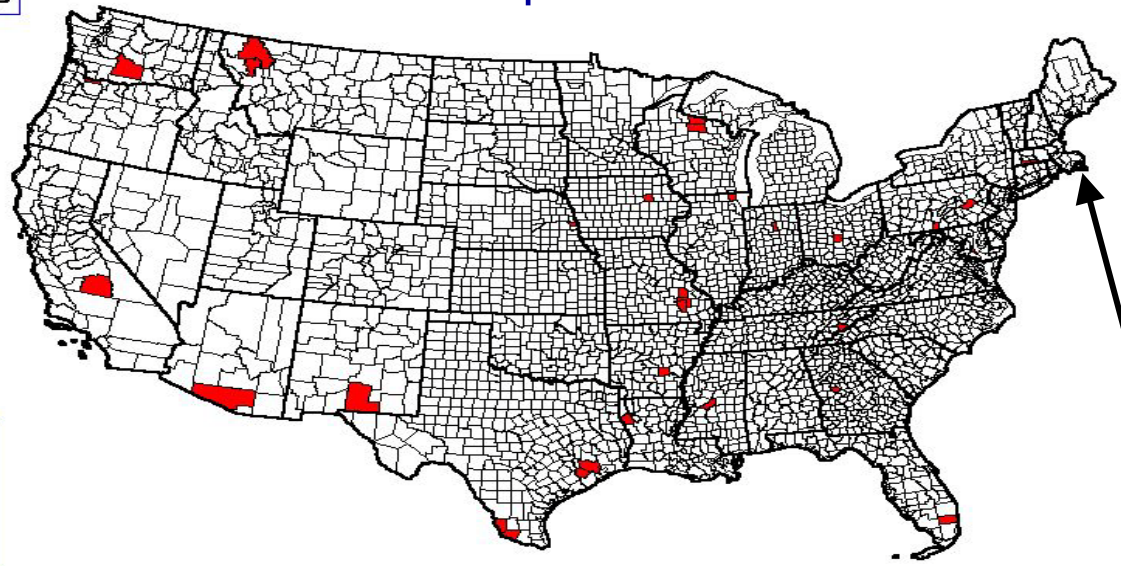
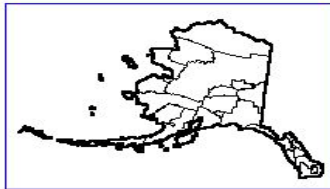
What is the American Community Survey (ACS)?

- survey by the US Census
- uses questions from the Census long-form
- data collected monthly and reported annually on a sample of the population



ACS Comparison Sites

American Community Survey
(1999 - 2002)
31 Comparison Sites





Advantages of ACS



- most current/accurate estimates
- yearly updates allow tracking of time trends
- additional questions not included in Census



Limitations of Current ACS Data



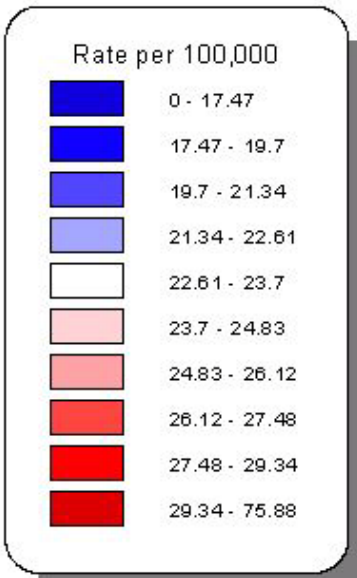
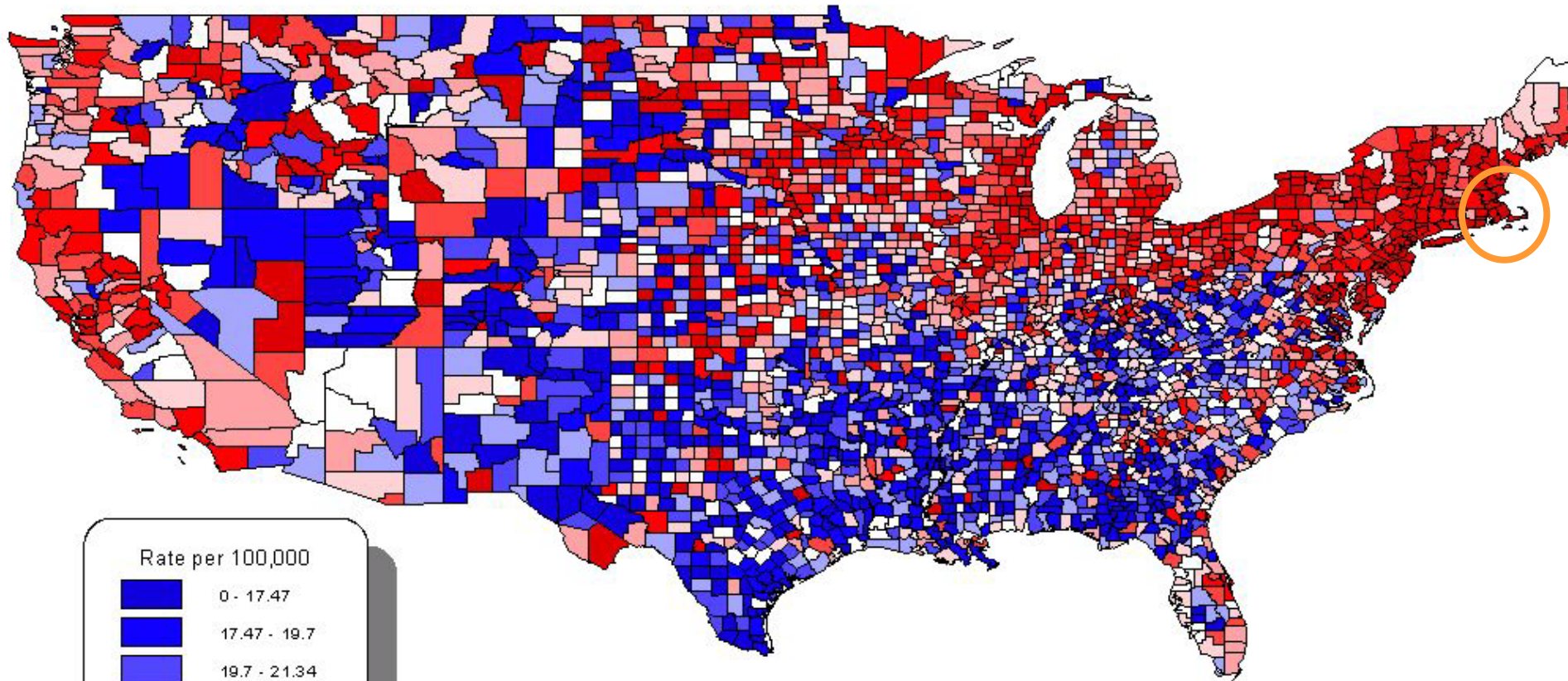
- estimates from a sample
- estimates based on weights from 1990 Census
- 2002 profiles will be more accurate



Defining the Problem



National Breast Cancer Mortality Rates* for White Females 1970-94

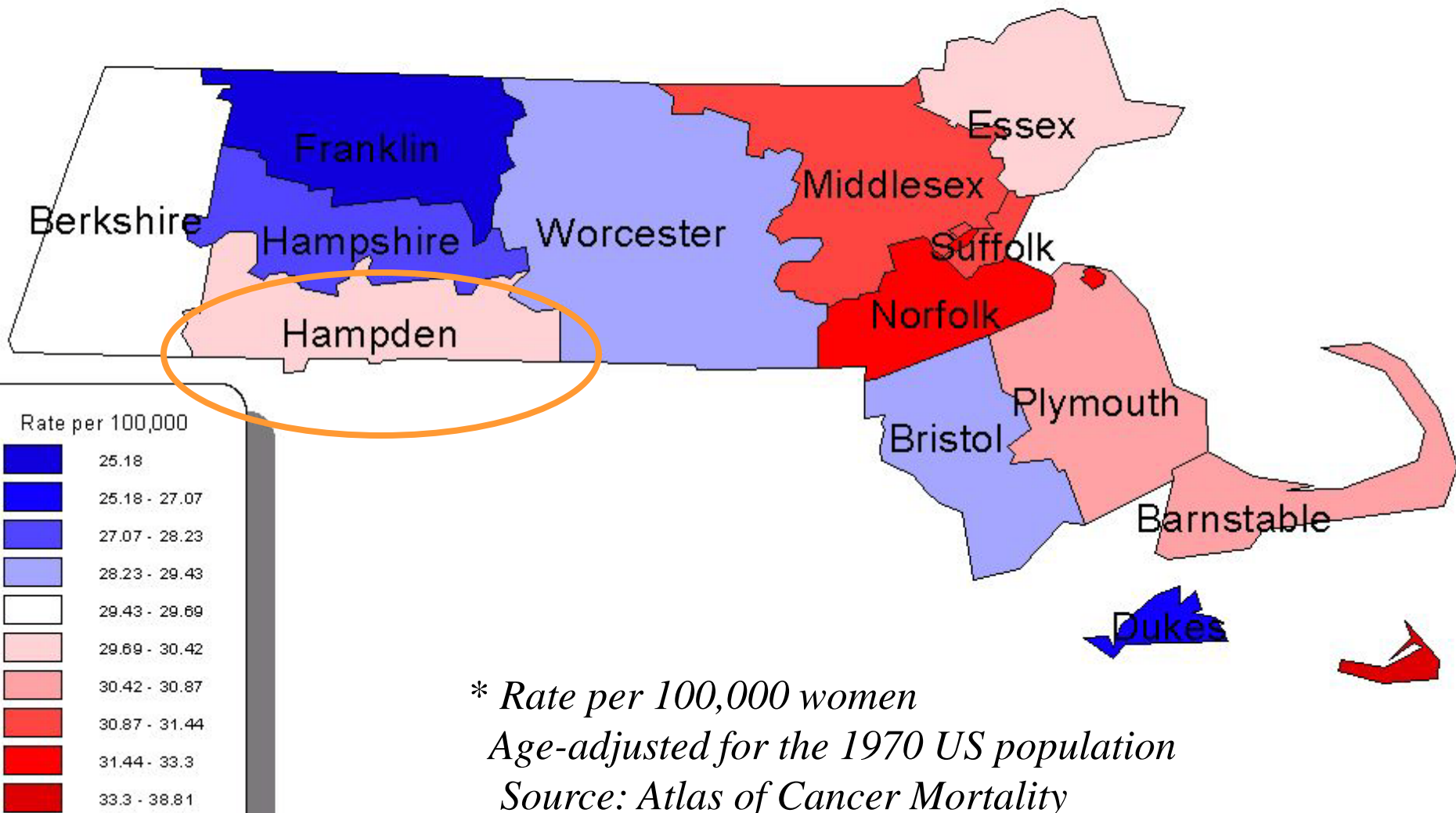


* Age-adjusted for the 1970 US population

Source: Atlas of Cancer Mortality

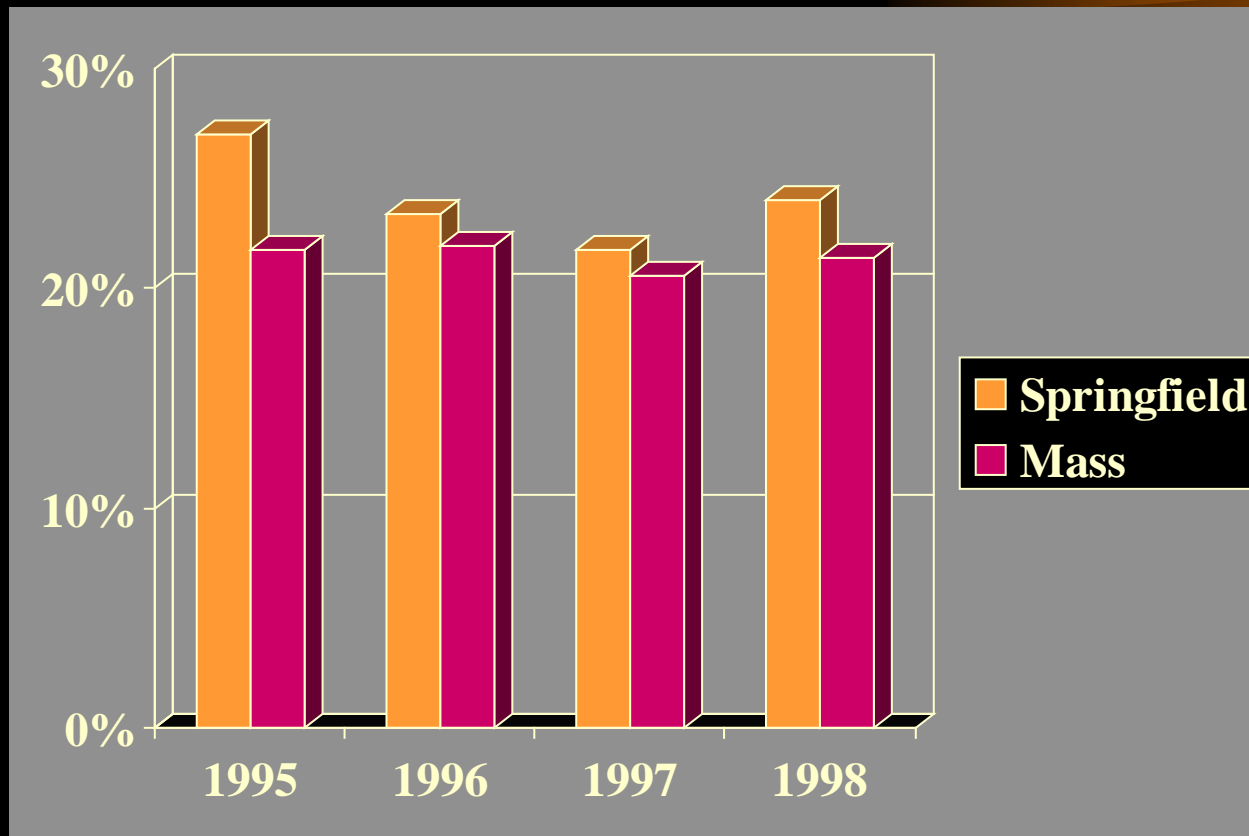
<http://www.nci.nih.gov/atlas>

Breast Cancer Rates by County in Massachusetts



** Rate per 100,000 women
Age-adjusted for the 1970 US population
Source: Atlas of Cancer Mortality*

Magnitude of Advanced Stage Breast Cancer



Source: Massachusetts Department of Public Health



Purpose

Create a profile of communities in Springfield in need of increased breast cancer screening to aid in planning intervention programs



Specific Aims



- identify geographic areas with high rates of advanced disease
- identify socioeconomic and demographic factors in advanced disease



American Community Survey

Data Sources

Baystate and
Mercy Medical
Centers

City of Springfield
Planning Department



ACS Data

Individuals

Age

Race

Ethnicity

Income

Education

Families/Households

Income

Assistance

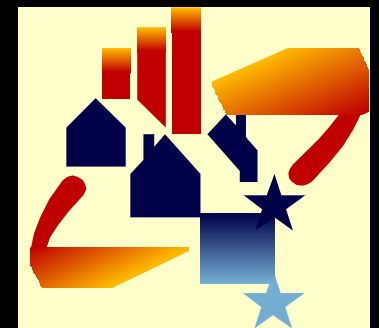
Composition

Housing

Value

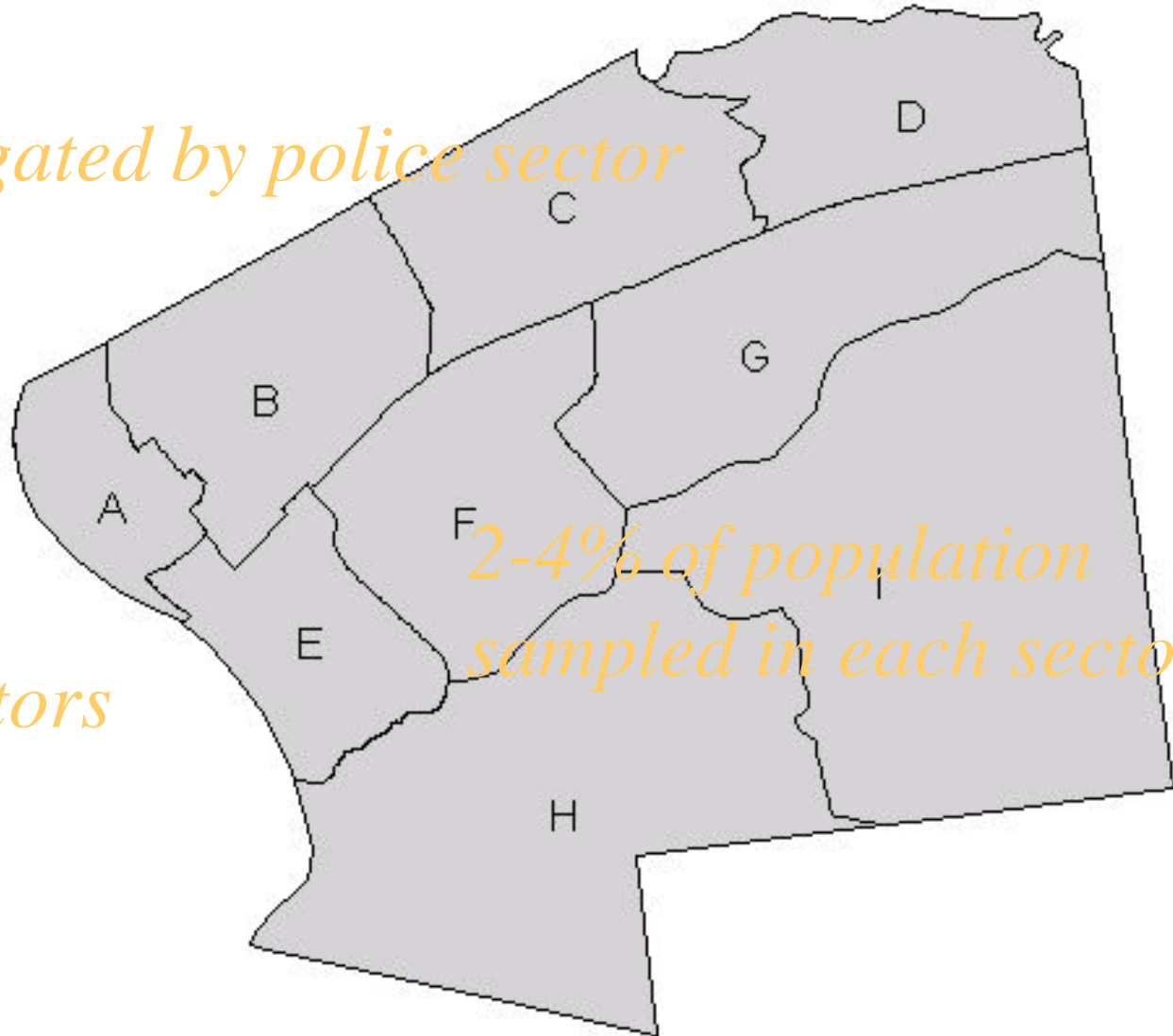
Tenancy

Occupancy



ACS Sampling Methods

Data aggregated by police sector



*2-4% of population
sampled in each sector*

9 police sectors



Hospital and Municipal Data

Patient Data

- address
- date of diagnosis
- stage at diagnosis
- race
- age
- marital status

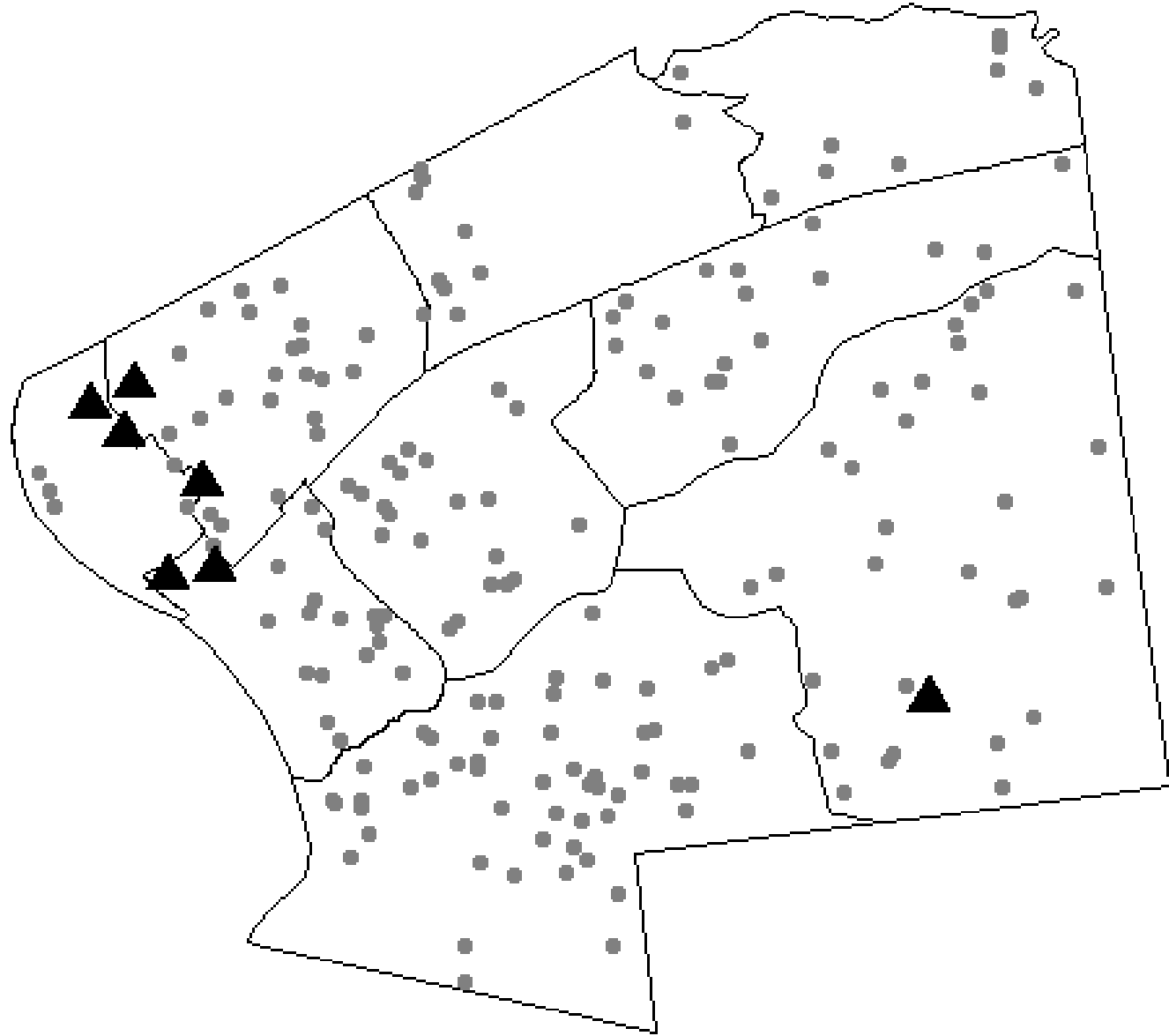
Geographic Data

- street centerlines
- police sector shape files
- location of mammography facilities



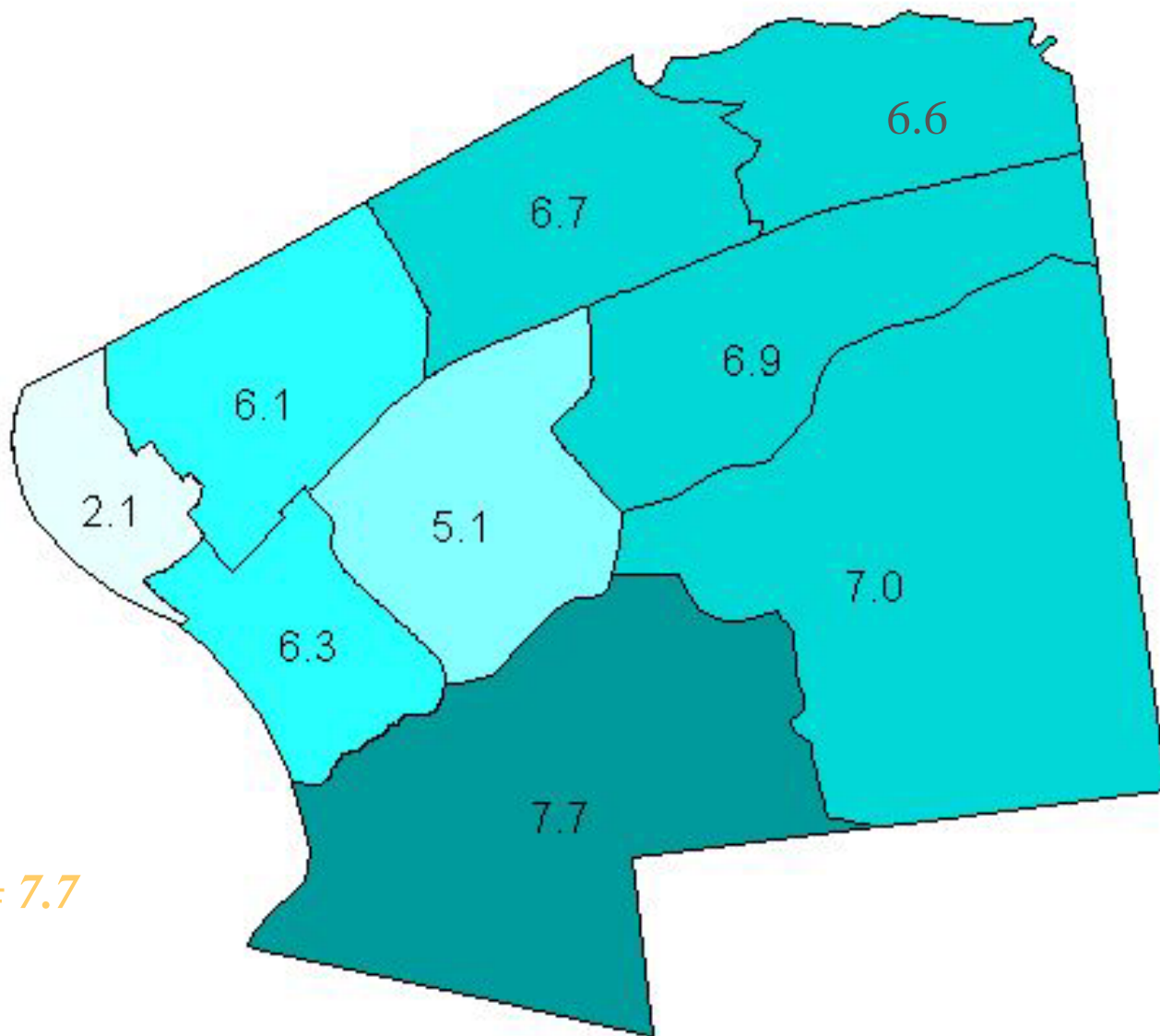
Our Approach

Locating Areas of Concentration





Risk of Advanced disease: 1995-1999 Prevalence per 1000 Women > 40



Sector H = 7.7



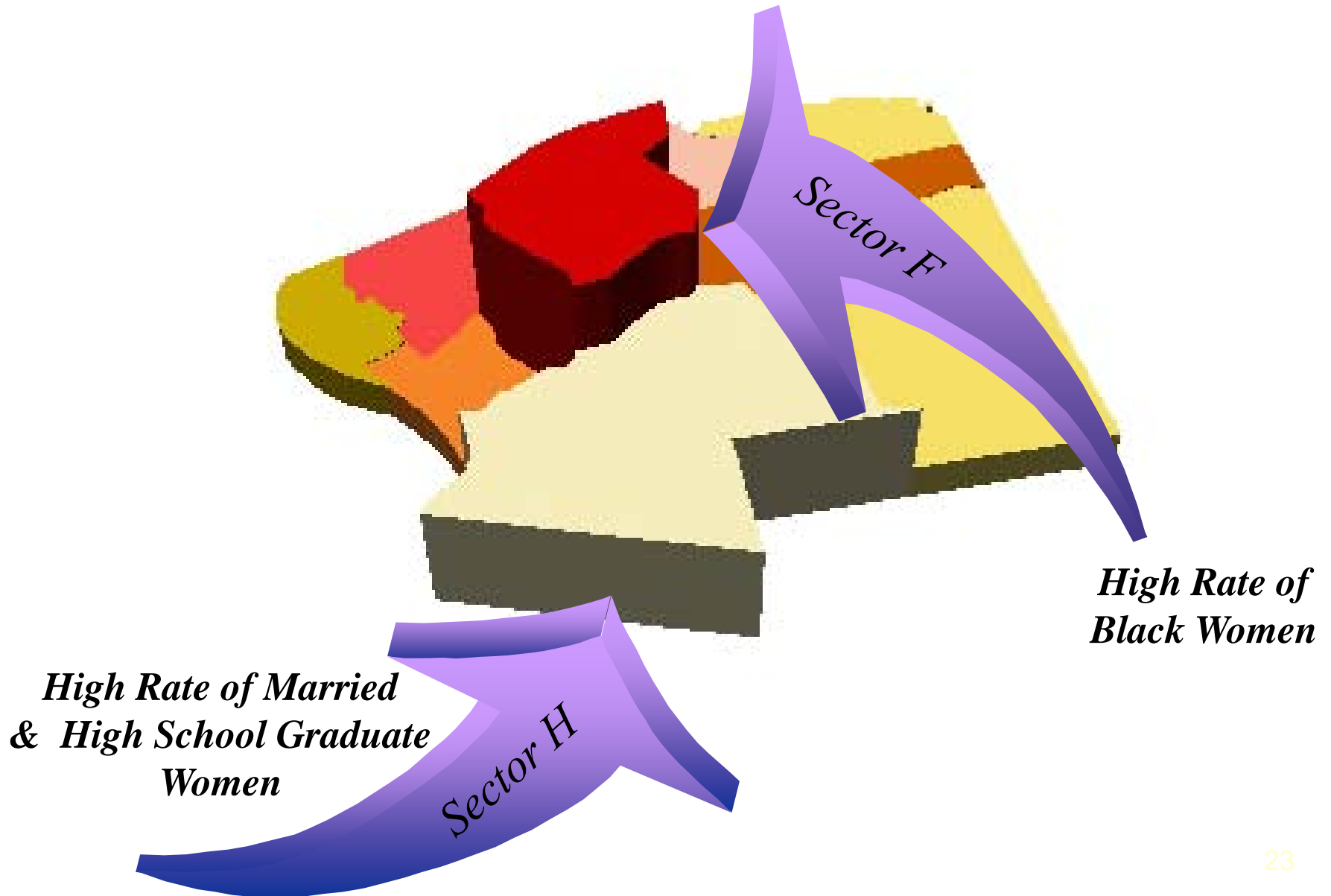
Spatial Regression: Factors in Advanced Disease

- tests for factors in rate of advanced disease
- police sector is unit of analysis
- ACS estimates are independent variables
- rate of advanced disease per women older than age 40 is dependent variable
- accounts for spatial proximity

Results of Spatial Regression

Factor	Coefficient	T-test	Significance
Black Race	0.0015	8.54	0.0034
High School Grads	0.0072	19.2406	0.0003
Foreign Born	0.0173	31.0393	0.0001
Married	0.0106	19.8701	0.0003

Targeting High-risk Populations





Designing Intervention Programs



- account for educational level of those at risk
- work with organizations for foreign-born
- work with African-American organizations



Summary: How we can use ACS Data in Healthcare

- demographic profile of communities
- calculation of risks (incidence/prevalence)
- planning/resource allocation
- identification of risk factors in disease
- design of intervention programs

Further Applications



- neighborhood level
- state rates
- individual level