Using The American Community Survey and GIS in Breast Cancer Screening

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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.

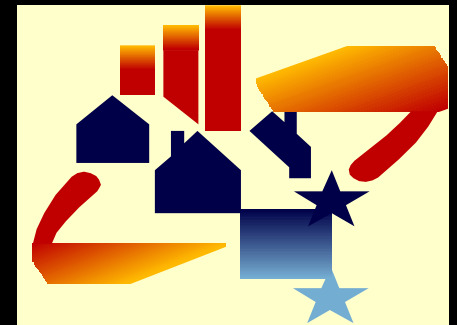**Springfield, Massachusetts**

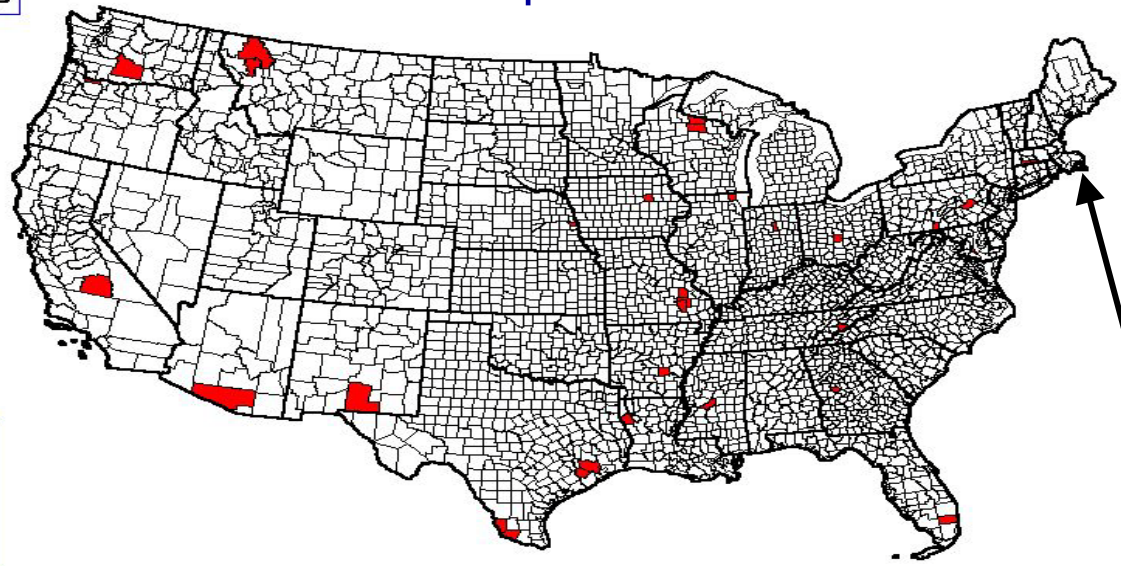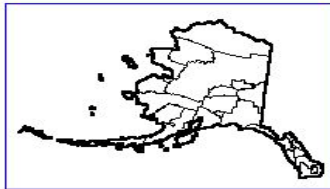# *How ACS data can be used to help address health problems with GIS?*

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
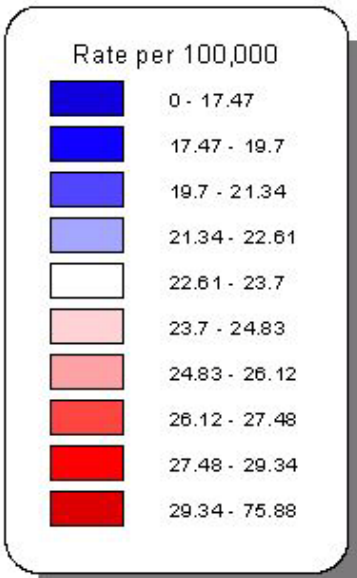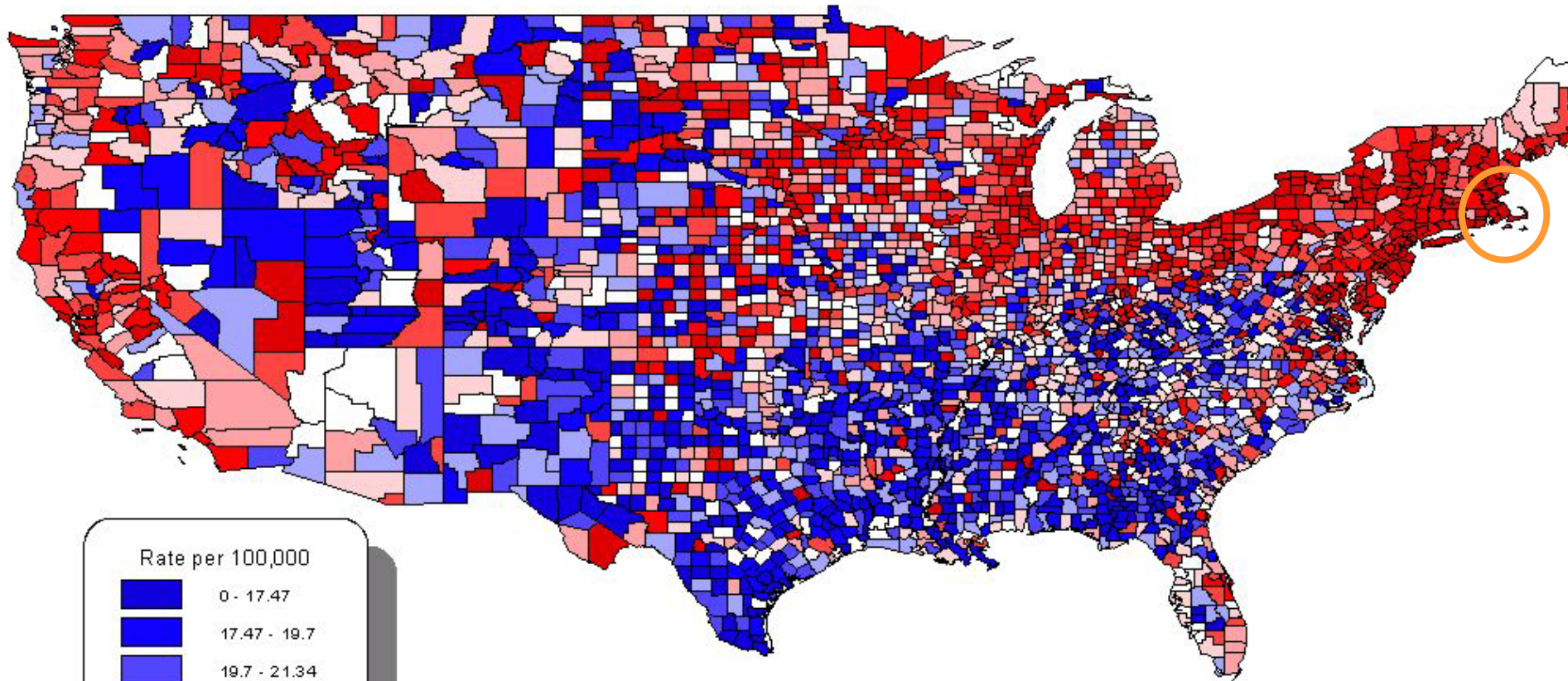
- 2002 profiles will be more accurate

Defining the Problem

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

Rate per 100,000

	0 - 17.47
	17.47 - 19.7
	19.7 - 21.34
	21.34 - 22.61
	22.61 - 23.7
	23.7 - 24.83
	24.83 - 26.12
	26.12 - 27.48
	27.48 - 29.34
	29.34 - 75.88

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

Color	Rate
	25.18
	25.18 - 27.07
	27.07 - 28.23
	28.23 - 29.43
	29.43 - 29.69
	29.69 - 30.42
	30.42 - 30.87
	30.87 - 31.44
	31.44 - 33.3
	33.3 - 38.81

Berkshire, Franklin, Hampshire, Hampden, Worcester, Middlesex, Essex, Suffolk, Norfolk, Bristol, Plymouth, Barnstable, Dukes
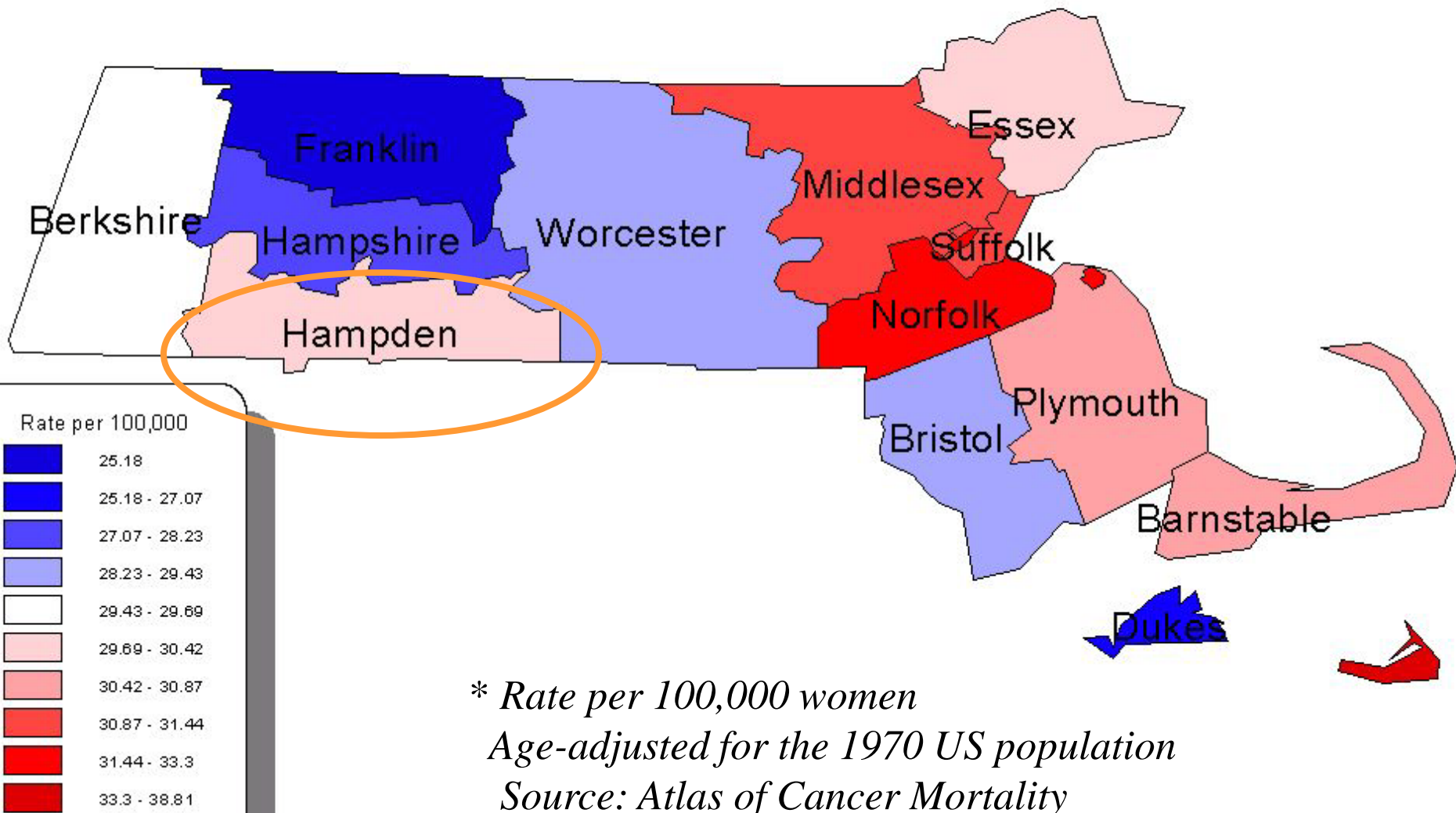
* Rate per 100,000 women
Age-adjusted for the 1970 US population
Source: Atlas of Cancer Mortality

Magnitude of Advanced Stage Breast Cancer
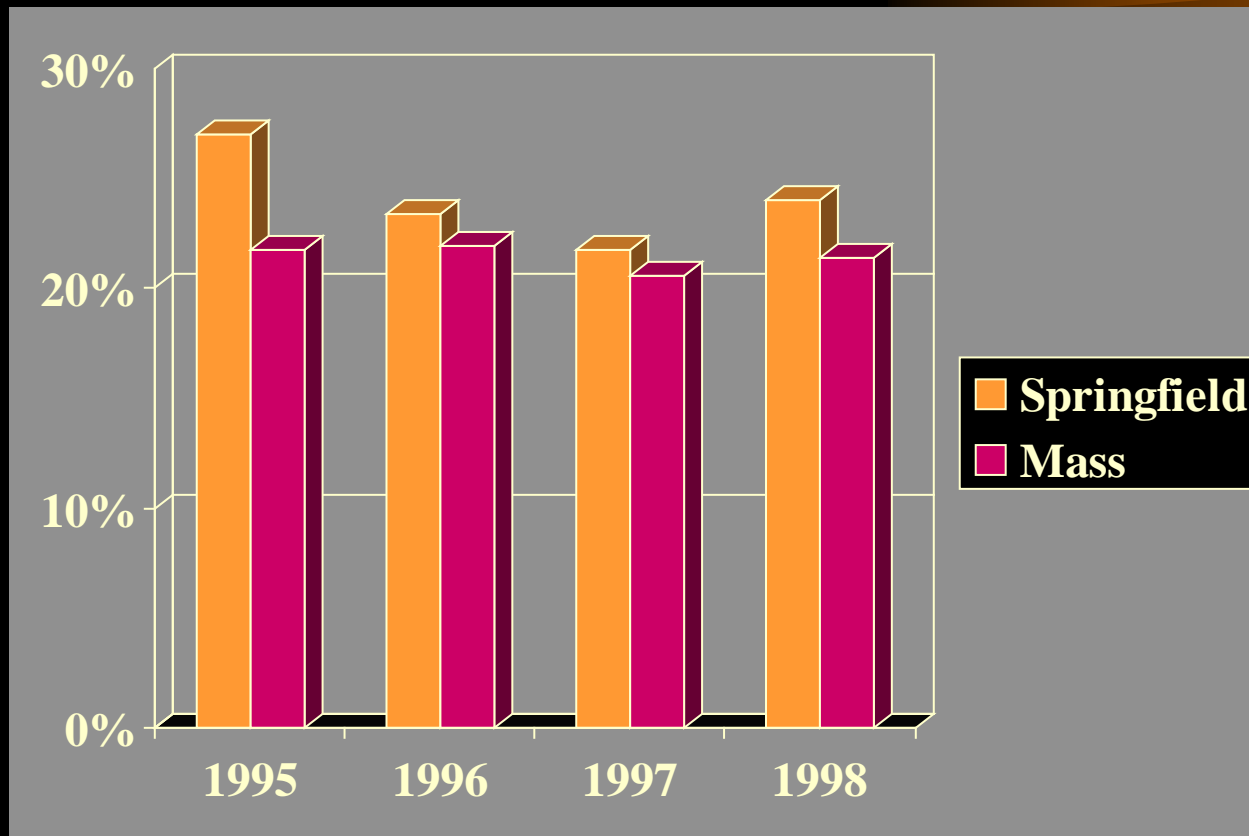
Source: Massachusetts Department of Public Health

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

Data Sources

American Community Survey

Baystate and Mercy Medical Centers

City of Springfield Planning Department

ACS Data

Individuals
Age
Race
Ethnicity
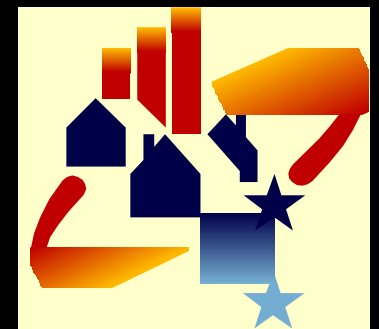Income
Education

Families/Households
Income
Assistance
Composition

Housing
Value
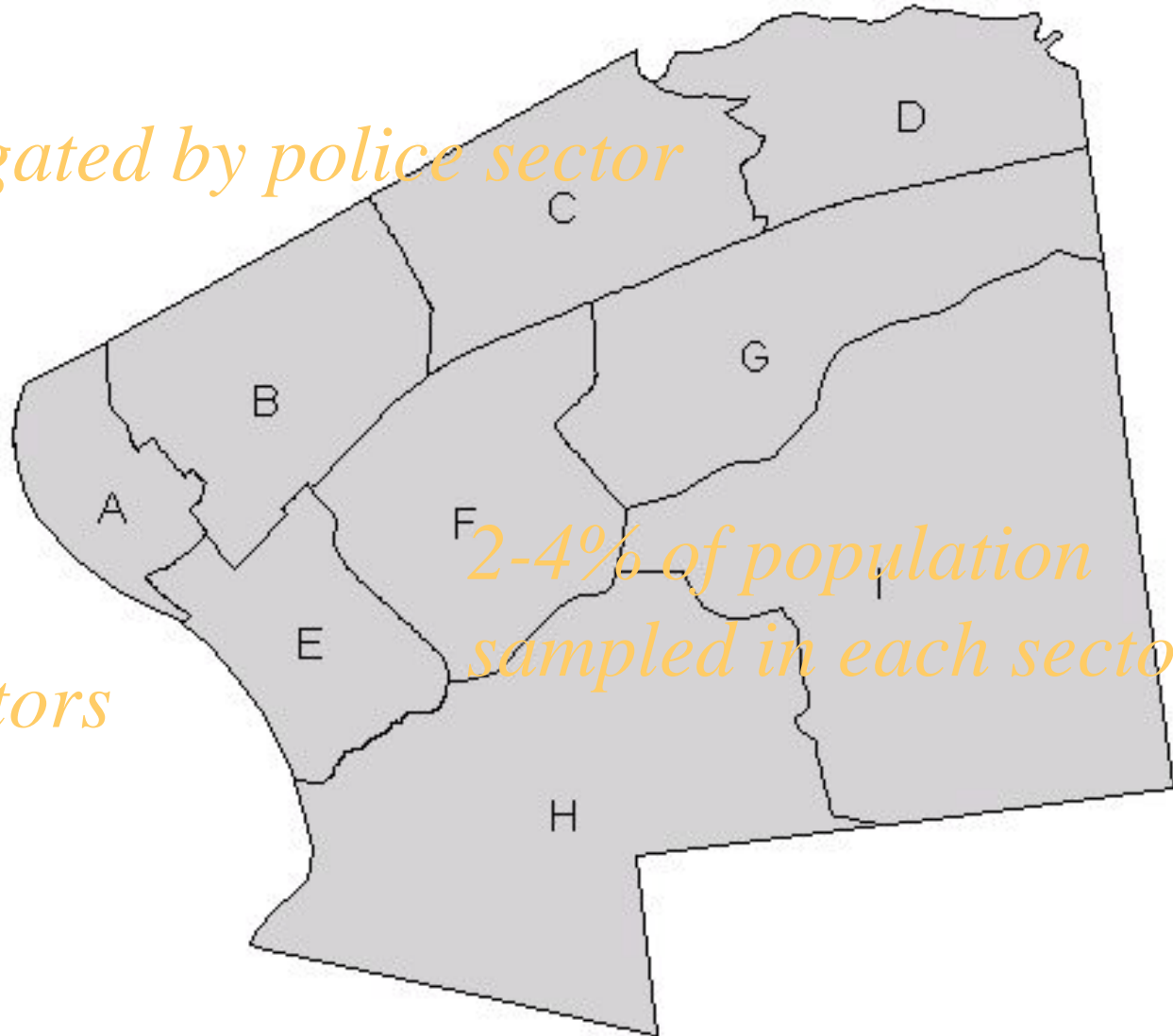Tenancy
Occupancy

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
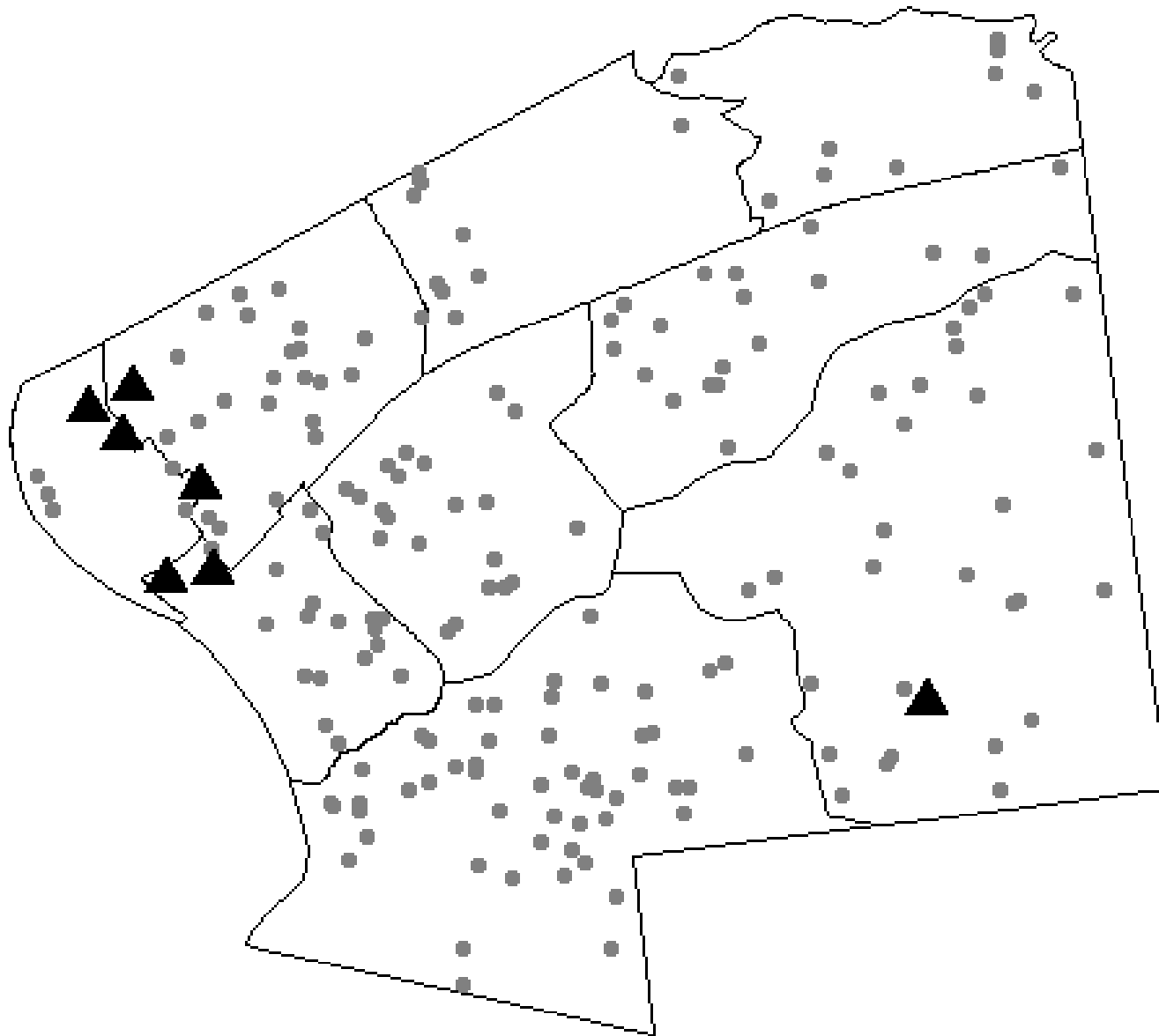- stage at diagnosis
- race
- age
- marital status

Geographic Data

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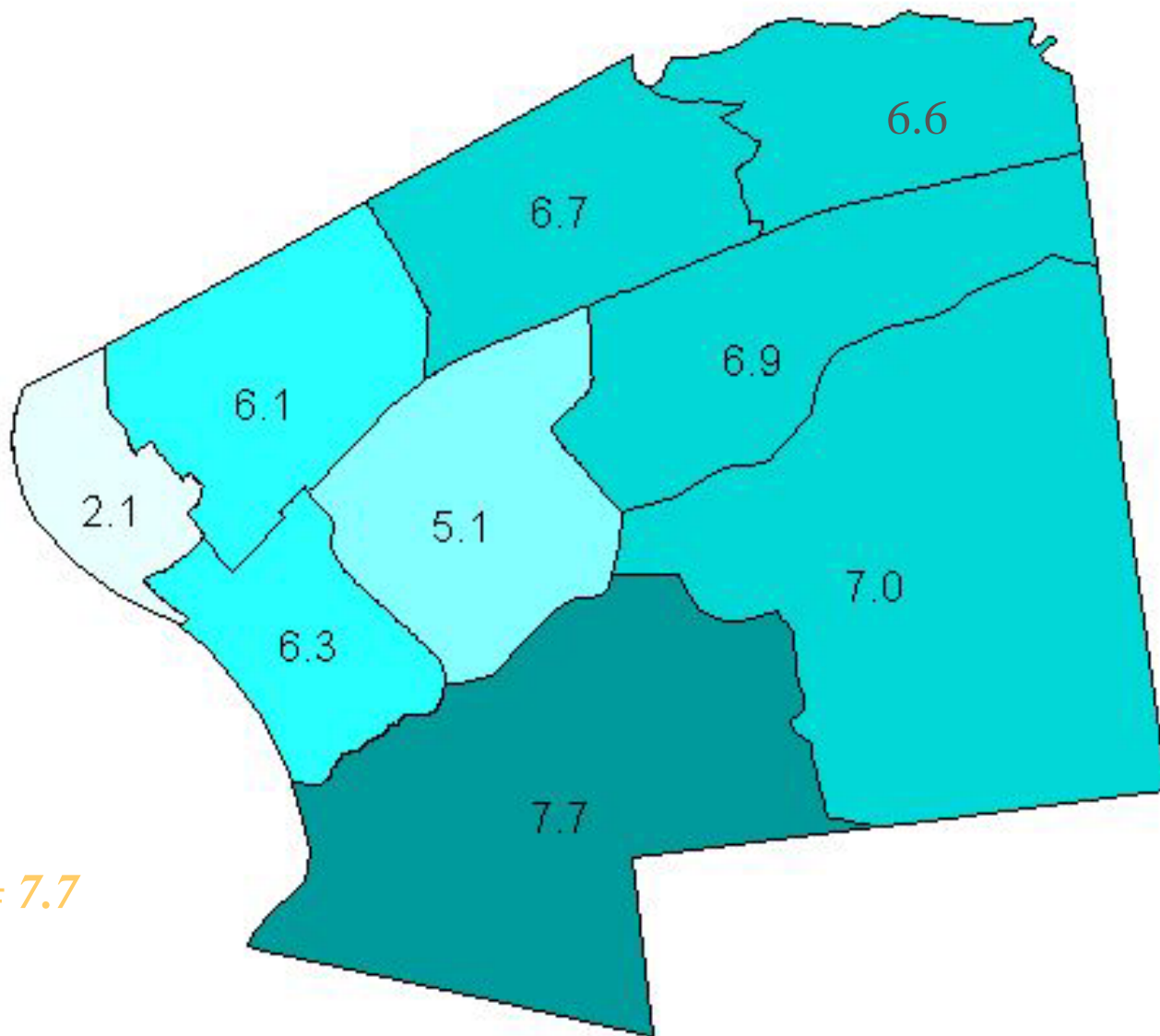- location of mammography facilities

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

Sector F

High Rate of
Black Women

High Rate of Married
& High School Graduate
Women

Sector H
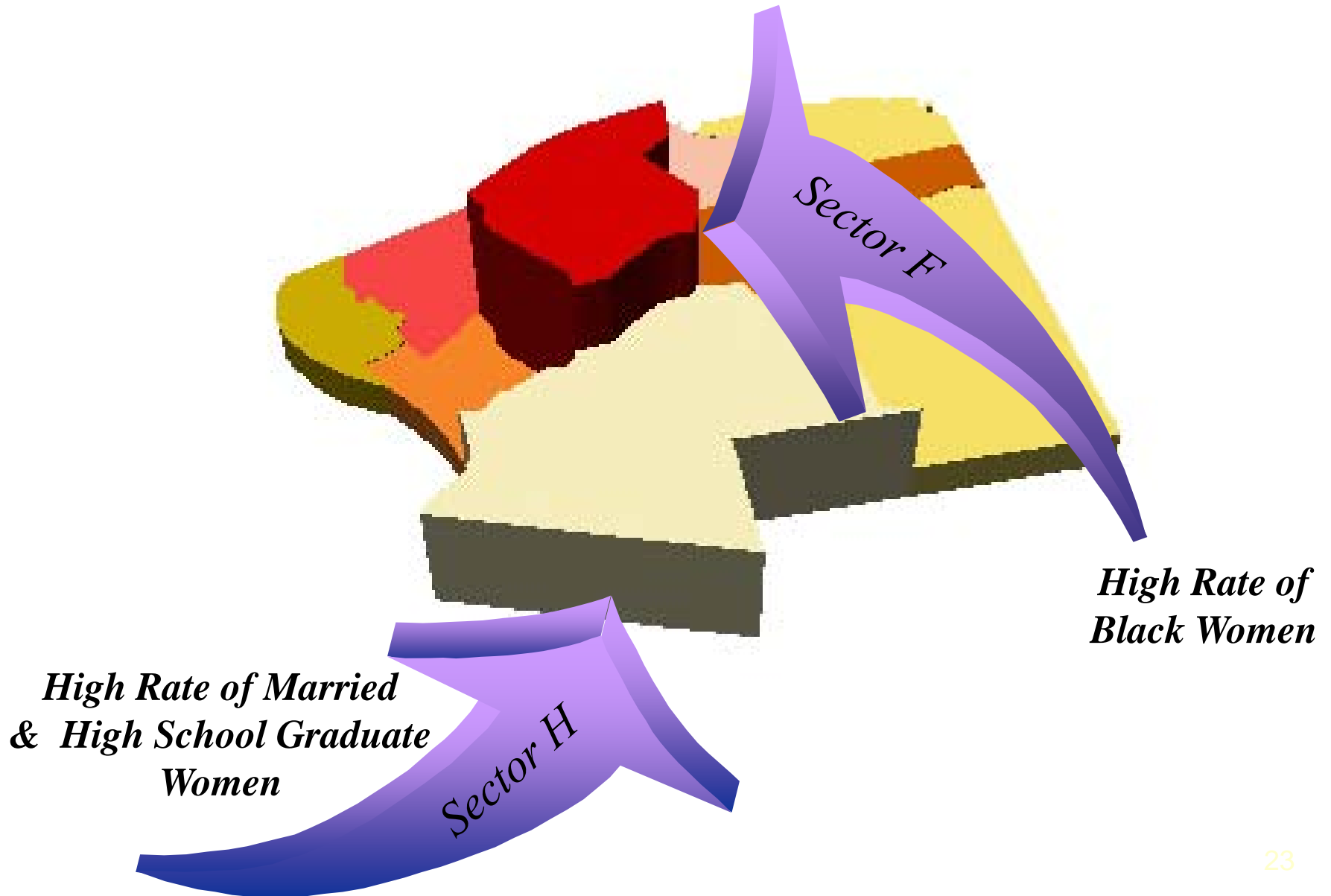
Designing Intervention Programs

- 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