# An Overview of the Community Health Status Indicators GIS Analyst

**Andrew Dent, MA, MBA**
**Janet Heitgerd, PhD**

**Geospatial Research, Analysis, and Services Program**
**Division of Health Studies**
**Agency for Toxic Substances and Disease Registry**
**Atlanta, Georgia**

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# GIS Component - Collaborative Effort

- **ATSDR – Kim Elmore and Brian Kaplan**
- **CDC – Marilyn Metzler and Jim Holt**
- **HRSA – Keisher Highsmith**
- **Johns Hopkins – Norma Kanarek**
- **Public Health Foundation – Jennifer Stanley**
- **ASTHO – Koren Melfi**
- **The Polis Center – Karen Comer**

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# Community Health Status Indicators Project (CHSI)

**Goal:**

**To develop a resource for monitoring and analyzing community health status at the county level**


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# CHSI

- **County-level profiles to monitor & address community health**
- **Easy to understand reports for all 3000+ U.S. counties**
- **Convey a range of community and public health issues**
- **HP 2010 objectives**
- **Peer counties**

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King
WA
MT
ND
MN
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ID
SD
Hennepin
WI
MI
WY
NY
VT
NH
ME
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CT
RI
Middlesex
Oakland
Wayne
PA
NJ
Suffolk
Queens
Cook
Cuyahoga
Allegheny
Philadelphia
NE
IA
OH
Franklin
Sacramento
Alameda
Santa Clara
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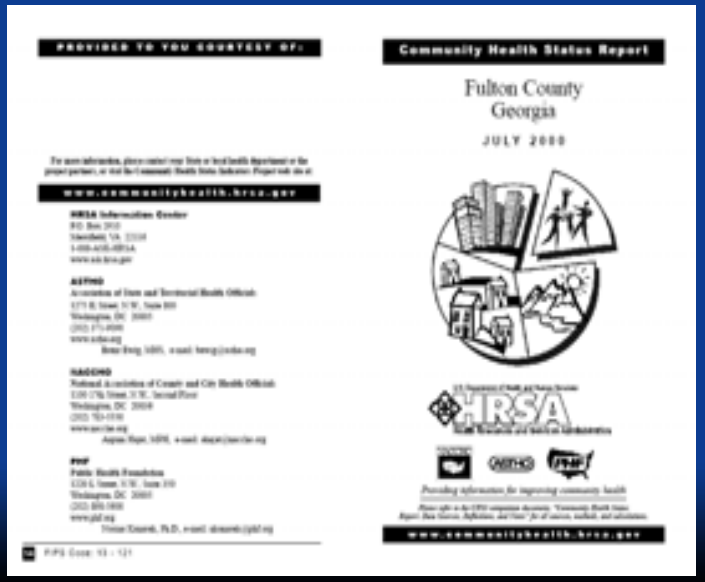
CO
KS
MO
St. Louis
VA
KY
Clark
San Bernardino
Los Angeles
Riverside
San Diego
AZ
Maricopa
TN
NC
OK
AR
SC
NM
MS
AL
GA
Dallas
TX
LA
Bexar
Harris
FL
Palm Beach
Miami-Dade
AK
HI
US Counties - Strata 1
Peer County
Non-Peer County

# CHSI Background

- **Pilot started by HRSA 1998**
- **Mailed and web-based PDF files for all 3,082 US counties**
- **20,000 ‘hits’ monthly**
- **Website removed in 2000**

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## Indicator Sets

- Vulnerable Populations
- Summary Measures of Health
- National Leading Causes of Death
- Risk Factors for Premature Death
- Measures of Birth and Death
- Relative Health Importance
- Preventive Services Use
- Access to Care

**Community Health Status Report**

# Orange County California

U.S. Department of Health and Human Services
HRSA
Health Resources and Services Administration

NACCHO ASTHO PHF

*Providing information for improving community health*

*Please refer to the CHSI companion document, "Community Health Status Report: Data Sources, Definitions, and Notes" for all sources, methods, and calculations.*

**www.communityhealth.hrsa.gov**

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## DEMOGRAPHIC INFORMATION

### Orange County, CA

| | |
|---|---|
| Population size: | 2,674,091 |
| Population density (people per square mile): | 3,385 |
| Individuals living below poverty level: | 11.3% |

**Age distribution**

| | |
|---|---|
| Under Age 18: | 26.4% |
| Age 65-84: | 8.4% |
| Age 85+: | 1.1% |

**Nonwhite population**

| | |
|---|---|
| Black: | 1.8% |
| American Indian: | 0.6% |
| Asian/Pacific Islander: | 12.9% |
| Hispanic origin: | 28.5% |

**PEER COUNTIES**

These peer counties (counties and county-like geographic areas) were grouped on the basis of frontier status and population size. There are 34 counties like Orange County, CA. (See the next panel.) Below is the range of values represented by the peer areas.

| | |
|---|---|
| Population size: | 1,003,595 - 9,145,219 |
| Population density (people per square mile): | 81 - 54,865 |
| Individuals living below poverty level: | 5.1 - 31.4 % |

**Age distribution**

| | |
|---|---|
| Under Age 18: | 18.3 - 32.9% |
| Age 65-84: | 6.4 - 21.6% |
| Age 85+: | 0.7 - 2.6% |

**Nonwhite population**

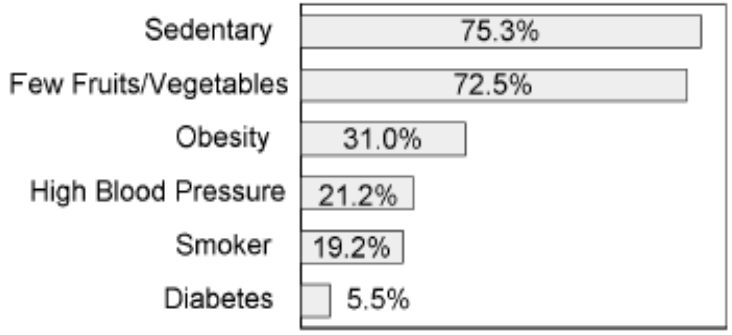
| | |
|---|---|
| Black: | 1.8 - 43.1% |
| American Indian: | 0.1 - 2.0% |
| Asian/Pacific Islander: | 1.4 - 21.3% |
| Hispanic origin: | 0.9 - 55.9% |

Source: U.S. Census Bureau, 1997. These population figures are used for calculations throughout brochure, when appropriate.

## RISK FACTORS FOR PREMATURE DEATH

### California

Communities may wish to obtain information about these measures, collected and monitored at the local level.




Prevalence estimates are from the Behavioral Risk Factor Surveillance System (BRFSS), (High Blood Pressure) 1997, (all others) 1998. For local estimates, contact your State BRFSS office.

## ACCESS TO CARE

### Orange County, CA

In addition to use of services, access to care may be characterized by medical care coverage and service availability.

| | |
|---|---|
| Uninsured individuals in the State (1998)[1]: | 7,373,000 |
| Medicare beneficiaries (1998)[2]: | |
| Elderly (Age 65+): | 253,100 |
| Disabled: | 23,650 |
| Medicaid beneficiaries: *The number of beneficiaries for each county is not available nationally, but may be obtained from your State.* | |
| Primary care physicians per 100,000 pop. (1998)[3]: | 103.3 |
| Dentists per 100,000 pop. (1998)[3]: | 67.3 |
| Community/Migrant Health Centers (1999)[3]: | Yes |
| Health Professional Shortage Area (12/17/99)[3]: | No |

1 Estimate of uninsured individuals in the State was obtained from the U.S. Census Bureau, Current Population Survey, 1998.
2 Health Care Financing Administration.
3 Area Resource File, Health Resources and Services Administration.

## PREVENTIVE SERVICES USE

### INFECTIOUS DISEASE CASES

**Orange County, CA**

These diseases respond to public health control efforts. The expected number (in parentheses) is based on the occurrence of cases among peer counties.

| | Cases | Expected |
|---|---|---|
| AIDS | rna | rna |
| Haemophilus influenzae B | nnn | nnn |
| Hepatitis A | 895 | (1,225) |
| Hepatitis B | 232 | (383) |
| Measles | 10 | (9) |
| Pertussis | 63 | (178) |
| Congenital Rubella Syndrome | 0 | (0) |
| Syphilis | rna | rna |
| Tuberculosis | rna | rna |

Indicates a status favorable to peers.

Indicates a status less than favorable.

rna The release of data for all counties has not been authorized.

nnn This was not a nationally notifiable condition for the entire time period.

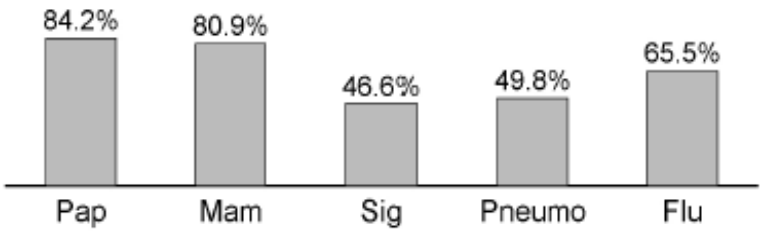
Source: Centers for Disease Control and Prevention, 1996-1998.

### CHILD PREVENTIVE SERVICES USE

Indicators such as immunizations, dental caries, and the prevalence of lead screening are not collected at the national level and must be obtained locally.

### ADULT PREVENTIVE SERVICES USE (%)

**California**




Source: Behavioral Risk Factor Surveillance System.
Pap smears among women 18+, past three years, (1998).
Mammography screening among women 50+, past 2 years, (1998).
Sigmoidoscopy screening among adults 50+, past five years, (1997).
Pneumonia vaccine among adults 65+, ever, (1998).
Flu vaccine among adults 65 and older, past year, (1997).

## PEER COUNTIES

Maricopa County, AZ
Alameda County, CA
Los Angeles County, CA
Orange County, CA
Riverside County, CA
Sacramento County, CA
San Bernardino County, CA
San Diego County, CA
Santa Clara County, CA
Broward County, FL
Dade County, FL
Palm Beach County, FL
Cook County, IL
Middlesex County, MA
Oakland County, MI
Wayne County, MI
Hennepin County, MN
St. Louis County, MO
Clark County, NV
Bronx County, NY
Kings County, NY
Nassau County, NY
New York County, NY
Queens County, NY
Suffolk County, NY
Cuyahoga County, OH
Franklin County, OH
Allegheny County, PA
Philadelphia County, PA
Bexar County, TX
Dallas County, TX
Harris County, TX
Tarrant County, TX
King County, WA


*Healthy People 2010 Vision:*
*Healthy People in Healthy Communities*

## SUMMARY MEASURES OF HEALTH

*Healthy People 2010 Goal:*
*Increase quality and years of healthy life*

### Orange County, CA

**AVERAGE LIFE EXPECTANCY (1990)[1]**
77.5 years

- Range among peer counties[2] (71.7 - 77.1)
- Median for all U.S. counties [75.4]

**ALL CAUSES OF DEATH (1993-97)[3]**
784.5 deaths/100,000 population *(Age-adjusted to year 2000 standard)*

- Range among peer counties[2] (805.5 - 1,013.2)
- Median for all U.S. counties [923.2]

**SELF-RATED HEALTH STATUS (1993-97)[4]**
10.9 % *(Percent of adults who report fair or poor health)*

- Range among peer counties[2] (8.8-17.2%)
- Median for all U.S. counties [14.7%]

**AVERAGE NUMBER OF UNHEALTHY DAYS IN PAST MONTH (1993-97)[4]**
5.4 days *(Average number of unhealthy days reported in a 30-day period)*

- Range among peer counties[2] (4.7-6.2)
- Median for all U.S. counties [5.1]

---

Indicates a status favorable to peers.
Indicates a status less than favorable.
A blank indicates that no comparison was made.
nrf No report, fewer than 10 deaths reported during the 5-year time period or fewer than 50 respondents to the survey.

1 Developed by Harvard University for the Health Resources and Services Administration's Bureau of Primary Health Care.
2 Eighty percent of the peer group values fall within this range.
3 National Center for Health Statistics.
4 Behavioral Risk Factor Survey; local estimates were developed by Centers for Disease Control and Prevention and are constructed from State-level data.

## VULNERABLE POPULATIONS

### Orange County, CA

Vulnerable populations may face unique health risks and barriers to care, requiring enhanced services and targeted strategies for outreach and case management.

**Vulnerable populations include:**

| | |
|---|---|
| People with no high school diploma[1] (among adults age 25 and older): | 316,780 |
| Unemployed individuals (1998): | 41,400 |
| People who are severely work disabled[1]: | 53,480 |
| Those suffering from major depression[1]: | 120,480 |
| Recent drug users[1] (within past month): | 157,450 |

## ENVIRONMENTAL HEALTH

### Orange County, CA

Infectious diseases[2] (1996-1998):

| | Cases | Reported | Expected |
|---|---|---|---|
| | E. coli | 23 | (52) |
| | Salmonella | 1,440 | (1,412) |
| | Shigella | 722 | (856) |

Toxic chemicals released annually[3] (EPA, 1996): 2,645,124 pounds

National air quality standards met by county[3] (1998):

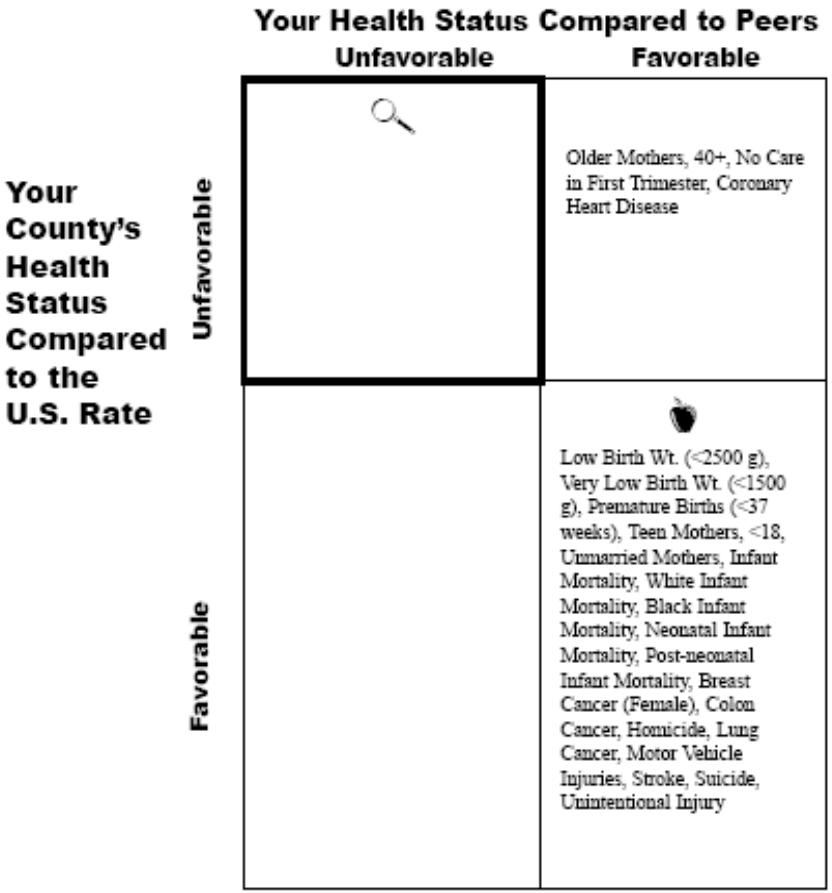
| Carbon Monoxide | Nitrogen Dioxide | Sulfur Dioxide | Ozone | Particulate Matter | Lead |
|---|---|---|---|---|---|
| Yes | Yes | Yes | No | Yes | Yes |

Indicates a status favorable to peers.
Indicates a status less than favorable.
nnn This was not a nationally notifiable condition for the entire time period.

1 The most current estimates of prevalence, obtained from various sources, (see the companion document for details), were applied to 1997 county population figures.
2 Prevention of these diseases is linked to having clean water, and proper hygiene and food handling. The expected number (in parentheses) is based on the occurrence of cases among peer counties. Source: Centers for Disease Control and Prevention.
3 Environmental Protection Agency (Toxic Chemical Release Inventory, AIRSData).

## RELATIVE HEALTH IMPORTANCE

### Orange County, CA




The Relative Health Importance table creates four categories of relative concern by simply comparing a county to its peers and to the U.S.

A county's indicators in the upper left-hand box (🔍) are higher than the U.S. and its peers and may warrant more attention. Conversely, indicators in the lower right-hand box (🍎) of the table compare favorably to both peers and the U.S. The other boxes represent intermediate levels of health where a county's rate is higher than either its peers or the U.S., but not both.

Source: Death Rates and Birth Measures Tables from pages 6-7.

Methodology: Studnicki, J. et al. (1997). Community health report card: Comprehensive Assessment for Tracking Community Health (CATCH), Best Practices and Benchmarking in Healthcare, Vol 2(5), 196-207.

## NATIONAL LEADING CAUSES OF DEATH

*Healthy People 2010 Goal: Eliminate Health Disparities*

### Orange County, CA

| | White | Black | Other | Hispanic |
|---|---|---|---|---|
| **Under Age 1** | | | | |
| Complications of Pregnancy/Birth | 12% | 11% | nrf | 10% |
| Birth Defects | 35% | 19% | 33% | 39% |
| **Ages 1-14** | | | | |
| Injuries | 30% | nrf | 45% | 35% |
| Cancer | 17% | nrf | 16% | 16% |
| Homicide | nrf | nrf | nrf | nrf |
| **Ages 15-24** | | | | |
| Injuries | 31% | 25% | 35% | 25% |
| Homicide | 25% | 25% | 27% | 40% |
| Cancer | nrf | 10% | nrf | nrf |
| **Ages 25-44** | | | | |
| Injuries | 18% | 17% | 17% | 19% |
| Cancer | 18% | 11% | 27% | 13% |
| Suicide | nrf | 11% | nrf | nrf |
| Heart Disease | nrf | 13% | 11% | nrf |
| HIV/AIDS | 14% | 21% | nrf | 16% |
| Homicide | nrf | nrf | nrf | 10% |
| **Ages 45-65** | | | | |
| Cancer | 38% | 33% | 44% | 28% |
| Heart Disease | 23% | 28% | 17% | 19% |
| **Ages 65+** | | | | |
| Heart Disease | 38% | 39% | 33% | 35% |
| Cancer | 22% | 24% | 25% | 22% |

nrf No report, fewer than 20 deaths in the race/ethnicity and age group or less than 10% of the deaths.

Local data are presented for the Nation's top leading causes of death in each age group. Columns, within age categories, do not total 100% because all causes of death are not listed.

The most complete ethnicity data available are reported.

Source: National Center for Health Statistics, Vital Statistics Reporting System, 1995-1997.

## MEASURES OF BIRTH AND DEATH

### Orange County, CA

| County Percent | | Peer County Range[1] | Birth Measures | U.S. Percent 1997 | Healthy People 2010 Target |
|---|---|---|---|---|---|
| 5.3 | 👍 | 6.0-9.2 | Low Birth Wt. (<2500 g) | 7.5 | 5.0 |
| 0.9 | 👍 | 1.0-1.9 | Very Low Birth Wt. (<1500 g) | 1.4 | 0.9 |
| 8.7 | 👍 | 8.7-12.8 | Premature Births (<37 weeks) | 11.4 | 7.6 |
| 3.4 | 👍 | 2.1-6.2 | Teen Mothers, <18 | 12.7 | No objective |
| 2.4 | 👍 | 1.6-3.2 | Older Mothers, 40+ | 2.1 | No objective |
| 25.4 | 👍 | 19.6- 50.3 | Unmarried Mothers | 32.4 | No objective |
| 17.1 | 👍 | 11.0-34.3 | No Care in First Trimester | 17.0 | 10.0 |

| County Rate | | Peer County Range[1] | Infant Mortality[2] | U.S. Rate 1997 | Healthy People 2010 Target |
|---|---|---|---|---|---|
| 4.8 | 👍 | 5.3-10.5 | Infant Mortality | 7.2 | 4.5 |
| 4.7 | 👍 | 4.5-7.3 | White Infant Mortality | 6.0 | 4.5 |
| 11.1 | 👍 | 9.9-17.8 | Black Infant Mortality | 13.7 | 4.5 |
| 3.2 | 👍 | 3.4- 6.9 | Neonatal Infant Mortality | 4.8 | 2.9 |
| 1.6 | 👍 | 1.6-3.3 | Post-neonatal Infant Mortality | 2.5 | 1.5 |

| County Rate | | Peer County Range[1] | Death Measures[3] | U.S. Rate 1997 | Healthy People 2010 Target |
|---|---|---|---|---|---|
| 28.1 | 👍 | 27.0-35.6 | Breast Cancer (Female) | 28.6 | 22.2 |
| 18.8 | 👍 | 18.6-26.0 | Colon Cancer | 21.6 | 13.9 |
| 227.1 | 👍 | 194.5-303.5 | Coronary Heart Disease | 216.0 | 166.0 |
| 4.9 | 👍 | 3.2-18.1 | Homicide | 7.2 | 3.2 |
| 50.1 | 👍 | 43.8-66.2 | Lung Cancer | 58.1 | 44.8 |
| 9.3 | 👍 | 7.4-18.5 | Motor Vehicle Injuries | 15.8 | 9.0 |
| 60.1 | 👍 | 36.9-68.3 | Stroke | 62.0 | 48.0 |
| 8.9 | 👍 | 7.3-14.1 | Suicide | 11.4 | 6.0 |
| 13.0 | 👍 | 13.0-23.3 | Unintentional Injury | 33.3 | 20.8 |

*Healthy People 2010 is grounded in science, built through consensus, and designed to measure progress.*

The total number of births during this time period was 143,013 and the total number of deaths was 47,389.

👍 Indicates a status favorable to peer county median value and 🔍 indicates that a closer look and perhaps reduction of the percent or rate may be needed. (A blank indicates that no comparison was made).

nrf No report, fewer than 500 births and 3 events (birth measures and infant mortality) or fewer than 10 events (death measures) occurred during the specified time period.

1 Eighty percent of the peer group values fall within this range.

2 Infant Mortality: deaths per 1,000 live births (Neonatal: < 29 days; Post-neonatal: 1 - 12 months).

3 Rates are age-adjusted to year 2000 standard; per 100,000 population.

Source: National Center for Health Statistics, Vital Statistics Reporting System, 1995-1997.

# CHSI II

- **Update existing indicators, add a few new ones**
- **Develop GIS component**
- **Document history of partnerships, challenges, feedback**
- **Re-debut October/November 2007 – *Preventing Chronic Diseases* (CDC e-journal)**
- **Lay groundwork for CHSI III, sustainability**

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# CHSI Website


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# CHSI GIS Analyst

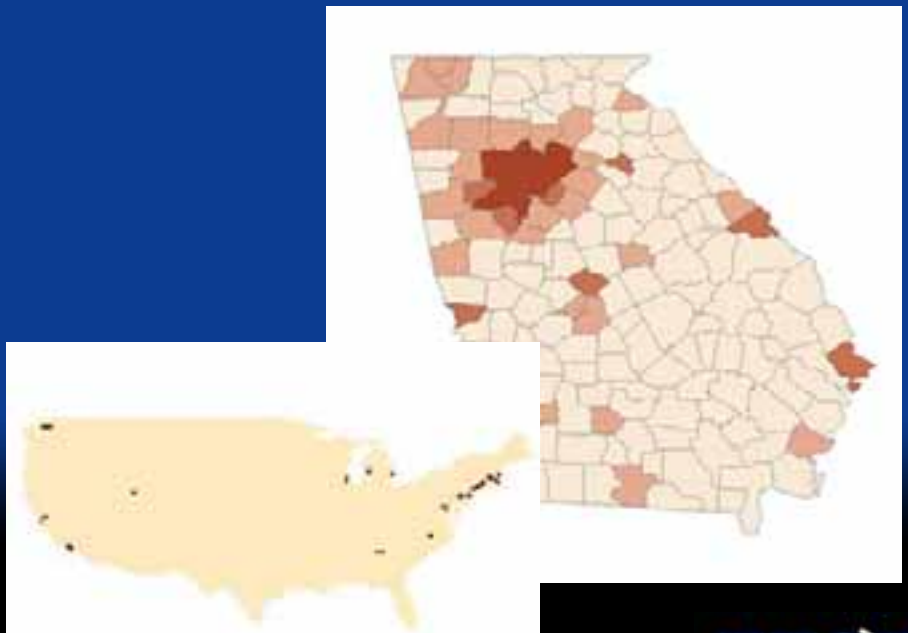
- Original Release of CHSI
  - In 2000, mapping was not routinely a part of public health projects
  - When GIS was integrated, it was thought of as an “after-thought”, not an integral piece enabling the interpretation of the public health data

# Since 2000…

- Much has changed surrounding the increased affordability, availability, and ease of use of GIS software.
- GIS software has made critical advances enabling the sharing of GIS data layers and the development of web-based GIS components.
- Proliferation of web-based tools (primarily for location and travel) have familiarized the public with the concept and purpose of mapping.

# CHSI II and the CHSI GIS Analyst

- GIS has been identified as being a critical component for the visualization and interpretation of the CHSI indicators.



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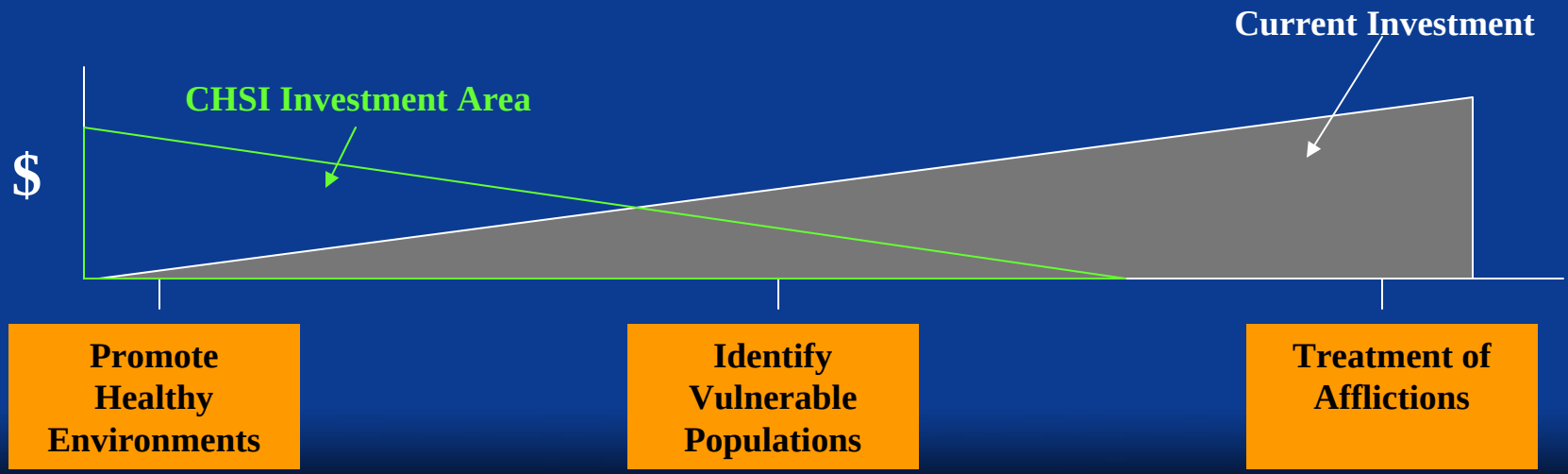
# Upstream Investment

- In the plenary, Dr. Bailey encouraged upstream investment, or the investment in activities to promote healthy environments and identify vulnerable populations, as opposed to investment primarily in the treatment of afflictions. CHSI represents just such an investment.

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# Overall Goals

- Ease of Use
  - Site designers were aware that positive characteristics of the first hard copy CHSI report were its simplicity, ease of use, and organization.
- Choropleth Map and Tabular Data Displays
  - Map and tabular displays must be employed to communicate the data in as rich a way as possible.



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# Design Considerations

- User Assessment
- Static vs. Dynamic Maps
- Cartography, Visualization, and Interpretation
- User Interface
- Architecture & Technology

DESIGN CONSIDERATIONS

# User Assessment

- User needs assessment was not feasible due to lack of available resources.
- GIS Team focused initial efforts on designing a site that would serve the needs of existing CHSI users, namely local community groups and local public health staff.

DESIGN CONSIDERATIONS

# Static versus Dynamic Maps

- Advantages of Static Maps
  - Map is pre-produced, allowing important cartographic decisions to be performed ahead of time
  - Map is easily distributed
  - User is not required to operate complex controls or make design decisions.
- Advantages of Dynamic Maps
  - Permits users to make important decisions resulting in a map that better meets the user needs.
  - Permits users to manipulate data and control the choropleth classes, map extent, and layers that might emphasize the message that is desired.

DESIGN CONSIDERATIONS

# Cartography, Visualization, and Interpretation

- A four class percentile ranking classification was chosen to simplify interpretation and the synthesis of multiple indicators.
- Color will be employed to enable identification of indicator group containing the indicator shown on the map.

DESIGN CONSIDERATIONS

# Interface

- Intuitive Tabbed Interface
  - The tabbed interface is a mechanism to bundle different views of selected geographies/data.
  - State View Tab
    - Enables comparison county to other counties in the same state.
  - Peer County View Tab
    - Enables comparison of county to other peer counties across the United States
  - Indicator Comparison Tab
    - Enables the comparison of multiple indicators for a single county


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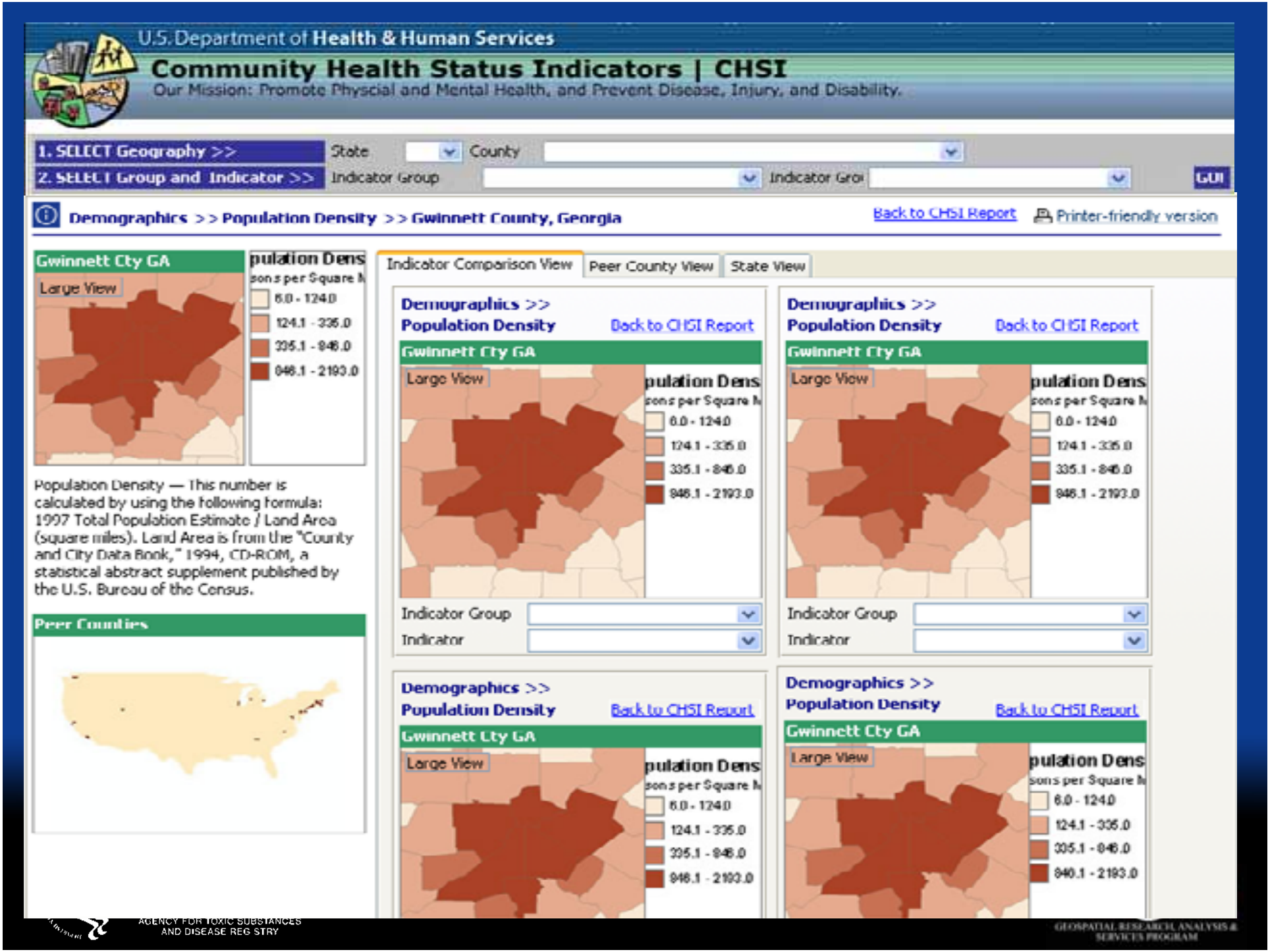
U.S. Department of Health & Human Services
Community Health Status Indicators | CHSI
Our Mission: Promote Physcial and Mental Health, and Prevent Disease, Injury, and Disability.
1. SELECT Geography >>
State
County
2. SELECT Group and Indicator >>
Indicator Group
Indicator
GO!
Demographics >> Population Density >> Gwinnett County, Georgia
Back to CHSI Report
Printer-friendly version
Gwinnett Cty GA
Large View
6.0 - 124.0
124.1 - 335.0
335.1 - 946.0
946.1 - 2193.0
Population Density — This number is calculated by using the following formula: 1997 Total Population Estimate / Land Area (square miles). Land Area is from the "County and City Data Book," 1994, CD-ROM, a statistical abstract supplement published by the U.S. Bureau of the Census.
Peer Counties
Indicator Comparison View
Peer County View
State View
Demographics >>
Population Density
Back to CHSI Report
Indicator Group
Indicator
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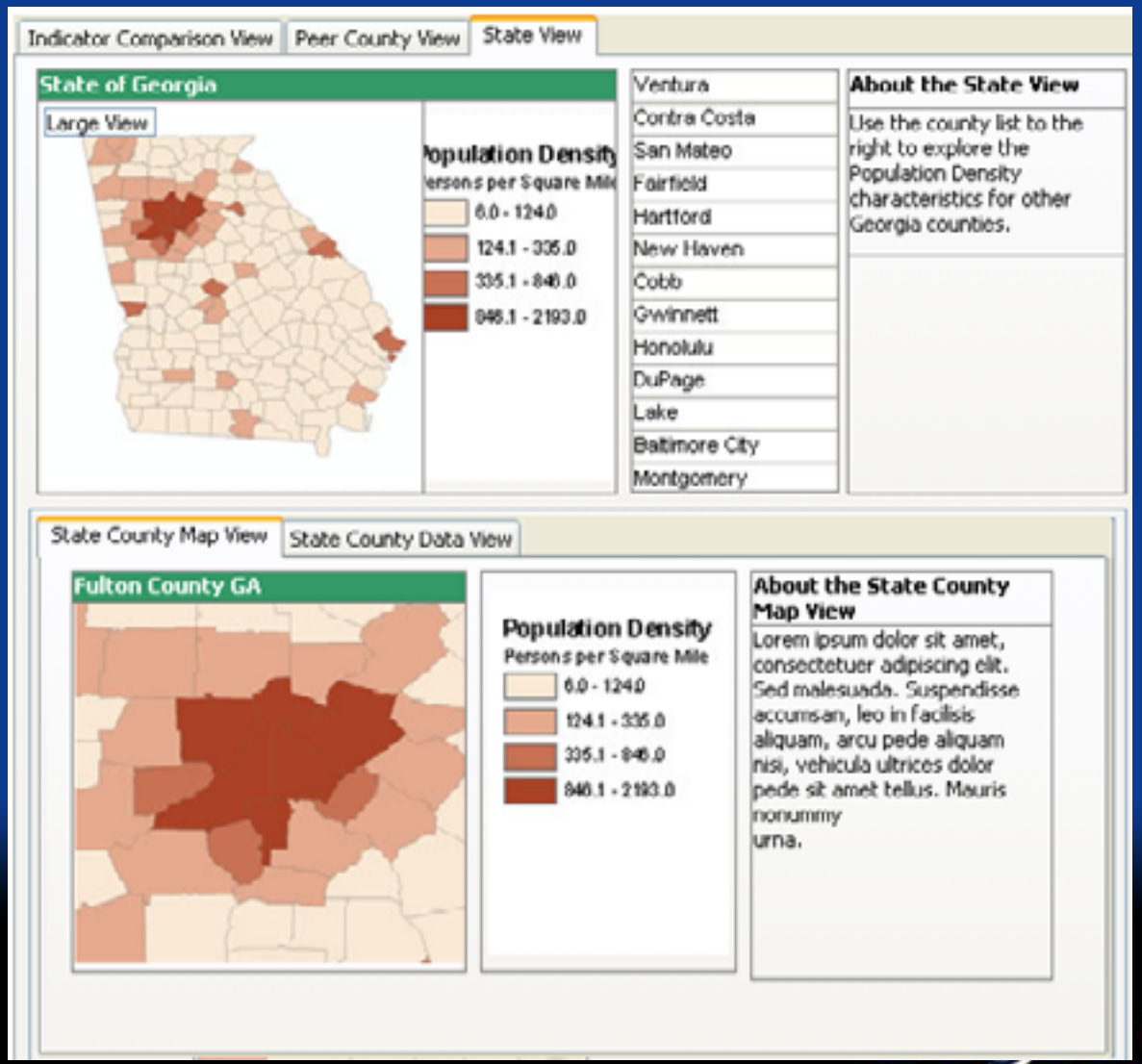
DESIGN CONSIDERATIONS

# State View Tab

- Facilitates access to indicator maps for other counties in selected state.

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DESIGN CONSIDERATIONS

# Peer County View Tab

- This tab enables the exploration of peer county data for the selected indicator.


Map View enabled.

Data View enabled.


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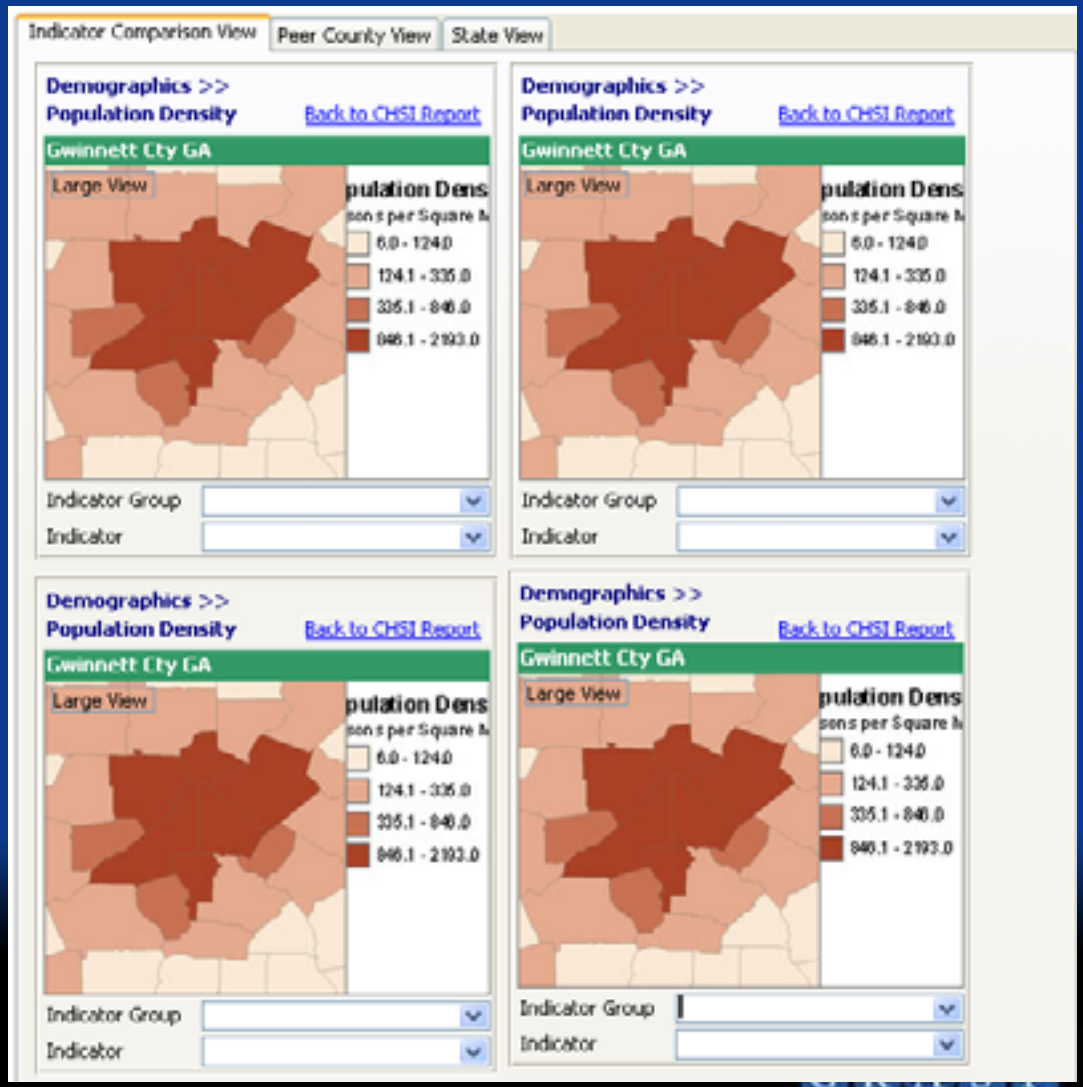
# Indicator Comparison Tab

- Enables the comparison of different indicators for the same geography.

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DESIGN CONSIDERATIONS

# Architecture and Technology

- A standard three-tier architecture is being employed.
  - Allows components to be replaced / upgraded independently at any time without disruption to the system as a whole.
- Data Tier
  - Microsoft SQL Server 2000 / ESRI SDE 9.2
- Application Tier
  - Microsost .Net 2003 / Microsoft IIS / Telerik .Net Controls / ESRI ArcIMS 9.2
- Presentation Tier
  - HTML / Javascript

# Future Plans

- Beta Release and User Testing will begin November 2007.

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# Conclusion

- Questions?

Andrew Dent, MBA, MA
aed5@cdc.gov

Janet Heitgerd, PhD
jbh0@cdc.gov

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