

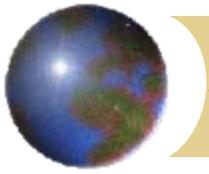
Connecting California

Linette Scott, MD, MPH

California Department of Public Health

CalGIS Annual Conference

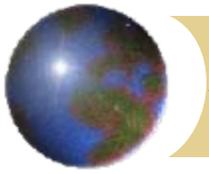
April 25, 2008



Public Health ...

- Understanding Populations
- Improving Environments

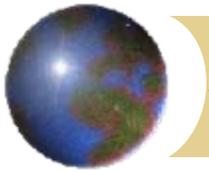
... Connecting California



Public Health

“Fulfill society's interest in assuring conditions in which people can be healthy.”

(Institute of Medicine, 1998)

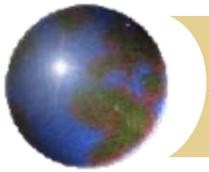


Public Health

Understanding the patient ...

- Disease patterns and distributions
- Health status and outcomes
- Access to health services
- Health service delivery

... through geography

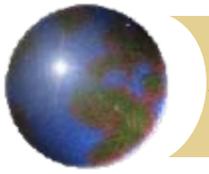


Public Health

Understanding impacts on the patient ...

- Emergency response and preparedness
- Environmental hazards
- Socioeconomic status
- Resource allocation and management

... through geography

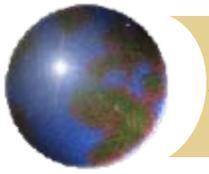


Public Health

Beyond the individual ...

- The patient is the population
- Assessment is multi-factorial
- The treatment is the environment

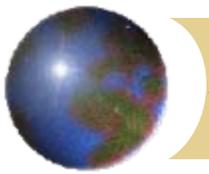
... geography is critical



Public Health

GIS through the centuries to ...

- Generate and test hypotheses
- Communicate findings
- Evaluate resources



Theories about causal relationships

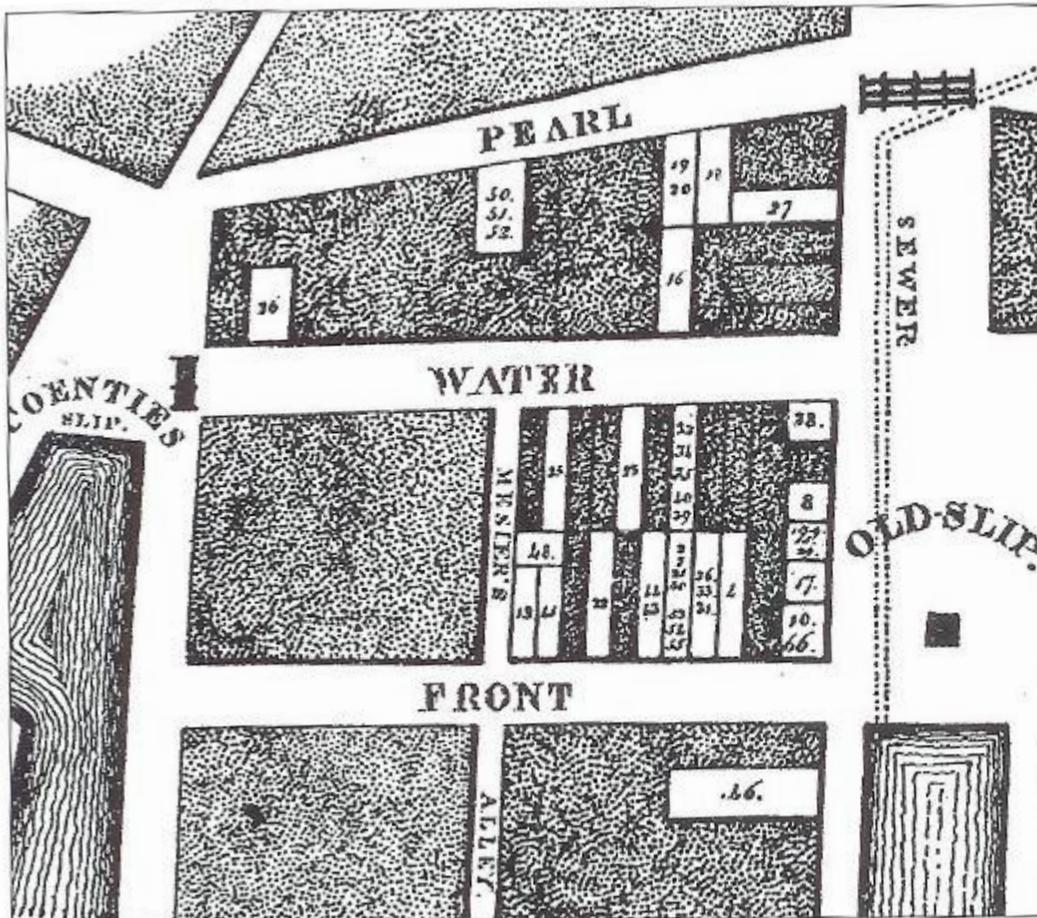
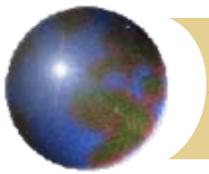


Figure 2.8b Detail in black and white of Pascalis's map of yellow fever cases near Old Slip, New York, 1819. Fatal cases are numbered sequentially by time of death.

Source: New York Academy of Medicine Library.



Environmental contributions to health

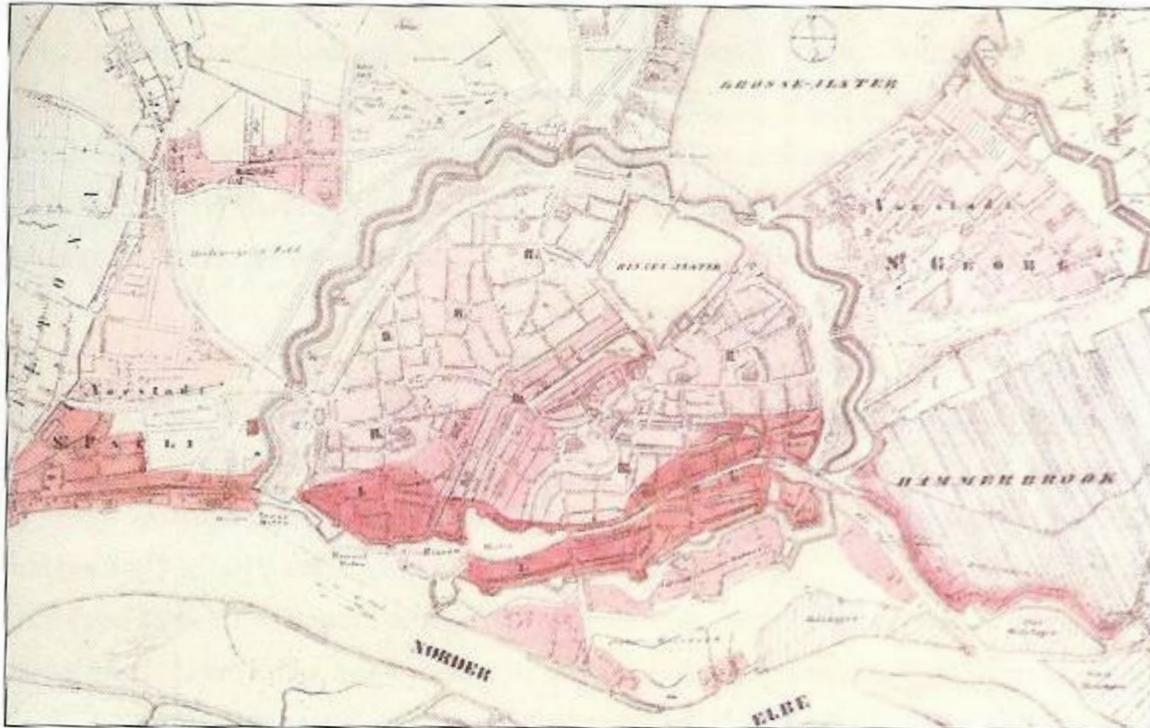
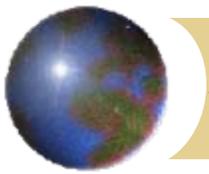


Figure 3.5 Map of the 1832 cholera outbreak in Hamburg, Germany, 1836, near Rothenburg. This map was later included in the Grainger report on cholera to the British Parliament in 1850.

Source: British Library.



Epidemiologic study and design ...

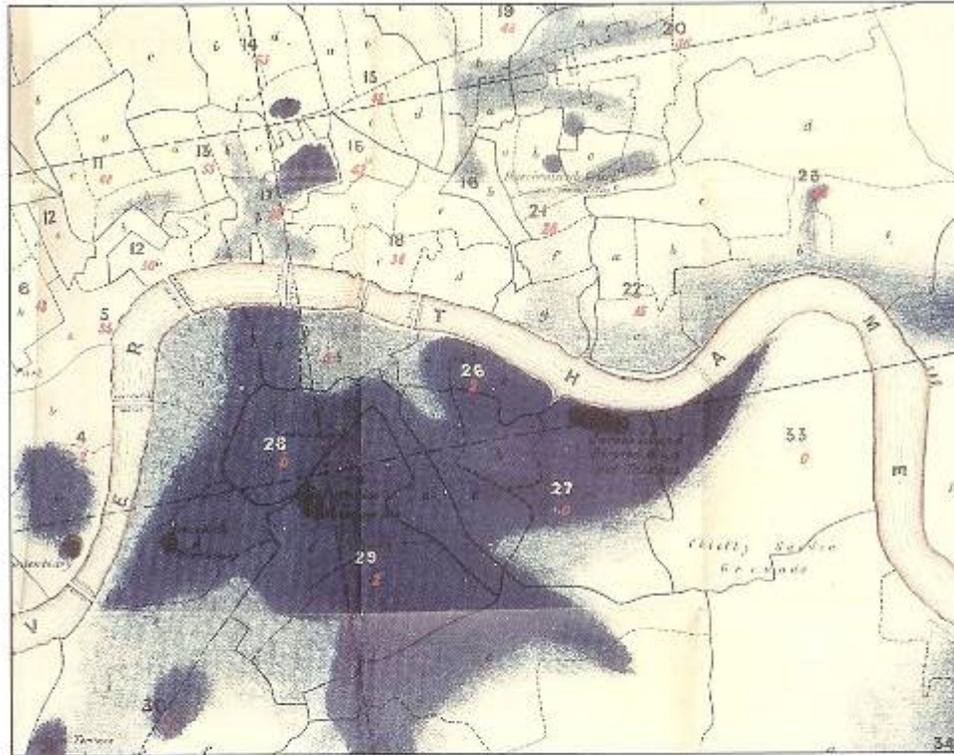
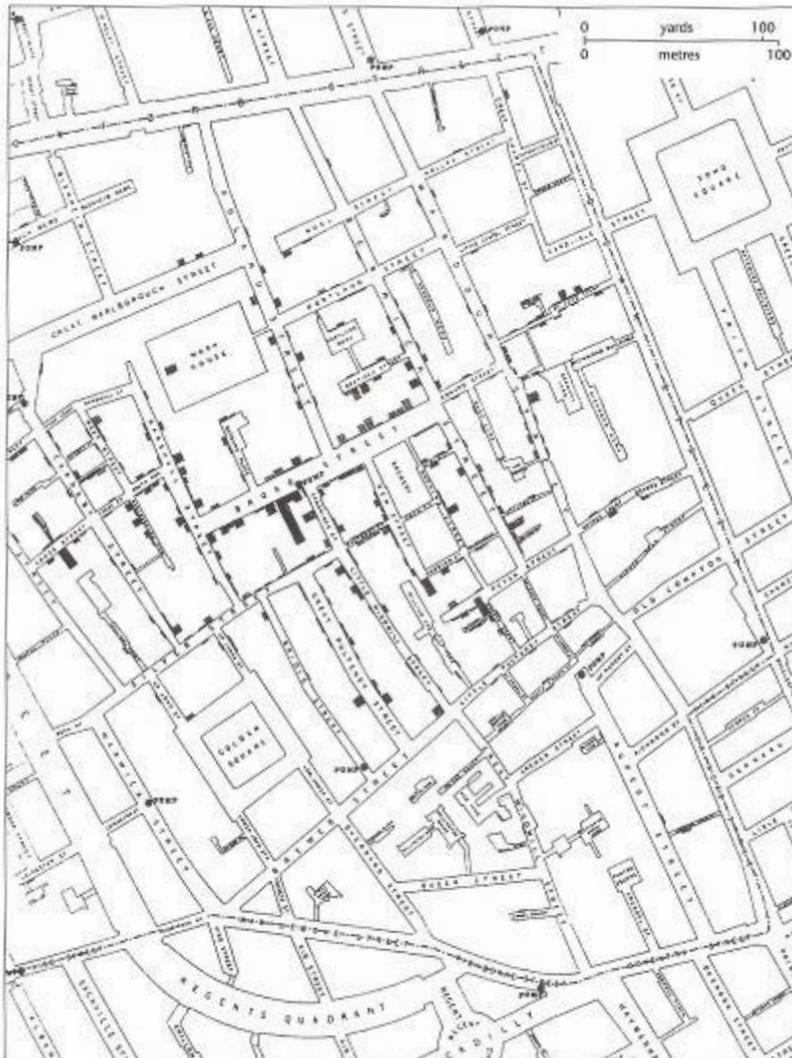
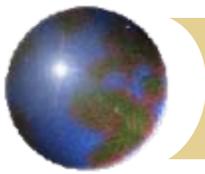


Figure 4.7b Detail of Grainger's density map "Cholera Map of the Metropolis." Small numerals designate altitude above sea level while larger numbers represent urban districts under the then operative Poor Law.

Source: Reproduced courtesy of College of Physicians of Philadelphia.

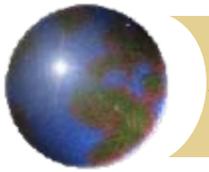


Epidemiologic study and design ...

Source:
Cartographies of Disease: Maps,
Mapping, and Medicine, 1st Edition,
Tom Koch, ESRI, 2005.

Figure 4.12a Snow's map of the Broad Street outbreak, 1854, from *On the Mode of Communication of Cholera, Second Edition*.

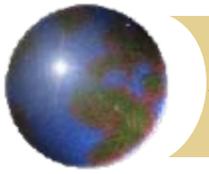
Source: Reproduced courtesy of College of Physicians of Philadelphia.



The 20th Century

Leading Causes of Death, 1900

1. **Pneumonia and Influenza**
2. **Tuberculosis**
3. **Diarrhea**
4. Disease of the heart
5. Intracranial lesions of vascular origin
6. Nephritis
7. All accidents
8. Cancer
9. Senility
10. **Diphtheria**

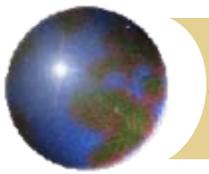


Advances for the 20th Century

Infectious Diseases ...

- Clean drinking water
- Sewage treatment

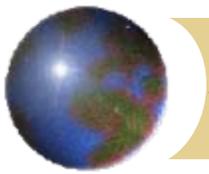
... changed by Environment



The 21st Century

Leading Causes of Death, 2000

1. **Heart Disease**
2. **Cancer**
3. **Stroke**
4. **Lung Disease**
5. **Accidents**
6. **Influenza/Pneumonia**
7. **Diabetes**
8. **Alzheimer's Disease**
9. **Cirrhosis**
10. **Suicide**

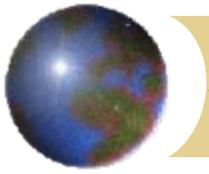


Advances for the 21st Century

Chronic Diseases ...

- Land management
- City planning
- Safe neighborhoods

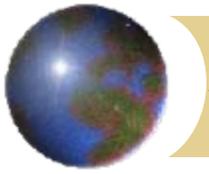
... will be changed by Environment



Public Health

As a connector ...

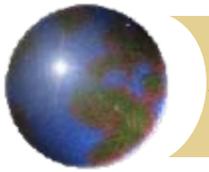
- Across agencies
- Across communities
- Across disciplines
- Across geography



GIS

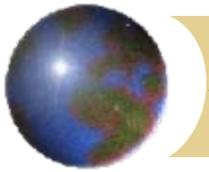
As a connector ...

- Bringing together disparate data sources
- Bringing together programs with shared needs
- Bringing together people



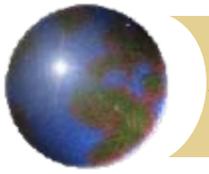
GIS in CDPH

- California Department of Public Health (CDPH) uses GIS every day
- Federated approach to GIS



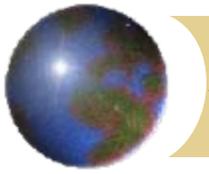
Federated GIS

- Shared centralized library
- Shared geocoding methodology
- Shared denominator data
- Shared training and development
- Shared funding

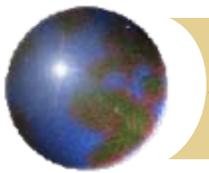


Federated GIS

- ⊕ Independent data sets
- Independent analysis needs
- Independent presentation formats
- Independent flexibility



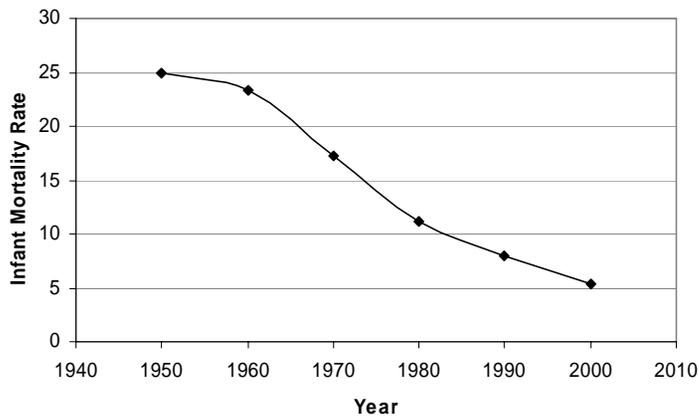
Examples



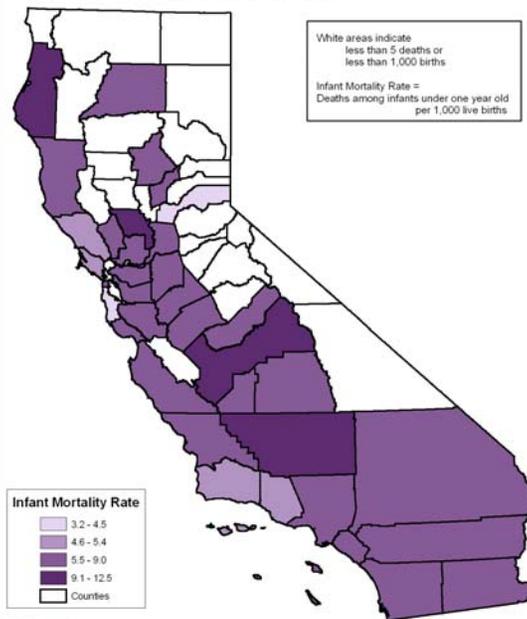
Vital Statistics

The Center for Health Statistics is responsible for coordinating and overseeing the collection, management, and dissemination of public health and vital statistics data in conjunction with other State agencies, local government agencies, and other customers.

Infant Mortality Rate by Place of Residence for California, 1950-2000

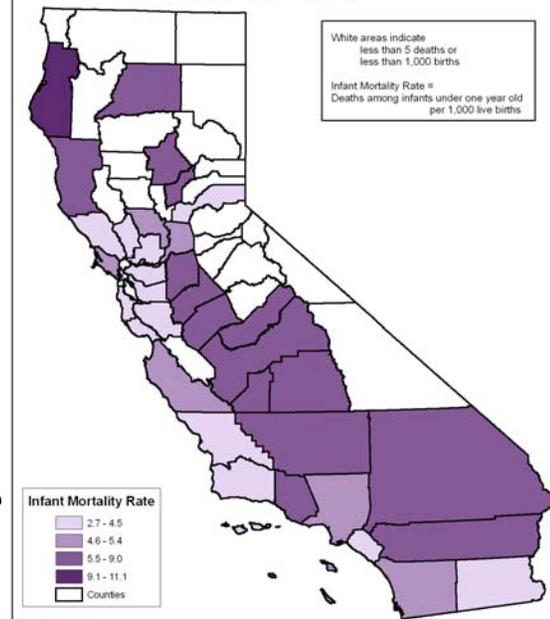


Infant Mortality Rate in California by County for 1994

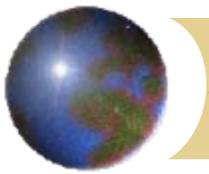


Data Sources: State of California, California Department of Health Services, Birth and Death Records, Office of Statewide Health Planning & Development
 Prepared By: Linette Scott, MD, MPH, Preventive Medicine Resident, California Department of Health Services, June 15, 2006

Infant Mortality Rate in California by County for 2003



Data Sources: State of California, California Department of Health Services, Birth and Death Records, Office of Statewide Health Planning & Development
 Prepared By: Linette Scott, MD, MPH, Preventive Medicine Resident, California Department of Health Services, June 15, 2006



Public Health Emergency Preparedness and Response

Potential threats to the overall health of a community

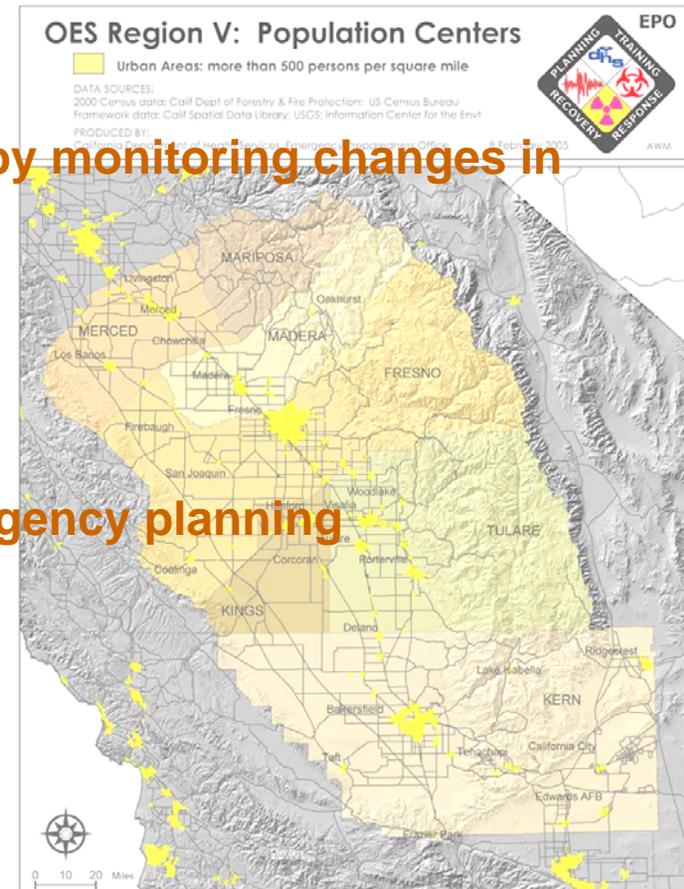
- Natural disasters (earthquakes, floods, extreme heat events)
- Infectious disease outbreaks (pandemic influenza)
- Biological, chemical or radiological terrorist attack

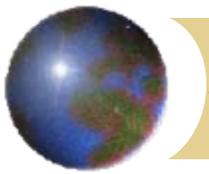
GIS supports emergency preparedness functions by monitoring changes in

- Events
- Populations
- Resources
- Conditions

GIS is utilized in all Four Functional Areas of emergency planning

- Preparedness and Communication
- Surveillance and Detection
- Response and Containment
- Mitigation and Recovery





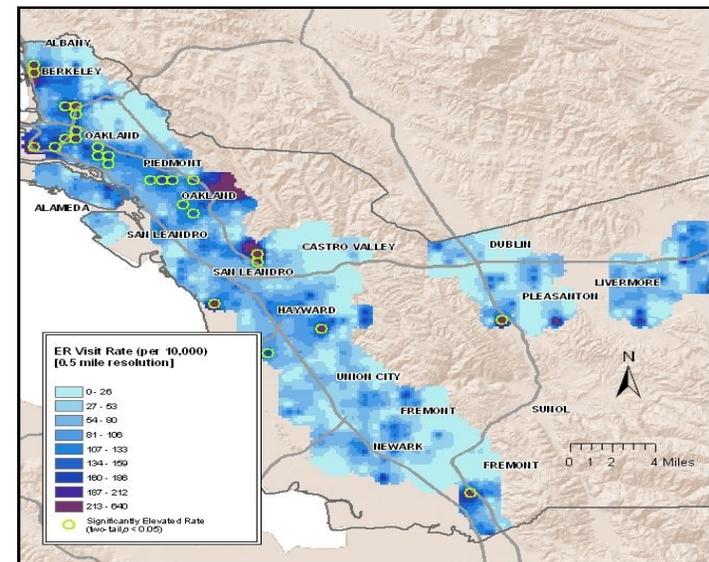
California Environmental Health Tracking Program

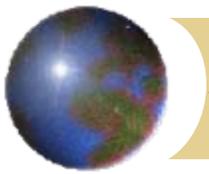
Environmental Health Tracking is the ongoing systematic collection, integration, analysis, interpretation, and dissemination of data about environmental hazards, exposure to environmental hazards, and health effects potentially related to exposure to environmental hazards.

GIS is utilized in each function of the program

- Development of service-oriented IT/GIS architecture
- Analysis, visualization, and reporting
- Dissemination of information

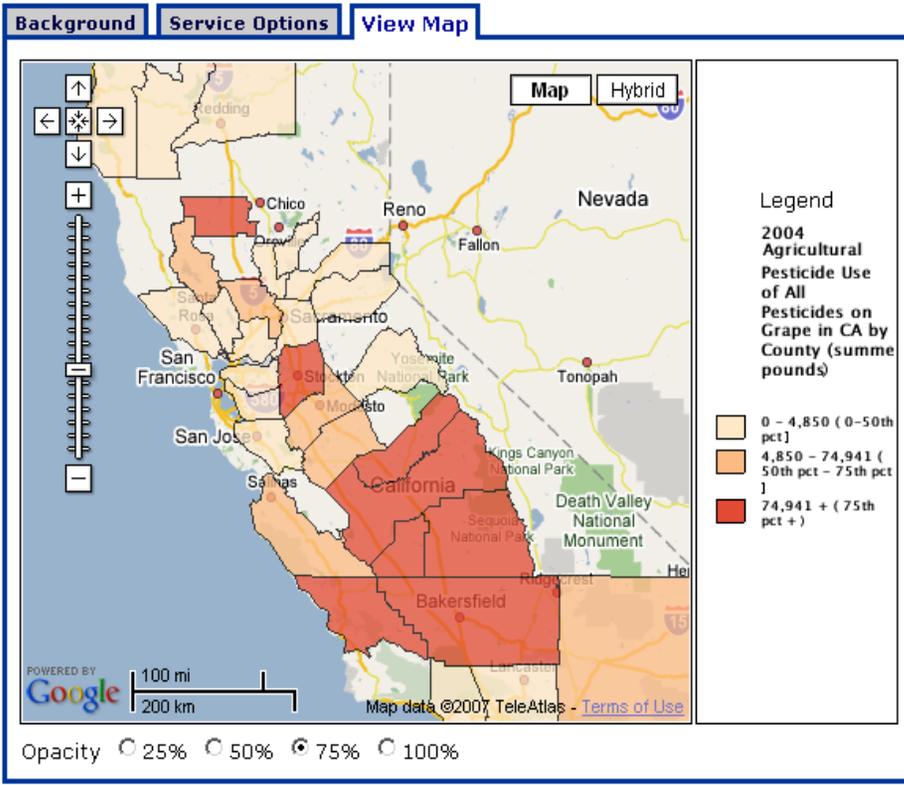
Object Type	Points	Lines	Areas
Examples			
Health	Address geocoded asthma cases	Asthma cases along street segments	Asthma cases within census tracts
Hazard	Drinking water wells	Drinking water distribution pipes	Drinking water service areas



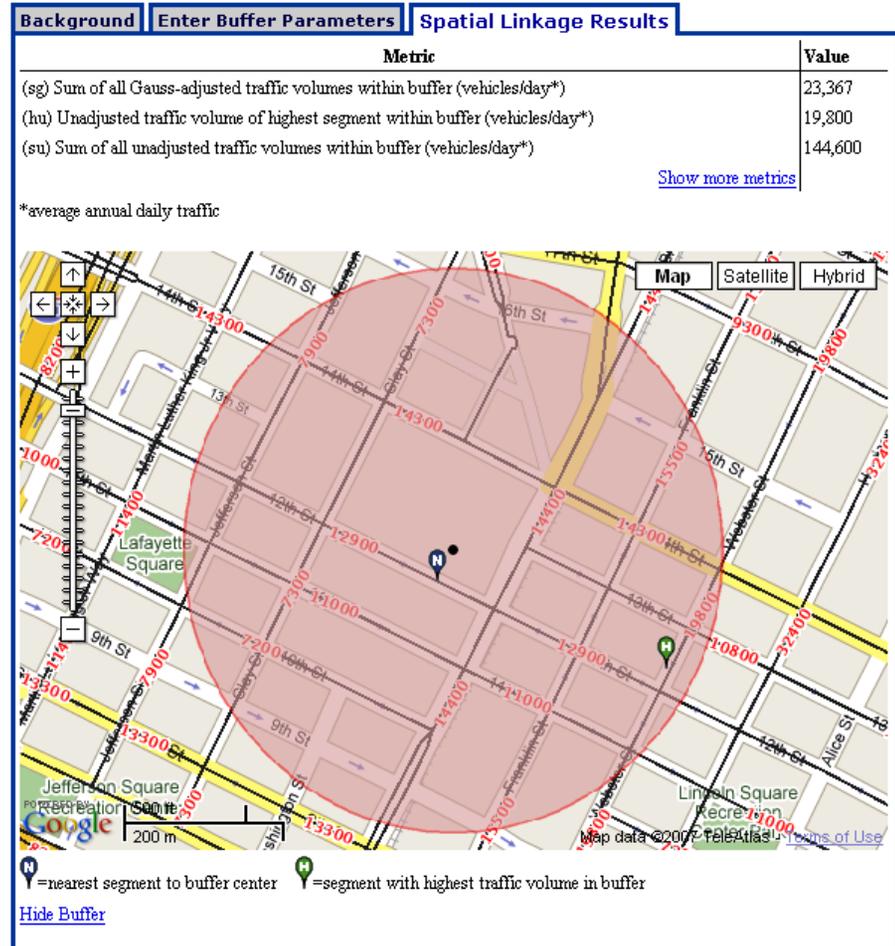


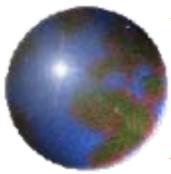
California Environmental Health Tracking Program

Agricultural Pesticide Web Mapping Service (WMS)



CEHTP Spatial Linkage Demonstration





California Nutrition Network Map Viewer

This mapping application is an interactive, internet-based GIS that allows users to view and query mapped nutrition and other health related data.

Nutrition
NETWORK
FOR HEALTHY ACTIVE FAMILIES

[Overview Map](#)
[Print This Map](#)
[Data Info](#)
[Need Help?](#)
[Contact Us](#)
[Admin Tools](#)
[About This Site](#)

Zoom In

Zoom Out

Last View

Full View

Pan

Get Info

Select

Clear

Clear Theme

Query

Measure

Save Map

Load Map

Current Map Tool:
Pan

Scale 1:48515

Map Layers Locate Advanced

Layer List Legend

- Food Stamp Outreach Projects
- WIC Clinics
- WIC Agencies
- WIC Vendors
- Counties
- Streets
- Major Cities
- Major Communities
- % of Households w/ Income < \$20k
- 0
- 0.277008% - 25.207756%
- 25.207757% - 50.138504%
- 50.138505% - 75.069252%
- 75.069253% - 100%
- Water
- State Boundary
- Neighbor States

Refresh the Map

Jump to a new location

Counties:

Reg. Networks:

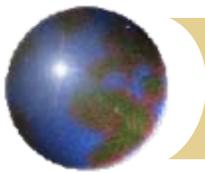
Census Tract:

Cities:

Zip Code:

Summarize Data

Summarize data from map layers in the current view. Select a layer from the list below and press GO.



California Healthcare Atlas

This mapping application is an interactive, internet-based GIS that allows users to view and query mapped hospital and other health related data.

The screenshot displays the California Healthcare Atlas web application. At the top left is the logo for the Office of Statewide Health Planning & Development (osHPD), featuring stylized figures. The title "California Healthcare Atlas" is centered at the top, with the State of California logo on the right. A navigation menu includes "Home", "Locate", "Select", "Create", "Results", "Maps", and "Help". A "Reset Application" link is located in the top right corner.

The main interface is divided into a legend on the left and a map area on the right. The legend, titled "Legend", explains the symbols and colors used on the map. It includes categories such as "Hospital" (represented by a blue 'H' icon), "Streets" (various line styles for streets, major highways, major roads, and ramps), "Ferry Crossing" (a blue arrow), "2003 Deaths: Diabetes" (shaded regions in light blue, medium blue, and dark blue), "ZIP Codes" (dashed lines), and "Counties" (yellow shaded areas).

The map area shows a geographic region in California, including cities like Ripon, Salida, Modesto, Kindred, Ceres, and Tallock. Several hospitals are marked with blue 'H' icons and labeled: Oak Valley Care Ctr, Oak Valley District Hosp, Doctors Med Ctr, Stanislaus Behavioral Hlth Ctr, and Brandel Manor - Emanuel Med Ctr. Major highways (99, 219, 132, 33, 5) and a scale bar (0 to 9 miles) are also visible. A "Refresh Map" button is located above the map.

At the bottom of the map area is a toolbar with icons for "Info", "Clear", "Zoom In", "Zoom Out", "Move Map", "Previous", and map style selection buttons for "Street", "City", and "CA".



Home

Locate

Select

Create

Results

Maps

Help

[Reset Application](#)

Location Information

Facility Reports

Inpatient Summary

Other Reports

Hospital ?

No features found.

Medical Service Study Area ?

MSSA ID	215a
MSSA Name	Modesto West
Definition	Urban
Area (Sq Mi)	31.5
Population (2000)	77170
Population Density	2449.8
More Demographics	MSSA Demographic Summary Report

Census Tracts ?

Tract Number	0008.05
More Demographics	Census Tract Demographic Summary Report

ZIP Codes

ZIP Code	95350
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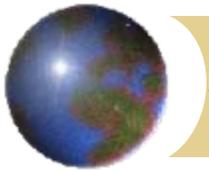
City/Place Boundaries

Place Name	Modesto
------------	---------

County

Name	Stanislaus
Population	490078

The zip code with the most diabetes deaths



GIS is ...

A System of:

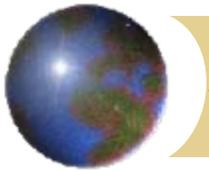
People

Data

Software

Hardware

Organization



GIS is ...

Decision Support System

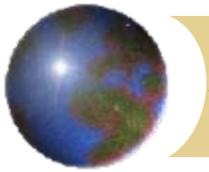
Computer-based information systems that support decision making activities

Analysis and Research Tool

For disease surveillance and resource planning

Communication Tool

Visual display of spatial data



Public Health and GIS

The Business Need

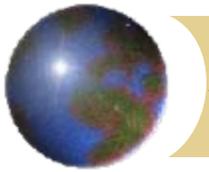
Health is based on location and geography

The Tool to Serve the Business Need

Geographic information systems

The Connectors

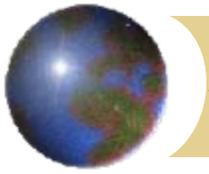
People work together to bring solutions to problems



Public Health

“Fulfill society's interest in assuring conditions in which people can be healthy.”

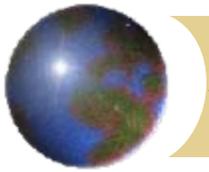
(Institute of Medicine, 1998)



Public Health ...

- Understanding Populations
- Improving Environments

... Connecting California



Thank you!

Questions?

Linette T Scott, MD, MPH

California Department of Public Health

Linette.Scott@cdph.ca.gov