



Improving Health Care Systems Using Geographic Information Systems (GIS)

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USAID

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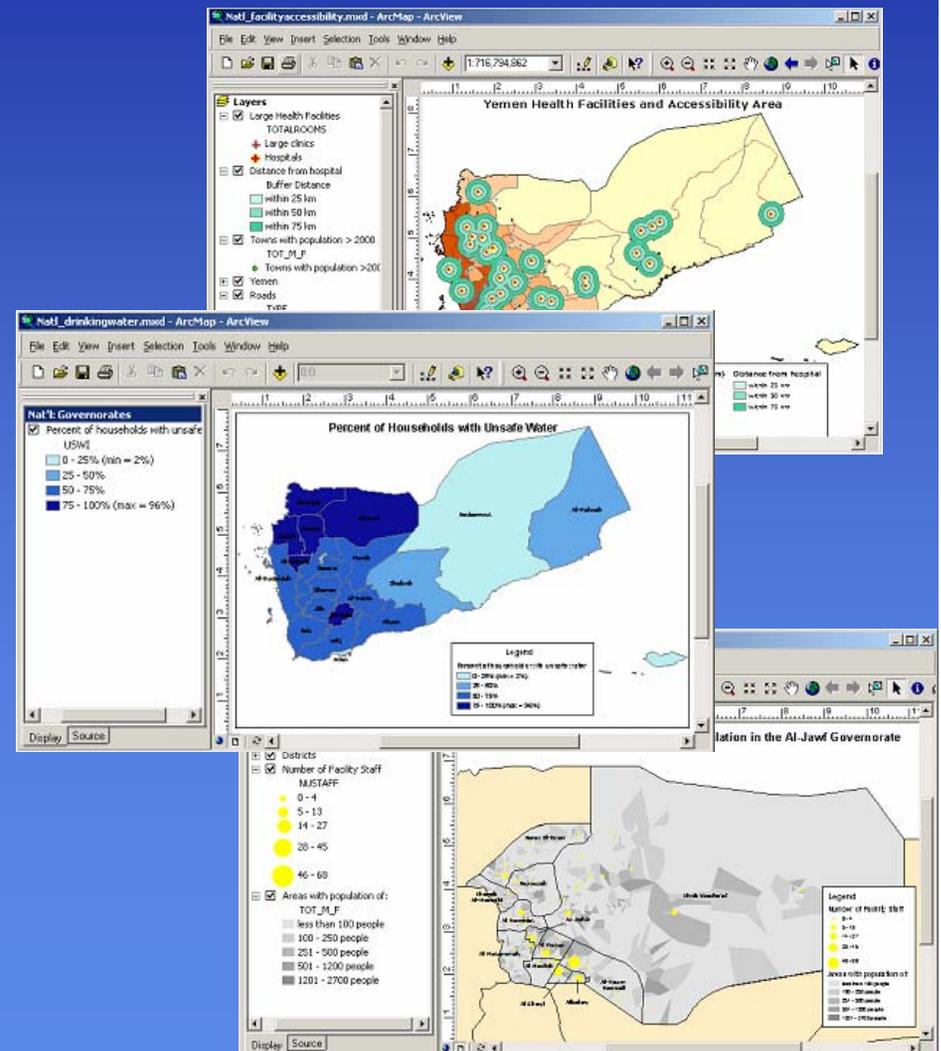


The PHRplus Project is funded by U.S. Agency for International Development and implemented by: Abt Associates Inc. and partners, Development Associates, Inc.; Emory University Rollins School of Public Health; Philoxenia International Travel, Inc. Program for Appropriate Technology in Health; SAG Corp.; Social Sectors Development Strategies, Inc.; Training Resources Group; Tulane University School of Public Health and Tropical Medicine; University Research Co., LLC.



Overview

- ▲ Why use GIS? How it works?
- ▲ Data Requirements
- ▲ Example Health GIS Applications
- ▲ Analytical Considerations
- ▲ Potential Implications



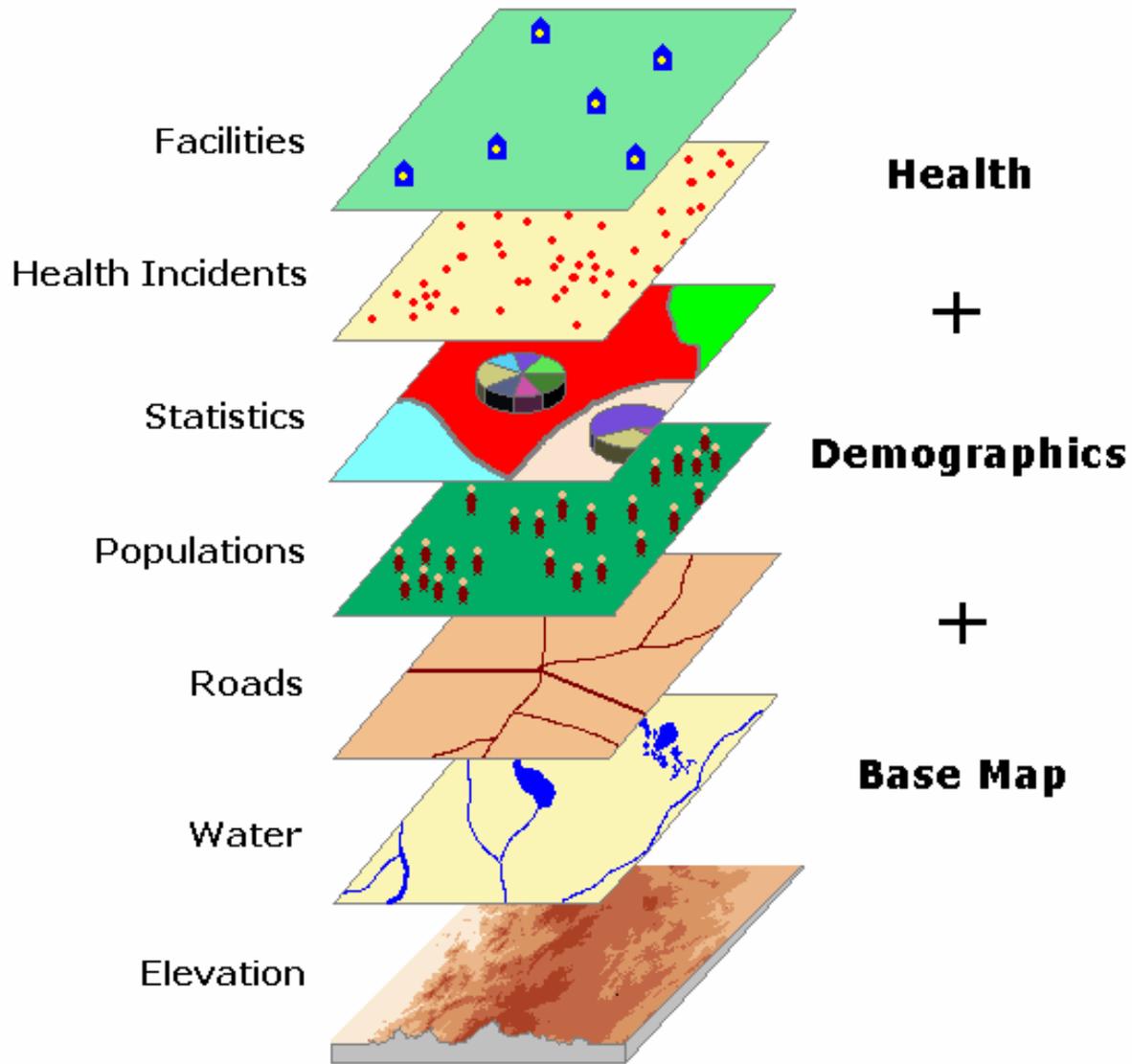
Why Use GIS in Developing Countries?

- ▲ Important role in public health – strengthening health systems
- ▲ Variation in health care needs are influenced by a variety of factors
- ▲ Ability to analyze health data in a clear, convenient, and easy to comprehend form
- ▲ Ability to convey information visually
- ▲ Ability to geographically link health data with population characteristics, environmental conditions, and health care conditions

How Health GIS Works

- ▲ Includes surveillance systems, surveys, and health information systems
- ▲ Common reference points are geographic locations such as health facilities, settlements, districts, road networks, streams, and other spatial references.
- ▲ GIS tools enable public health professionals to overlay their health information on a map for visualization and analysis.

Integrating GIS Data



Base Data Requirements

▲ Base Map Data Layers

- ▲ Administrative boundaries
- ▲ Road network
- ▲ Elevation data
- ▲ Hydrography
- ▲ Land Use

▲ Population and Demographics

- ▲ Critical information for developing health indicators and all types of analyses
- ▲ 2005 Census

Base Data Requirements (continued)

▲ Health Facilities

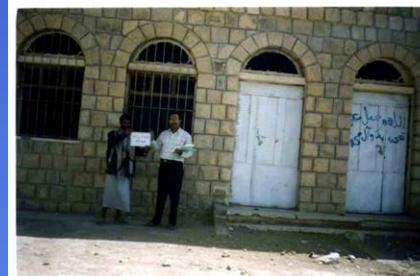
- ▲ Status and location of ALL health facilities is unknown
- ▲ Implement 2004 Health Facility Survey
- ▲ Supplement survey data with use of digital photographs & GPS coordinates

▲ Health Information Systems (HIS)

- ▲ Consistency begins with developing data standards
- ▲ Determination of essential elements or indicators



Al-Eagda Health Unit / Al - Zahir
وحدة العقدة / مديرية الزاهر



Al-Zahir Health Centre/ Al-Zahir
مركز الزاهر / مديرية الزاهر

Sample Health GIS Applications

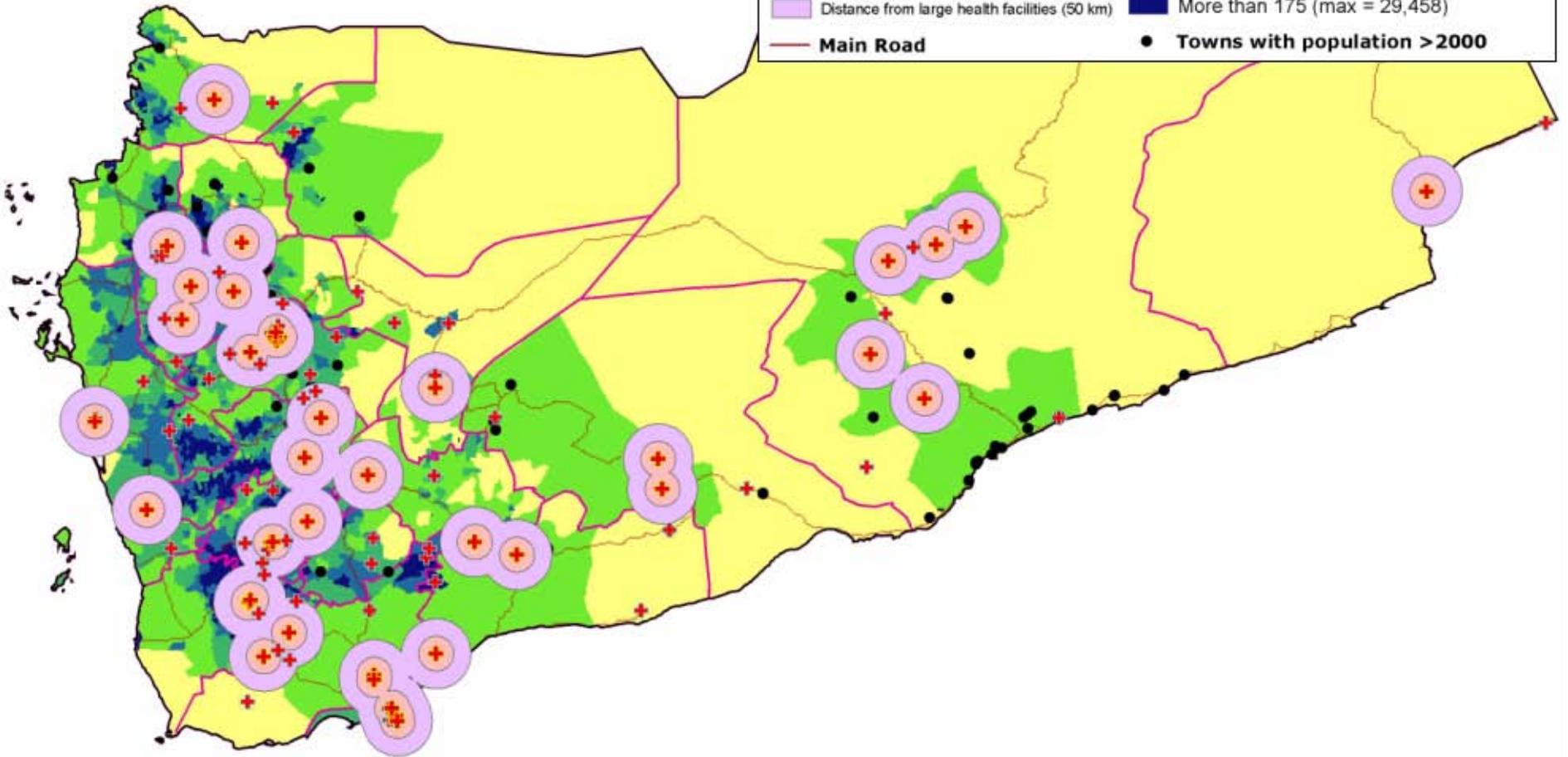
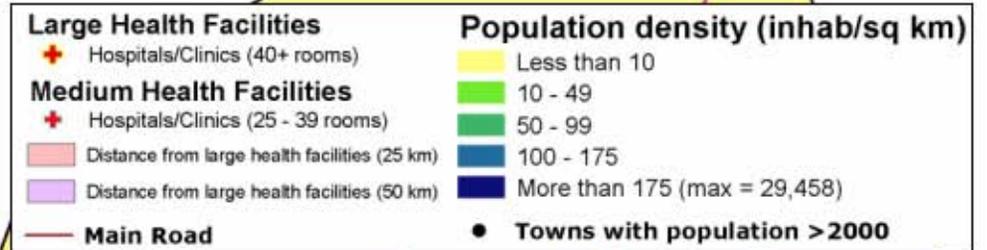
- ▲ Availability and access to health care
- ▲ Targeting resources
- ▲ Analyze program interventions
- ▲ Registry mapping
- ▲ Disease Surveillance
- ▲ Promote awareness
- ▲ Evaluate population groups at risk
- ▲ Assess equity and efficiency of health service delivery
- ▲ Integrate with Health Information Systems to support evidence-based decision making

Health GIS Efforts in Yemen

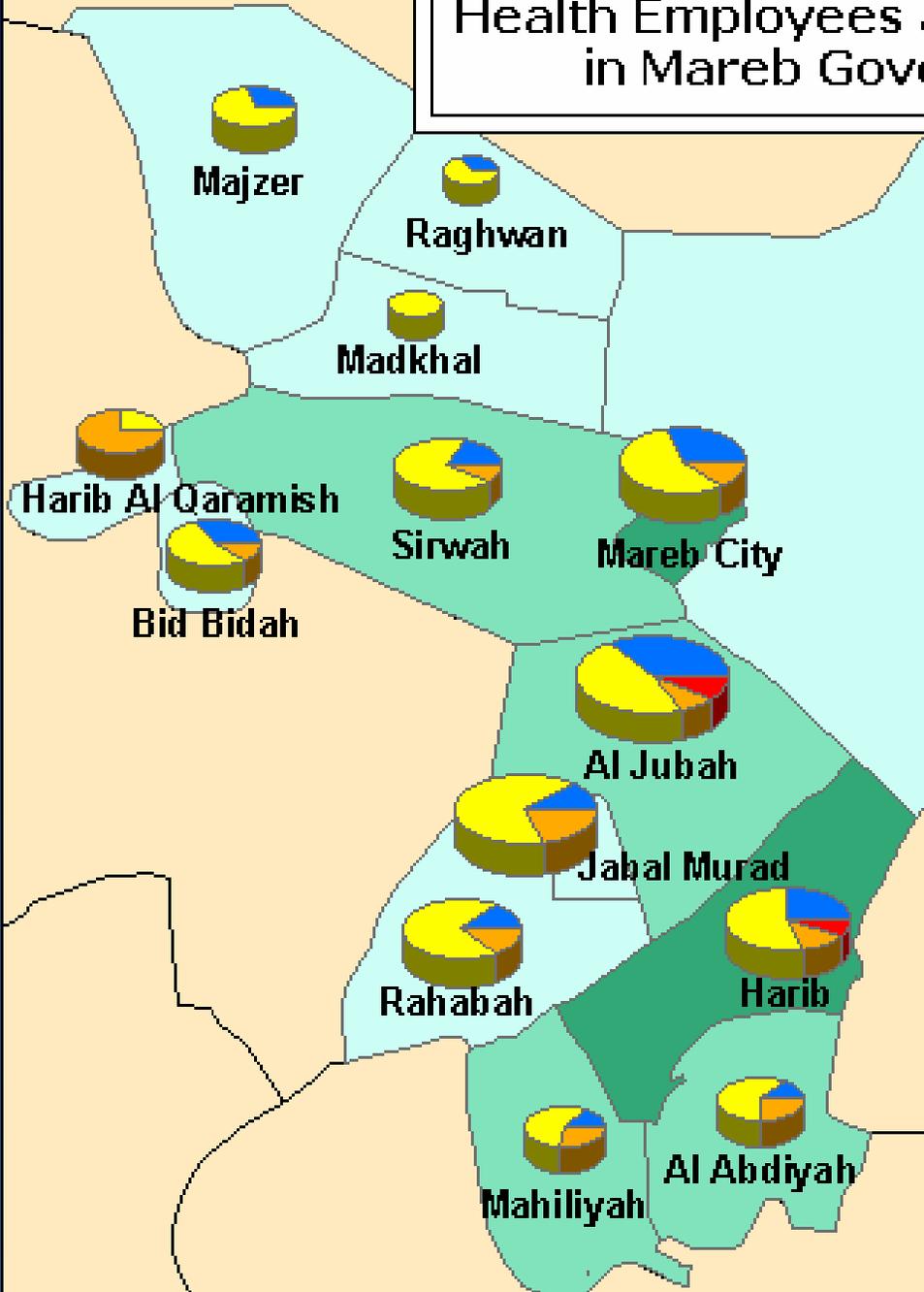
- ▲ Held workshop in February 2004 to bring together the Yemeni GIS user community
- ▲ Ongoing collection of health-related data
- ▲ Built base Health GIS
- ▲ Providing support to the MOPHP with health sector donor mapping
- ▲ Developing customized health GIS analyses
- ▲ Assist the Ministry of Health with implementing the Health Facility Survey
- ▲ Deliver technical support to select Governorates
- ▲ Designing new Ministry of Health Website
- ▲ Implementing HIS in pilot health centers

Health Care Accessibility Areas

Republic of Yemen Large Health Facility Accessibility



Health Employees and Population in Mareb Governorate



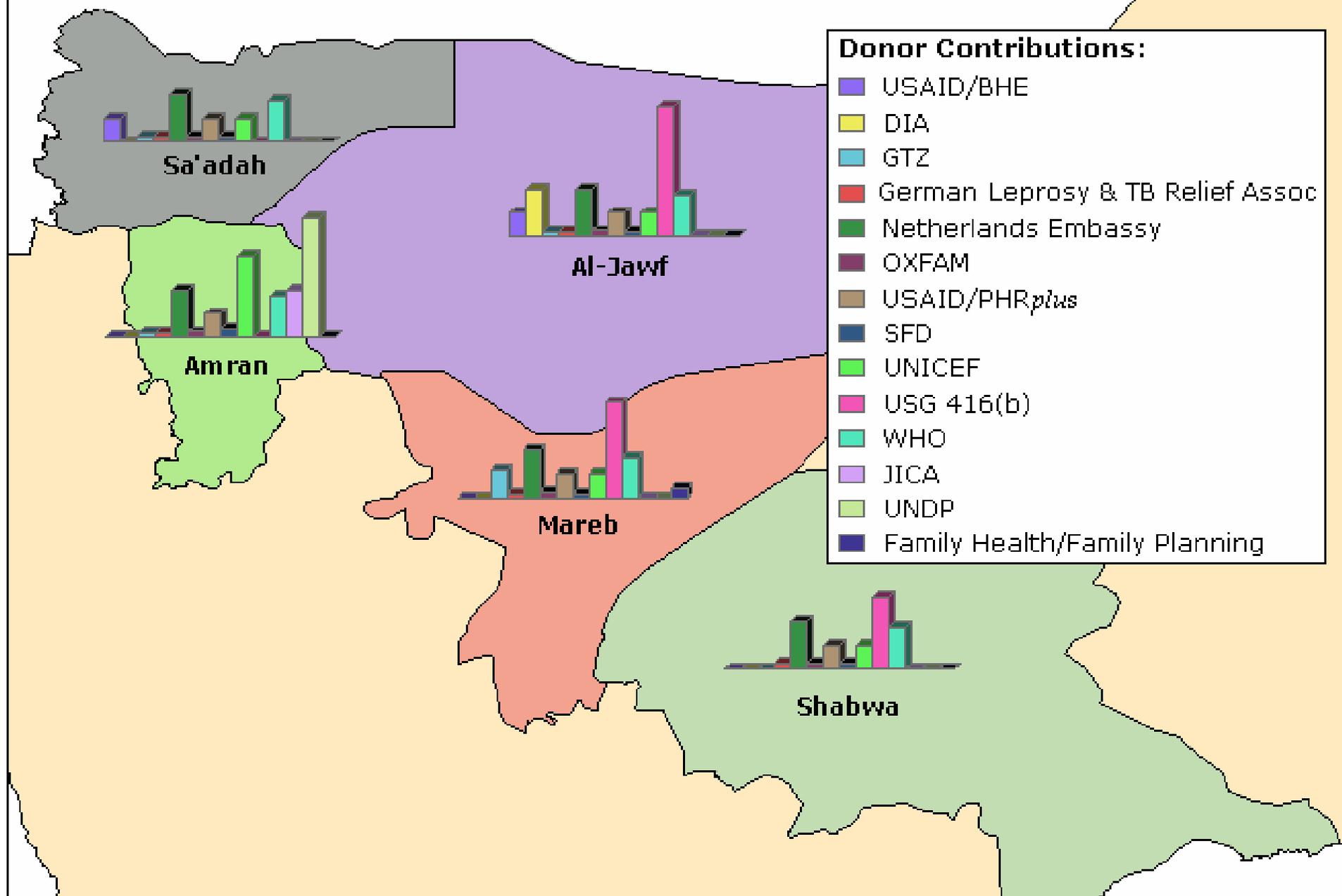
District Population Size

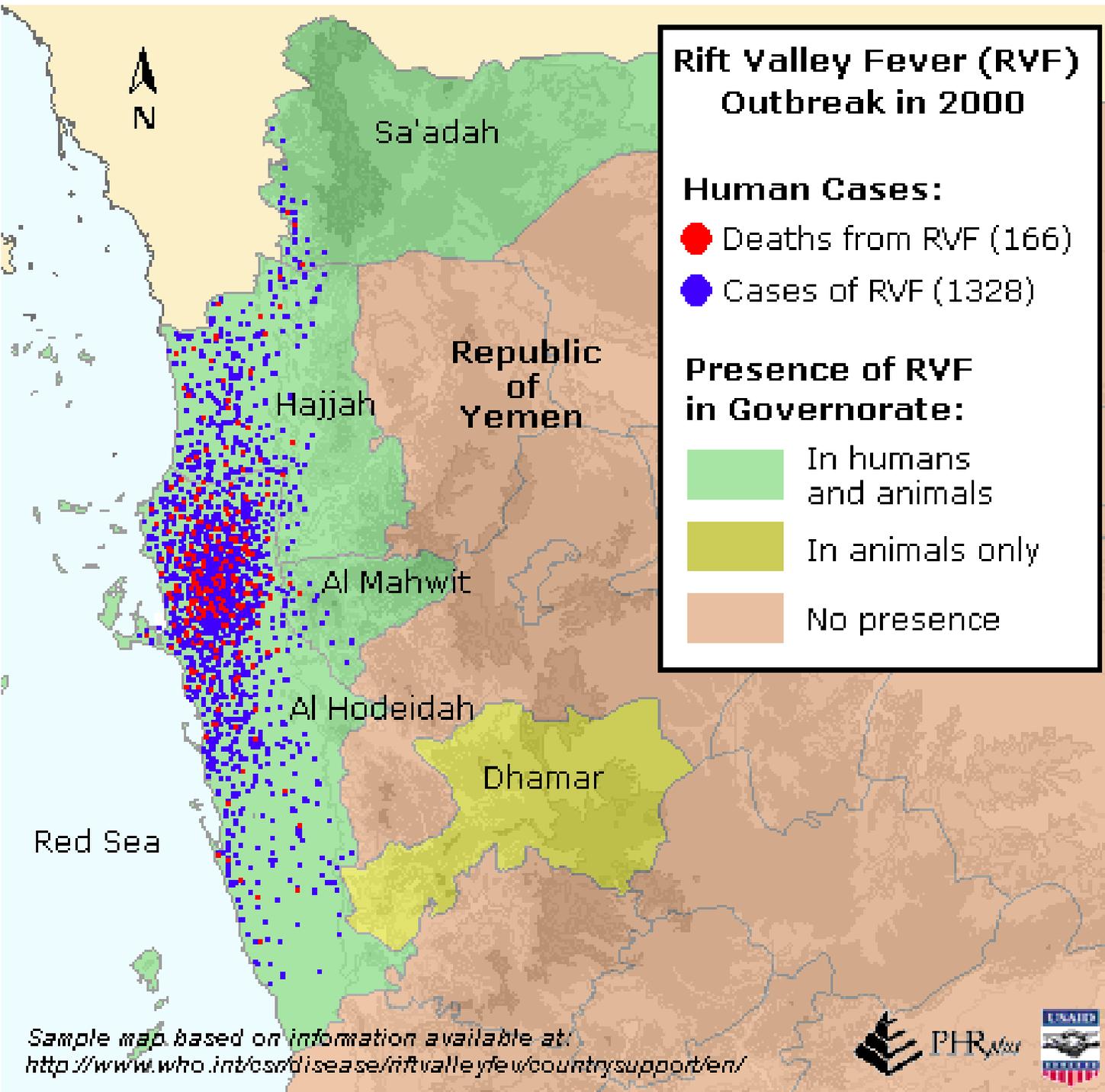
- < 9,000
- 9,000 - 18,000
- > 18,000

Proportion of Health Employees

- Doctors
- Nurses
- Doctor's Assistants
- Midwives

Relative Levels of Donor Contributions to USAID Governorates of Interest





Spatial Patterns of Outbreaks

Integrating Health Information Systems (HIS) with GIS

- ▲ Standardization of facility-level health statistics data collection
- ▲ Simplify process and provide adequate training
- ▲ Improve data collection efficiency
- ▲ Provide a “feedback intervention” for creating continuous process of evidence-based health care pattern improvements

Targeting Program Interventions

Yemen Health Information System - Query Form

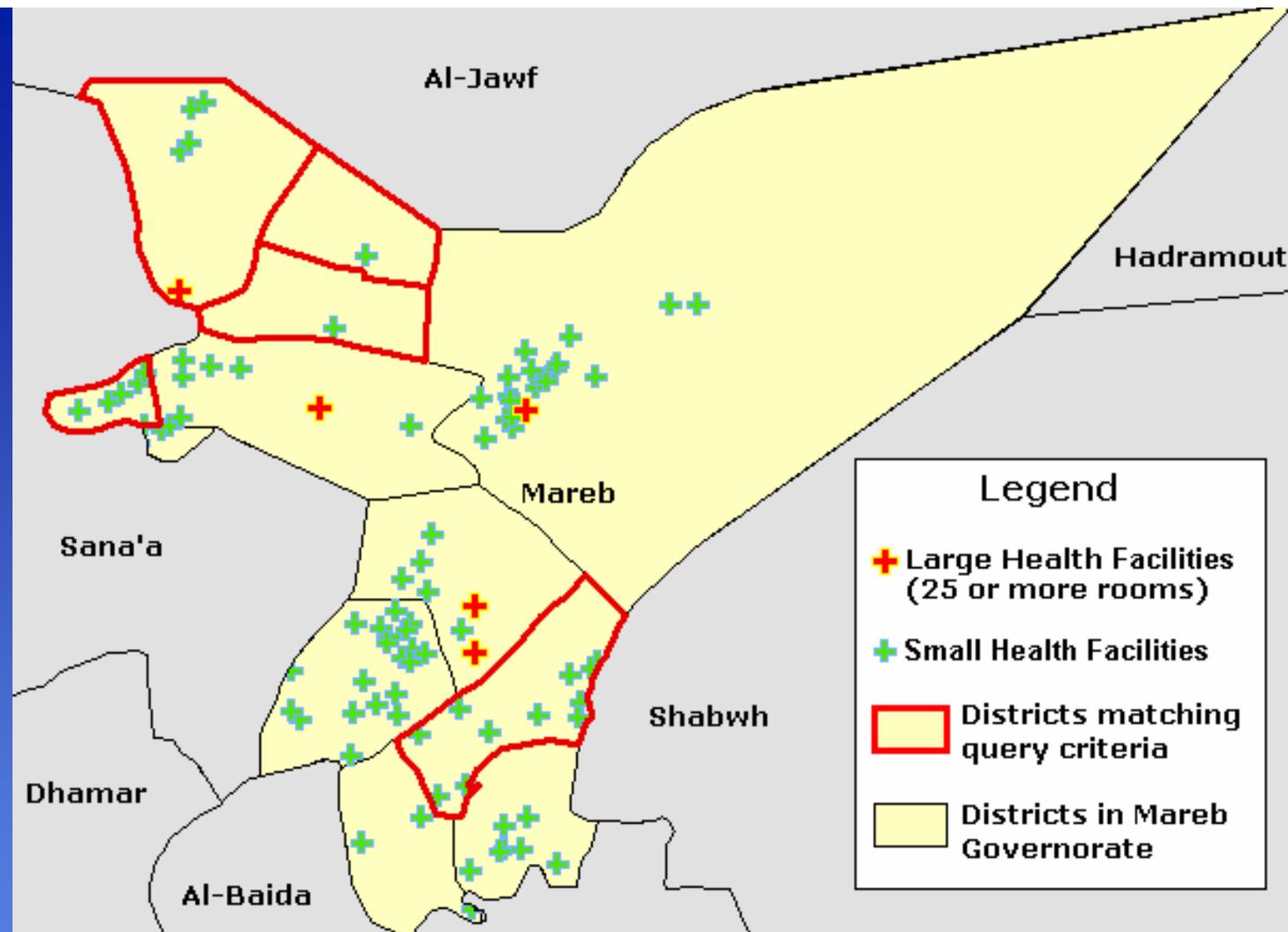
Select Governorate to Query:

Locate all where:

- Total Number of Health Employees
- Number of Physicians
- Number of Nurses
- Number of Midwives

is per 10,000 people.
(enter number)





Legend

- + Large Health Facilities (25 or more rooms)
- + Small Health Facilities
- Districts matching query criteria
- Districts in Mareb Governorate

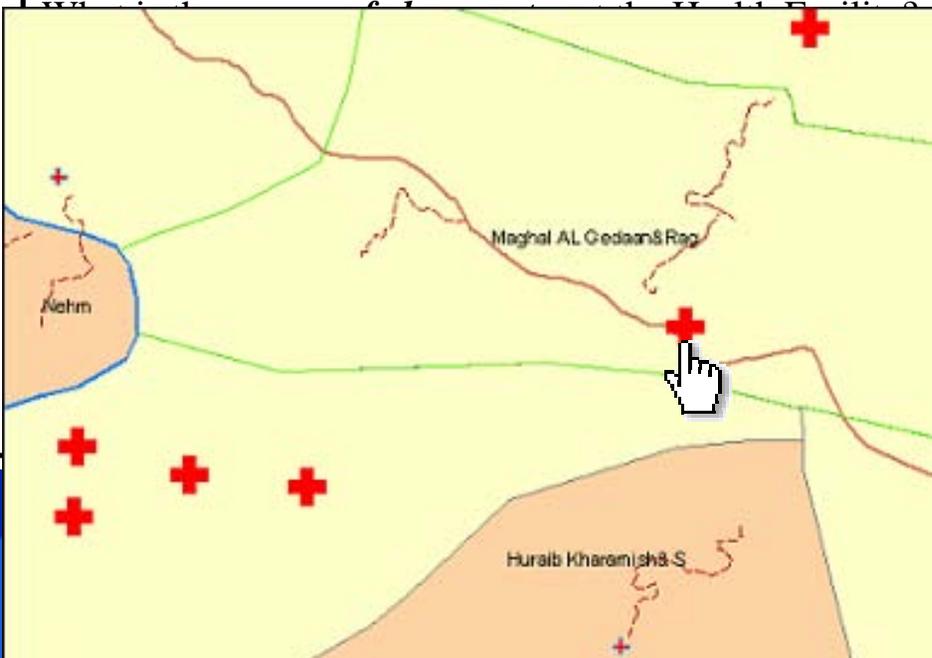
Selected?	Governorate	District	District ID	Population	Health Staff	Staff per 10,000
●	Mareb	Maghal Al Ge	1	9502	0	0.0
●	Mareb	Maghal Al Ge	2	7458	0	0.0
●	Mareb	Maghal Al Ge	3	8554	0	0.0
●	Mareb	Huraib Khara	4	13287	3	2.3
●	Mareb	Hareeb	10	21458	10	4.7
	Mareb	Huraib Khara	5	15846	16	10.1
	Mareb	Al Jubah&Rh.	9	32440	33	10.2
	Mareb	Mareb	7	42357	49	11.6

Health Facility Inventory

27 What is the *source of electricity* at the Health Facility?
(multiple answers permitted)

	Source of electricity
1	Main network
2	Cooperative network
3	Private network
4	Generator
5	No electricity

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**Medghil Al-Jeda'an
Health Center**

Facility Name:	Medghil Al-Jeda'an
Governorate:	Mareb
Facility Type:	Health Center
Ownership:	Government
Year Opened:	1997
# of Staff:	8
# of Rooms:	11
# of Useable Toilets:	4
# of Telephone Lines:	1
Electricity Source:	Generator



The Republic of Yemen
Ministry of Public Health & Population
 Leading Yemen to Better Health, Safety and Well Being



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 - Population
 - Support Units
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Welcome

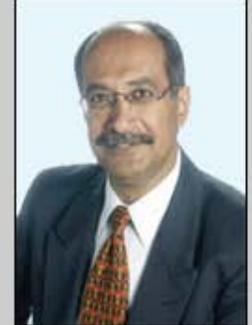
Our mission is to promote health and quality of life by preventing and controlling disease, injury, and disability.



Highlights

- **MoPHP Announces New Goals and Organizational Structure.** Learn more about the new health goals and integrated operations that will allow MoPHP to have a greater public health impact... [more](#)
- The **National Malaria Project** has reached out to thousands of children and prevented numerous malaria cases. Protect your child. Contact your local health clinic today... [more](#)
- **Childhood immunization rates** are steadily increasing with the implementation of the Extended Immunization Program. View the statistics by selected governorate... [more](#)

Minister of Health



Prof. Abdul-Nasser Ali Abdo Munaibari

[Minister's Message](#)

Overcoming Barriers

- ▲ Data collection can be an enormous undertaking
- ▲ Relying on existing data sources can be problematic
- ▲ Integrating data from a variety of sources often requires extensive efforts to clean and convert the data into a useable format.



Potential Implications of Using Health GIS

- ▲ Reveals relationships and trends that might not be evident when the data is viewed in tabular format
- ▲ Innovative framework for accessing, integrating, visualizing and utilizing health data to inform decisions
- ▲ Illustrates evidence-based rationale
- ▲ Moves beyond basic mapping capabilities toward sophisticated, robust spatial analyses



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