Using GIS to Enhance Health Care Access for Underserved Populations in San Bernardino County

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All thanks and praise are due to God, the most Compassionate, all Merciful

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  - Andrea Rodriguez, MS
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Introduction: Healthcare Disparity in the USA

- Superior healthcare technology…
- Health care resources: unevenly distributed
- May impact whole populations, especially in certain geographic regions
- National efforts to improve this: *Healthy People 2010*

Local efforts to improve disparity: California

- Determined to promote equitable healthcare
- Counties vary in size, terrain, population density
- Vary in their healthcare needs
- Office of statewide health planning and development (OSHPD) put in charge

Medical Service Study Areas

- Counties divided into unique zones based on census tracts: MSSAs -Medical Service Study Areas
- Goal of this division: direct healthcare efforts to the neediest populations within the counties.

Map 1
California with MSSA Divisions
Southwest Region
of San Bernardino County
Individual MSSAs
San Bernardino County MSSAs

Health Professional Shortage Areas

- MSSAs can be evaluated for federal *Health Professional Shortage Area* (HPSA) designation
- This is based on the availability of providers & population needs of a particular MSSA
- There are three HPSA types based on the type of provider in shortage:
  - Primary Care, Mental health, & Dental

An MSSA must meet these criteria to qualify as a Primary Care HPSA

1. Population to primary care provider (PCP) ratio:
   - ≥ 3,500:1 *or*
   - ≥ 3,000:1 (high need areas -poverty, infant death rates)

2. Lack of access to health care in neighboring MSSAs:
   - Travel time >30 minutes to other MSSA
   - Population /doctor ratio in neighbor MSSA > 2000/1
   - Other barriers: mountains in between, etc.

Mental and Dental HPSA Criteria

- Mental HPSA criteria:
  - Population to psychiatrist ratio (≥ 30,000:1) or to certified mental health provider (≥ 9000:1)
- Dental HPSA criteria:
  - Population to dentist ratio ≥ 5,000:1

The benefits of designation as an HPSA include:

- Eligibility for Rural Health Clinics
- Improved Medicare reimbursement
- Enhanced Federal Grant eligibility
- Student Loan Repayment

Aim of this Project

- San Bernardino County has 26 MSSAs including several geographically isolated ones
- Five of these were already designated as HPSAs
- We aimed to determine whether other MSSAs in the county would also qualify as HPSAs

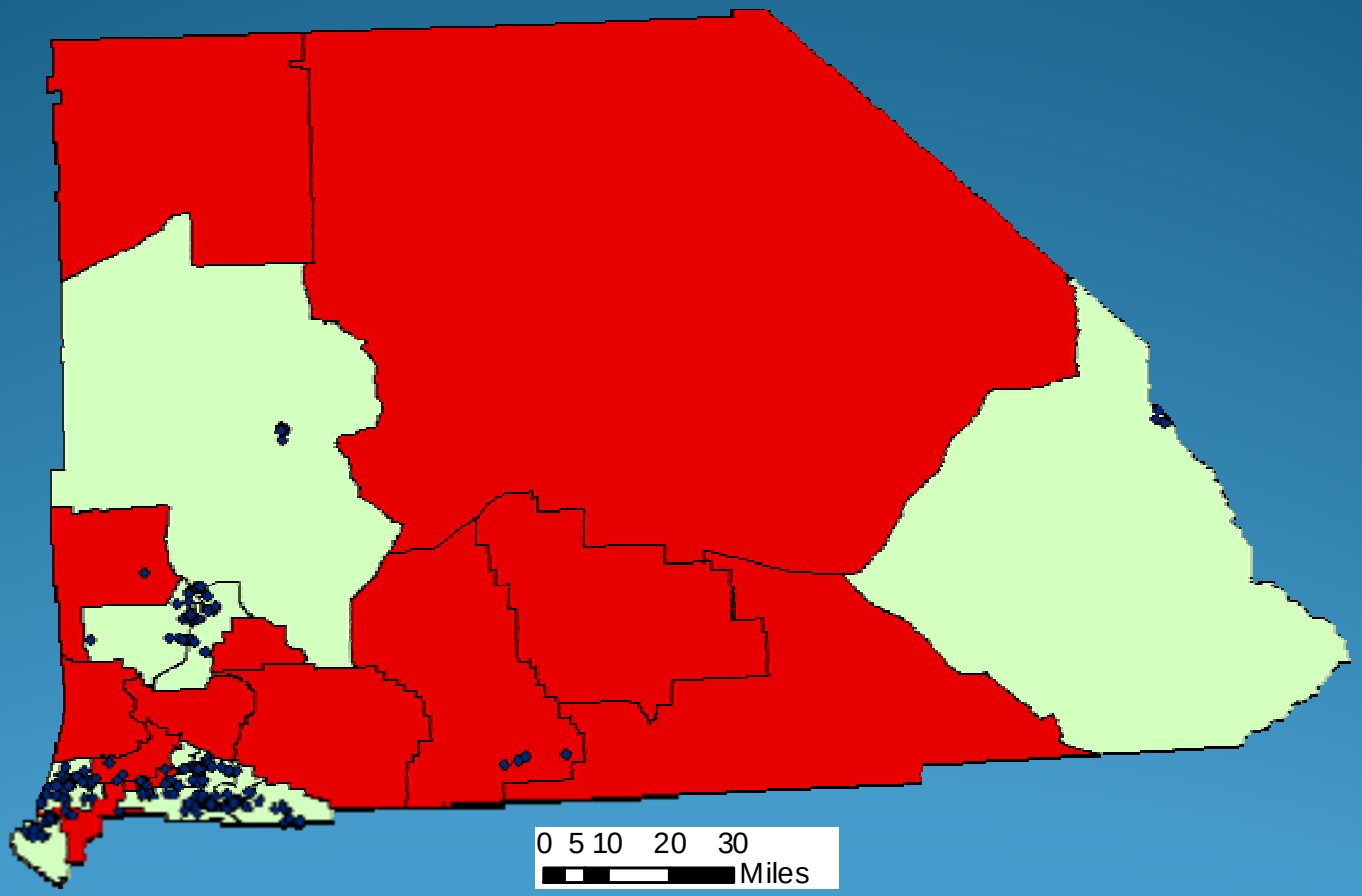
Methods: Preparing Maps and Populations

- An *ArcGIS* map with *San Bernardino County's 26 MSSA's* was created from OSHPD's database
- MSSA populations: OSHPD's attribute tables

Physician search

- Data sources for Providers in each MSSA:
  - SBC Medical Society
  - OSHPD
  - Tri-County Dental Society & CA Dental Board
- Providers listed by work address & specialty only
- 1,185 PCPs Geo-coded into the MSSA map
- The population/PCP ratios were calculated

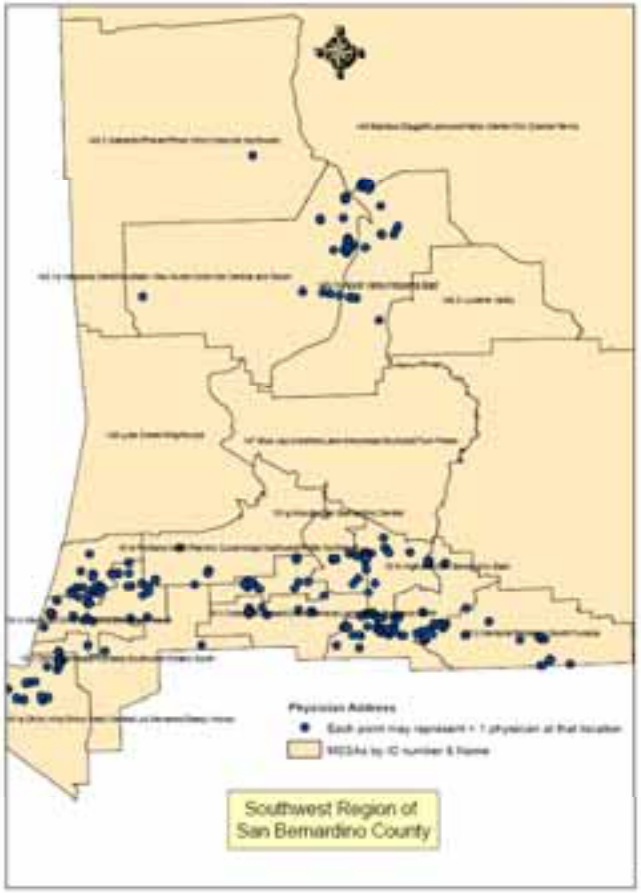
Primary Care Physicians



Source: OSHPD, By Lance Miller (SBCDPH)

Map 6

San Bernardino County Primary Care Physician Locations by MSSA

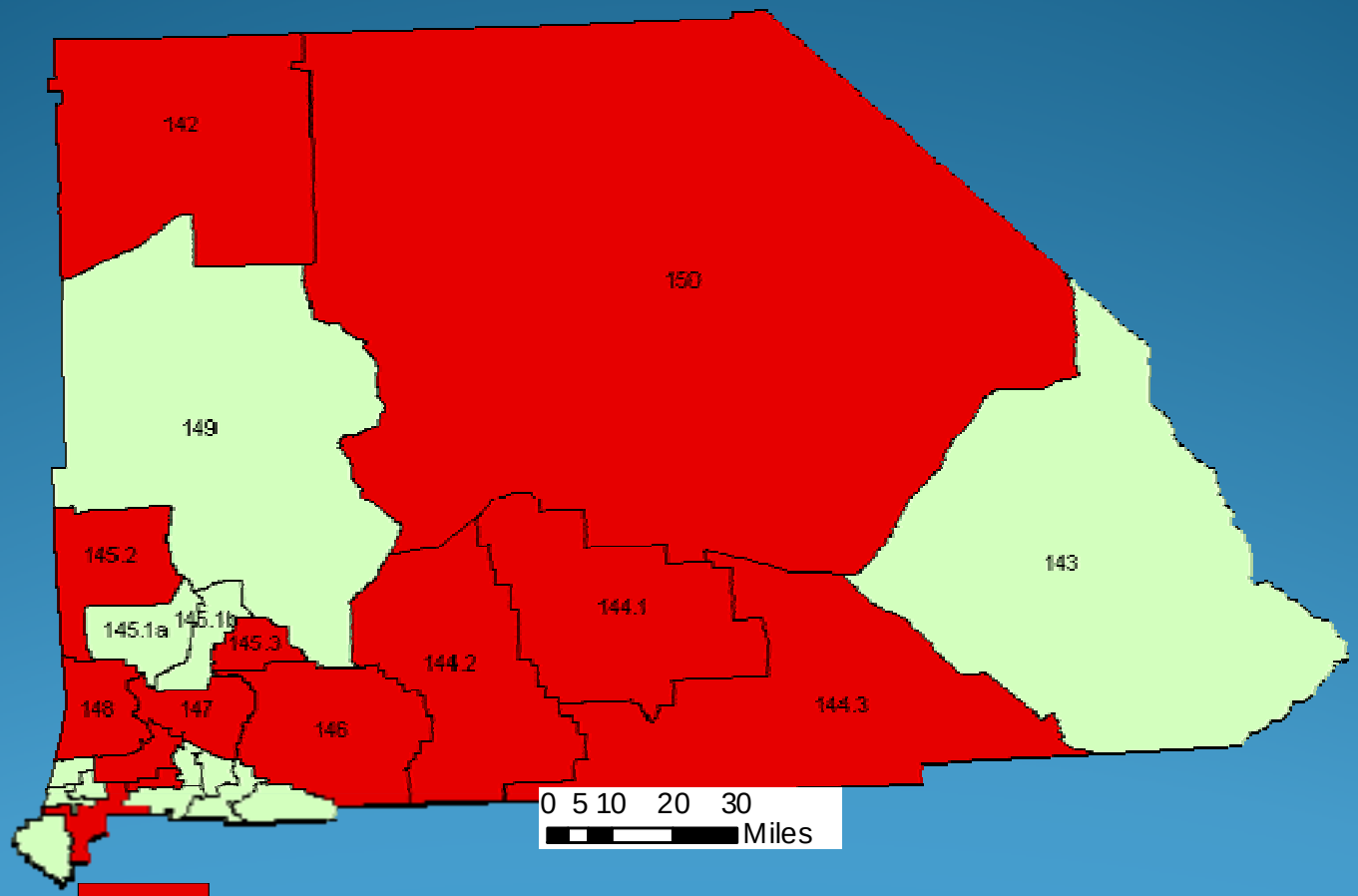


Criteria to qualify as an HPSA

1. Population to provider ratio:
   - Example: primary care: ≥ 3,500:1

2. Lack of access to care in neighboring MSSAs:
   - Travel time >30 minutes
   - Population /doctor ratio > 2000/1

Population to Primary Care Provider Ratios

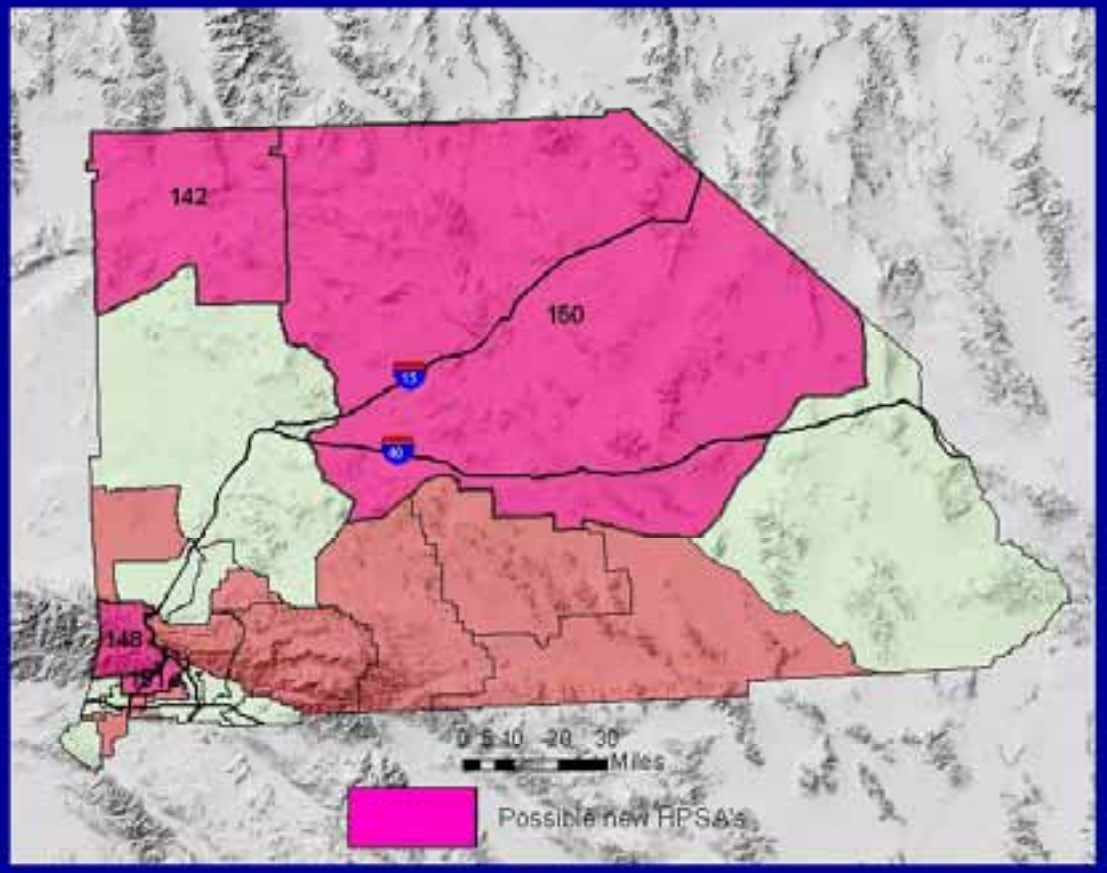


Meets 3,500:1 population to PCP criterion

Does not meet criteria

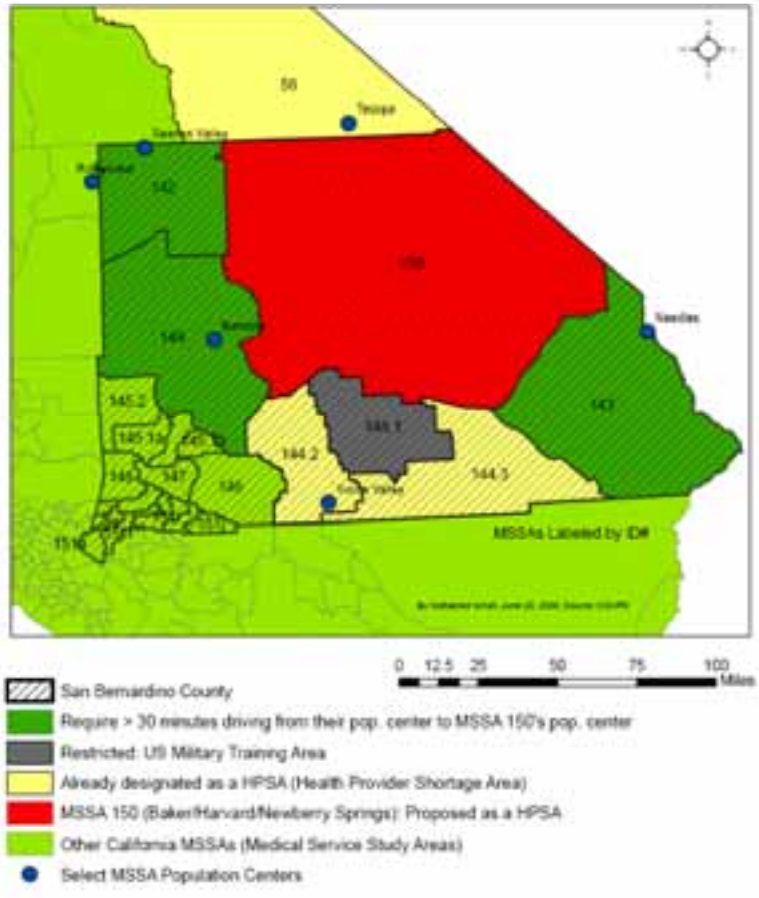
Source: OSHPD; By Lance Miller (SBCDPH)

Possible New Health Provider Shortage Areas

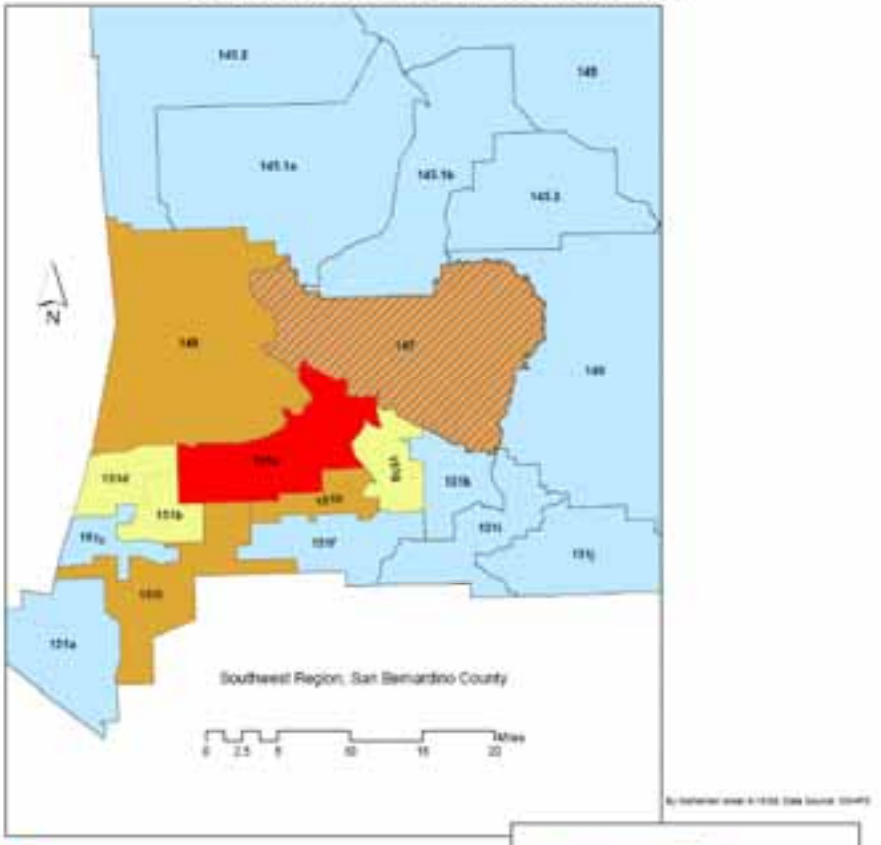


Source: OSHPD, By Lance Miller (SBCDPH)

MSSA 150 and its Contiguous MSSAs



MSSA 151e: Rationale for Proposal as a Health Provider Shortage Area



Limitations

- HPSA designation does not *guarantee* improved access to the population
- Gathering accurate physician location data in urban areas is very time consuming
- Dental and mental shortage areas were only searched for in the county's rural MSSAs

Conclusion and recommendations

- Using GIS may serve as a model to enhance healthcare access.
- A health department may improve healthcare access
- Many potential shortage designation areas are overlooked
- A solution for this would be a centralized system of automatic shortage designation with an up-to-date database of physician work addresses would help

References

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- http://ahrq.gov
- http://bhpr.hrsa.gov/shortage
- http://www.csrha.org
- http://tcds.org/
- http://www.dbc.ca.gov
- http://www.cdc.gov/nchs
- www.mapquest.com

Appendix 1:

- Unusually High Need Populations
  - >20% of the population ≤ 100% of poverty level
  - >100 births per 1000 females age 15-44 per year
  - >20 infant deaths per 1000 live births per year
- Primary care providers are in one of these specialties
  - Internal Medicine, Family Practice
  - OB/GYN, Pediatrics
  - General Practice