GIS Strengthens Health Services Policy and Programming

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THE GOAL OF THIS PRESENTATION
is to illustrate the use of GIS to inform state Medicaid policy and programs that have national implications.

HEALTH CARE NEEDS OF THE UNINSURED

BETTER BIRTH OUTCOMES

HEALTH CARE ACCESSIBILITY

COMMUNITY DEPRIVATION AND SOCIAL DETERMINANTS OF HEALTH
HIGH QUALITY DATA

Yields
HIGH QUALITY
Information
for Health Care Policy
and Programming
Provider Data Flow

Conflated Provider Dataset
Including Primary and Secondary Locations

Processing/Conflation of Data

Unique Provider LOCATION Dataset

Unique Provider COUNT Dataset

Master Files

Source Systems

DHHS MMIS
Enrollment Broker
POS
NPI
LLR
Health Care Needs of the Uninsured
Mapping and Identifying Key Characteristics of The Uninsured
An Environmental Scan Methodology to Inform Health Care Planning and Decision Making at the Local Level
An Environmental Scan is a process...

...involving systematic data collection and analysis that allows us to...

- detect and project local patterns and trends
  - population health
  - social determinants of health
  - health care accessibility
  - health service utilization
- identify gaps between local health needs and resources
- prioritize areas for targeted intervention
- encourage local health care partnerships and innovation
Environmental Scan GIS Technology

ESRI ArcGIS Desktop Advanced (Version 10.1): Using geodatabases and shape files; Model Builder and numerous ArcGIS Tools in the standard toolbox (Geocoding Locators, Origin/Destination Cost Matrix, Spatial Statistics) for processing the underlying data.

ESRI ArcGIS Desktop Network Analysis Extension

Publication Format: Dynamic PDFs were created with the “Export PDF Layers Only” function from ArcGIS Desktop.

– Audience primarily non-GIS users with varied levels of technical expertise and familiar with Adobe PDF and the dynamic capabilities of this file type allowed multiple layer combinations.
Dynamic Maps

- Multiple layers can be turned on and off to display data singly or in combination.
- State-level overview
- Region-specific patterns and distributions
More on the Environmental Scan

No GIS Experience Required: Format supports decision makers and better outcomes. John Stewart, Jared Shoultz, Ana López-De Fede, and Kathy Mayfield-Smith, University of South Carolina Institute for Families in Society, Division of Medicaid Policy and Research

ArcUser Winter 2014
Health care providers build collaborative partnerships to:

- improve health care quality;
- provide comprehensive, culturally appropriate health care services;
- strengthen care coordination; and
- ensure continuity of care.

Typically, provider partners and their recipients benefit from shared planning, resource allocation, and service delivery activities aimed at achieving mutual health care objectives.
Healthy Outcomes Plan (HOP) Active Participants
By County in South Carolina, April 2015

Source: Healthy Outcomes Plan (HOP) Program, April 2015:
The American Community Survey (ACS) Public Use Microdata
Sample (PUMS) 3 Year data file, 2011-2013.
BETTER BIRTH OUTCOMES
Better Birth Outcomes

- Care Coordination
- Quality Improvement
- Medicaid Reform

Reduction of Low Birth Weight Births
Better Birth Outcomes

South Carolina Population Diversity, Percent Medicaid Low Birth Weight Babies and Percent Women of Childbearing Age with Hispanic Ethnicity

Ring Key
- Outer Ring: 2017 Diversity Index, 2012 Diversity Index
- Inner Ring: Medicaid Low Birth Weight Babies

Quartile Ranking
- Low
- Medium Low
- Medium High
- High

% Hispanic Women
- Low - Medium
- High

County Indicator Ranges

Notes:
Percent Hispanic Women of Childbearing Age is the percent of the total estimated female population ages 15 to 44 with Hispanic ethnicity. The Diversity Index is based on ESRI analysis and projections which represent the likelihood that two persons, chosen at random from the same area, belonging to different race or ethnic groups, will represent no diversity and 100 represents complete diversity.

Dynamic Maps

- Multiple layers can be turned on and off to display data singly or in combination.
- State-level overview
- County- and ZCTA-level patterns and distributions
MPR/ESRI Partnership: Birth Outcomes Analysis Tool

Overview

The Birth Outcome Analysis map facilitates spatial analysis to help organizations understand birth outcome patterns across their state.

The analysis map uses sample data provided by USC- Medicaid Policy Research and Spatial Statistics Optimized Hot Spot Analysis tool to identify areas where there are higher incidents of low birth weight babies are born.

Then you can begin to understand areas where you need to focus efforts to better understand why hot spots are occurring in certain areas. By better understanding the spatial pattern that emerges as a result of this type of analysis, then develop a pattern and methodology for putting measures into place to help improve birth outcomes.

HEALTH CARE ACCESSIBILITY
Primary Care Provider (PCP) to Population Ratio as a Measure of Provider Adequacy

PCP Adequacy
- High Adequacy
- Moderate Adequacy
- Low Adequacy
- County Boundary

Notes: This analysis utilized both primary care provider locations from the National Provider Identification (NPI) dataset and population data by ZCTA from the American Community Survey (ACS) 2012 5-Year Estimates to calculate a smooth estimate of PCP adequacy across South Carolina. Only SC provider locations were used in this analysis.

Provider* to Population Ratio as a Measure of Access to Care by Census Block using the Enhanced Two Step Floating Catchment Area Method

* A provider was defined as a primary care provider (pcp) according to the IFS definition of a pcp and by using the CMS specialty code to NPI taxonomy crosswalk.

All providers within 60 miles and blocks within 30 miles of SC were used in this analysis to remove border effects.

Number of PCPs Analyzed = 19,385
Number of Blocks Analyzed = 177,582

Accessibility per 1,000 people

- 0 - 0.3 (<= 1:3500)
- 0.4 - 0.7 (<= 1:1500)
- 0.8 - 2.4
- 2.5 - 7.2
- 7.3 - 16.6
- 16.7 - 33.0 (> 1:50)

County Boundary

Adequacy Provider to Population values are based on the AMA Master File 2010 definitions: Adequate > 1:1500 (classed as ordered quartiles), Moderate 1:1500 - 1:3500, Low <1:3500.

Method parameters:
The provider catchment area was based on a provider to population ratio of 1:3500.
The population catchment area was based on the first 100 services from the population location.

Data Source: US Census 2010, NPI data 2013 08 11

Map Created: June, 2014

Medicaid Policy Research at the USC Institute for Families in Society
Access to Nearest 5 Care Providers
Primary Care, Pediatric, and Obstetrics/Gynecology Providers

Source: SC MMIS, March 2015; SC Enrollment Broker Provider Dataset, March 2015.

Medicaid Enrollee Residential Category
- Urban
- Suburban
- Rural

Pediatric Providers

Obstetrics/Gynecology Providers

Source: SC MMIS, March 2015; SC Enrollment Broker Provider Dataset, March 2015.
Hepatitis C Prevalence and Number of Selected Provider Types per 1,000 Medicaid Recipients by County, CY 2014

Ring Key
- Outer Ring: Primary Care Providers (PCP)
- Inner Ring: Gastroenterology Providers

Provider to Recipient Ratio
- Low
- Medium
- High
- No Providers of This Type

High Prevalence of Hepatitis C
- High Prevalence of Hepatitis C and
- Low PCP and Gastroenterology Provider to Recipient Ratios
- High Prevalence of Hepatitis C and
- Low Gastroenterology Provider to Recipient Ratio

Provider to Recipient Ratio:
( # of Providers by Type / # of Medicaid Recipients *1000)
Primary Care Providers - Low 5.52 to 12.19; Med 12.20 to 17.97; High: 17.98 to 19.75
Gastroenterology Providers - Low 0.07 to 0.24; Med 0.25 to 0.47; High: 0.48 to 1.46

County Hepatitis C Prevalence:
( # of cases of Hepatitis C / # of Medicaid Recipients *1000).
High Prevalence = 3.63; State Mean = 2.87

Notes:
All classifications are based on ordered quartiles.
Source:
South Carolina Medicaid Information Systems, CY 2014.
MMS March 2015, Enrollment Broker March 2015.
COMMUNITY DEPRIVATION AND SOCIAL DETERMINANTS OF HEALTH
“When we think about health, we usually think about health care and access to care and the quality of care. But what research clearly shows is that health is embedded in the larger conditions in which we live and work. So, the quality of housing and the quality of neighborhood have dramatic effects on health.”

DAVID WILLIAMS
Sociologist, Harvard School of Public Health
Significant geographic disparities in health exist in South Carolina. Numerous studies have shown higher rates of infectious and chronic diseases in socioeconomically deprived areas of the state. Persistent health disparities make continual assessment of local population health needs and health services capacities essential to the fair and effective allocation of limited state health care resources.

**Source:** Division of Medicaid Policy and Research, USC Institute for Families in Society
Family Household Poverty Rates
By County with 3D Visualization Effects

Notes: Areas of higher family household poverty rates are given a longer shadow in the bottom map, and are given a higher elevation in the upper map. Counties with lower family household poverty rates are given a shorter shadow in the bottom map, and are given a lower elevation in the upper map. Values are represented as rank-ordered quartiles.

Palmetto Small Area Deprivation Index (SADI)

We developed a census-based socioeconomic deprivation measure, the Palmetto Small Area Deprivation Index (Palmetto SADI), to identify areas at risk for high chronic disease burden among Medicaid recipients in South Carolina.

In addition to identifying areas with high chronic disease burden among current Medicaid enrollees, Palmetto SADI can be used to locate other low-income populations at greatest risk for chronic illness.

Efforts to control Medicaid spending and improve health outcomes among Medicaid beneficiaries must address the health care requirements of high need, high cost recipients with chronic illnesses. Low-cost assessment tools using existing data sources may be especially valuable in targeting limited state resources to prevent, diagnose, and effectively manage chronic conditions among Medicaid recipients.
Palmetto SADI High Deprivation Areas in South Carolina

Key
- High Deprivation-Rural
- High Deprivation-Urban
- Low/Moderate Deprivation

* No Population

* High deprivation areas are defined as the top quartile of ZCTA-level Palmetto SADI scores.

Created by the University of South Carolina, Institute for Families in Society, Division of Policy and Research on Medicaid and Medicare.
High Need Areas (symbolized in red on the map) have lower educational attainment, higher poverty rates, higher unemployment, and less access to health care.
Mapping the Story of Health Disparities

See the interactive demo on the ESRI Health and Human Services Overview
www.esri.com/industries/health/
“Maps are the workbench on which ideas are fashioned in a manner that permits them to be argued and, often, tested." ---- Tom Koch
QUESTIONS?

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