Secondary Data Collection and Analysis

Stephen Njenga
Director of Performance Measurement Compliance

October 2017
Regulatory Requirement

• Hospitals are required to use secondary data from credible sources for their Community Health Needs Assessment
• Quality of data is critical in the analysis
Secondary Data Sources

- **Local, state, national databases**
  - County Health Rankings
  - State vital records
  - Healthy People 2020
  - Behavioral Risk Factor Surveillance System
  - Youth Risk Behavior Survey
  - MICA data profiles
  - Community Commons

- **Previously conducted health assessments or reports**
  - United Way
  - Non-profit hospital CHNA
  - FQHC CHNA
  - Program-specific assessments
Secondary Data Collection

• Partners who have access to data through their organizations
  ➢ Government agencies such as: state health agency, other cabinet agencies (environmental health, social services, etc.), courts, police, schools, libraries, parks, planners
  ➢ Non-profit organizations
  ➢ Managed care organizations
  ➢ Universities and colleges
  ➢ Chambers of Commerce
Secondary Data

• Advantages
  ▶ Reduces duplication in data collection
  ▶ Less expensive than primary data collection
  ▶ Frequently collected using standardized and tested research methods; provides some assurance of data quality
  ▶ Often available by different geographies, e.g. census tract, zip code or school district

• Disadvantages
  ▶ Limited to data already collected
  ▶ Data may be from different time periods or geographic areas; limits comparisons
  ▶ Potentially limited ability in ways data can be analyzed
  ▶ Often older data
Data Collection

• Data quality and validity
  ➢ Reliable data source?
  ➢ Appropriate data collection methods used?
  ➢ Sample used?
  ➢ How old is the data?
  ➢ Geographic areas covered?

• Communities/groups disproportionately affected by poor health outcomes

• All data have limitations; important to be transparent
Stephen Njenga, MPH, MHA, CPHQ, CPPS
Director of Performance Measurement Compliance
Missouri Hospital Association
snjenga@mhanet.com
573/893-3700, ext. 1325
Population Health

ZIP Health Rankings
Missouri ZIP Health Rankings
Project Background

County Health Rankings & Roadmaps 2015 Research Grant

- Washington University School of Medicine and Missouri Hospital Association
- Advisory committee: academic/health disparities, community benefit, Missouri Foundation for Health, local public health agencies

Project Aim:

- Extend CHR&R conceptual model to the ZIP-level using widely-available data
  - Inform Community Health Needs Assessments
  - Target scarce community intervention resources
CHR&R Model of Population Health

County-level health ranking system for 50 states and DC

Population health model causal order:
- Health policies and programs result in health factors that determine health outcomes

Rankings confined to intrastate-level
- No national/interstate rankings

Hundreds of measures compiled from 20+ national data sources into health factors and health outcomes domains
- CDC, Census, BLS, USDA, FBI, HRSA, Dartmouth, etc.

Overarching Goal: Promote action by raising awareness of multiple factors influencing health differently across counties
- Prioritize → Intervene → Evaluate → Repeat
Missouri ZIP Health Rankings Conceptual Model

Built based on CHR&R population health model

Utilizes data available at ZIP-level
- Three years hospital IP/OP/ED discharges (health factors)
- Nielsen-Claritas (socioeconomic/demographic/environmental factors)

• ZIP-level indices fit to CHR&R domains
• Weighted aggregation at county-level for comparison to CHR&R results
• Scalable to other states
Missouri ZIP Health Rankings
Data and Methods

• Data
  – HI DI FY 2012-2014 Inpatient, Outpatient & ED Discharges for Missouri Residents
    • 36,176,000 Records
    • Health Factors and Outcomes Identified with diagnosis, CCS, MDC, Disposition & Expected Payer Codes
    • Aggregated at County & ZIP Levels
  – Nielsen-Claritas 2015 PopFacts Premier for Missouri Counties and ZIP Codes
    • Health Factors — Socioeconomic, Clinical Access and Environmental Factors

• Methods
  – Candidate variables screened evaluated at county-level with pairwise correlations and linear regression
  – Model refined using principle components analysis & multilevel modeling
    • Standardized ZIP data → principal components → multilevel regression * ZIP to county weighting file
  – Derived county-level results compared with 2015 CHR&R Ranks with using pairwise correlation and weighted kappa methods
  – Proportion of variation at sub-county level assessed with model-based intra-class correlations and visually depicted using mapping methods
Comparative Results: County to County

Health Factors:
- Weighted Kappa = 0.66
- Correlation = 0.87
- Percent of Counties in:
  - Same Quintile = 48%
  - Within One Quintile = 93%

Health Outcomes:
- Weighted Kappa = 0.54
- Correlation = 0.83
- Percent of Counties in:
  - Same Quintile = 49%
  - Within One Quintile = 83%
Comparative Results: County to ZIP Code

Sub-County Variation:
- Approximately half of the variation in derived health factors and outcomes scores observed at the ZIP code level

Health Factors:
- 38.9% of ZIP codes in same quintile as parent county.
- 15.9% of ZIP codes in top two CHR&R county quintiles in bottom two ZIP quintiles.
- 18.2% of ZIP codes in bottom two CHR&R county quintiles in top two ZIP quintiles.

Health Outcomes:
- 36.4% of ZIP codes in same quintile as parent county.
- 20.5% of ZIP codes in top two CHR&R county quintiles in bottom two ZIP quintiles.
- 22% of ZIP codes in bottom two CHR&R county quintiles in top two ZIP quintiles.
Sub-County Variation: Rural and Urban Examples

Rural Franklin County, Missouri
ZIP Ranking Range: 158 to 828 (of 976)

Urban St. Louis City & County, Missouri
ZIP Ranking Range: 2 to 964 (of 976)
Measuring Subcounty Differences in Population Health Using Hospital and Census-Derived Data Sets: The Missouri ZIP Health Rankings Project

Elina Nagasako, MD, PhD, MPH; Brian Waterman, MPH; Mathew Reidhead, MA; Min Lian, MD, PhD; Sarah Gehlert, PhD, MA, MSW

Abstract
Context: Measures of population health at the subcounty level are needed to identify areas for focused interventions and evaluate public health outcomes. This study tests a population health measurement model to the ZIP code level using widely available data sources.

Inpatient, outpatient, and emergency department discharge encounters (N = 1,827,495) were observed across Missouri. Of association were observed between the ZIP code-level population health indicators. Variation within counties was observed in both urban and rural areas. Measures was observed at the ZIP code level with 20 (17%) Missouri counties in quintiles of health factors and health outcomes. Thirty of the 46 (65.2%) ZIP codes in the bottom 2 quintiles.

The study suggests that readily available hospital and census-derived data can be used to measure subcounty level. Those widely available data sources could be used to identify communities, health rankings, population health, public health surveillance, small-area estimates.

http://journals.lww.com/jhmp/Abstract/publishahead/Measuring_Subcounty_Differences_in_Population.99586.aspx
Updated Data and Research Brief

“The Missouri ZIP Health Rankings project has been focused from its beginning on addressing the needs of people in Missouri who are working to improve the health of our communities. It’s been important for us to hear directly from our advisory group and others about what kinds of information they need to move their work forward. Our plans for the future include making these data available through a publicly accessible data platform, continuing to engage Missouri stakeholders to ensure these data are meeting their needs, and evaluating the performance of the ZIP Health Rankings model over multiple years, and potentially across other states.”

— Etsa Nagasako, M.D. Ph.D. MPH Missouri ZIP Health Rankings Project Principal Investigator

“The top three community health needs assessment issues identified in Missouri are: access to care; chronic diseases, including diabetes, heart disease and obesity; and behavioral health. Management and improvement of these health challenges requires a commitment from both health care and community leaders. Hospitals’ first CHNA process provides a baseline for community-centered partnership on population health improvement. As hospitals engage in the next cycle of CHNAs, MHA has tools and resources to assist in the process.”

— For Hill: Missouri Map mosaic of Quality Evaluation & Program Development

Background
The places we live, work, learn and play affect our health. The more that is known about these places, the better clinicians and community-based partners can identify and address the influence of these factors on health.

Population health improvement requires community-wide partnerships to address social, economic, environmental, clinical and behavioral factors that affect health and lead to poor health outcomes. In standardized comparative measures across these domains, Missouri has been ranked below the national average for overall health since 1990.1

Significant data is available on health factors and outcomes at the county level. However, these political subdivisions often are too large to effectively identify population health challenges. Increased attention is being given to geographic variation in health at the subcounty level.1

The Affordable Care Act expanded emphasis on population health, transitioning the model of health care beyond the hospital campus and into patients’ communities. As a result, providers are focusing on upstream social, environmental and contextual determinants of health that often result in poor physical and emotional downstream health outcomes. The ACA has accomplished a great deal in moving traditional health care toward an intersection with the disciplines of public health.

The concept of an individual’s ZIP code being a more powerful predictor of health than their genetic code is gaining widespread acceptance in the medical community. The population health movement also has led to an increased demand for meaningful community-based health and sociodemographic data.
Currently developing **ExploreMOHealth.org**, an interactive CHNA data platform powered by the University of Missouri, Center for Applied Research and Environmental Systems, Community Commons System. Anticipated go-live in **January, 2018**

Discussion with AHA & HRET to expand nationally

**MHA and the Missouri Foundation for Health, ZIP & County-Level CHNA Platform**

**Tobacco Expenditures**

This indicator reports estimated expenditures for cigarettes, as a percentage of total household expenditures. This indicator is relevant because tobacco use is linked to leading causes of death such as cancer and cardiovascular disease. Expenditures data are suppressed for single counties and single-geography custom areas. Rank data are not available custom report areas or multi-county areas. Expenditures data are suppressed for single counties and single-geography custom areas. Rank data are not available custom report areas or multi-county areas.

<table>
<thead>
<tr>
<th>Report Area</th>
<th>State Rank</th>
<th>Z-Score (US)</th>
<th>Z-Score (State)</th>
<th>Average Expenditures (USD)</th>
<th>Percentage of Food-At-Home Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Area</td>
<td>suppressed</td>
<td>-0.2</td>
<td>-1.48</td>
<td>$755.12</td>
<td>1.48%</td>
</tr>
<tr>
<td>St. Louis County, MO</td>
<td>1</td>
<td>-0.50</td>
<td>-1.92</td>
<td>suppressed</td>
<td>suppressed</td>
</tr>
<tr>
<td>St. Louis City, MO</td>
<td>14</td>
<td>1.06</td>
<td>0.33</td>
<td>suppressed</td>
<td>suppressed</td>
</tr>
<tr>
<td>Missouri</td>
<td>no data</td>
<td>0.31</td>
<td>0</td>
<td>$935.41</td>
<td>1.89%</td>
</tr>
<tr>
<td>United States</td>
<td>no data</td>
<td>no data</td>
<td>no data</td>
<td>$822.7</td>
<td>1.56%</td>
</tr>
</tbody>
</table>

Note: This indicator is compared with the state average.
Data Source: Nielsen, Nielsen IQ Reports, 2014. Source geography: Tract