Secondary Data Collection and Analysis

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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
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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
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)
Manuscript Published in May 2017

Measuring Subcounty Differences in Population Health Using Hospital and Census-Derived Data Sets: The Missouri ZIP Health Rankings Project

Elna 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 to support public health policy. This study explores the potential of a national population health measurement model to the ZIP code level using widely available data sources.

Inpatient, outpatient, and emergency department discharge encounters (N = 4,536,376) were observed between the ZIP code-level population health indicators. Variation within counties was observed in both urban and rural areas. The indicators were observed at the ZIP code level with 200 (17.7%) Missouri counties classified in the top 2 quintiles of health factors and health outcomes. Thirty of the 46 (65.2%) ZIP codes in the bottom 2 quintiles suggest that readily available hospital and census-derived data can be used to identify subcounty-level areas of need.

Subcounty variation in health factors and outcomes in rural Franklin County, Missouri.

http://journals.lww.com/jphmp/Abstract/publishahead/Measuring_Subcounty_Differences_in_Population.99586.aspx
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 publically 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.

— Eula 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.”

— Patricia Mixon Vice President of Quality Evaluation & Program Development
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