Developing and Assessing Oral Health Rational Service Areas (RSAs) Using Medicaid Claims Data in New York State

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The Center for Health Workforce Studies at SUNY Albany School of Public Health

• Established in 1996
• Based at the UAlbany School of Public Health
• Committed to collecting and analyzing data to understand workforce dynamics and trends
• Goal to inform public policies, the health and education sectors and the public
• Other contributors: Jean Moore and Guy Forte
Access to Oral Health - What’s the Problem?

- **What is Happening in the Real World?**
  - Developing strategies to improve access to oral health services requires an understanding of patients’ care seeking patterns and their access barriers, especially for underserved populations.

- **Workforce Maldistribution**
  - While NY has an abundant supply of dentists, they are not well distributed geographically, e.g. Upstate versus Downstate.

- **Insurance Status**
  - Access may be limited for publicly-insured (Medicaid) patients since many dentists in NY do not accept Medicaid.

- **Commuting Patterns**
  - Analyzing patterns can assist in the identification of areas where patients commute further, reflecting more limited access, and to create *rational service areas (RSAs)*.
Rational Service Areas (RSAs) Are a Key Component of Federal Shortage Area Designations

• RSAs are geographic areas that represent how and where the population residing within that area “reasonably” seeks certain health services

• RSAs must account for:
  o **Physical barriers** that can limit access to available providers
    – highways
    – mountains
    – bodies of water
  o **Individual characteristics** that can limit access to available providers
    – culture
    – transportation, and
    – insurance status
Example of Rational Service Areas (RSAs)

Western New York Primary Care RSAs
Why Developing and Assessing Oral Health RSAs Using Medicaid Claims Data?

• **Reveal the Reality** - while county, region, and state are preferred geographic units, patients often seek oral health care across these geo-political boundaries

• **Make Available Data Talk** - analyzing claims data provides an accurate assessment of Medicaid patients’ commuting patterns for oral care at the zip code level

• **Targeting High-Need RSAs**
  
  o Rank oral health RSAs based on important indicators
  
  o Facilitates the targeting of resources to neediest areas
  
  o Recruitment and retention incentives
  
  o Program development/expansion
Data Preparation

2015 NYS Medicaid claims data (12 months)

- Source: NYS Medicaid Data Warehouse
- # of claims included: **1,864,329**
- General dentists only (FFS and capitation)
- CPT codes for general oral health services
- Zip code level - pairing patient zip codes with provider zip codes
- Excluded emergency department visits
- Excluded out of NYS claims (except bordering cases)
Steps to Assessing Oral Health RSAs

1. Patient-Provider Matrices
2. Social Network / GIS Analysis
3. RSA Mapping and Revision
4. Composite Ranking of RSAs
5. Identify High-Need RSAs
1. Patient-Provider Relational Matrices

- **Matrices** (1960 x 677 zip codes)
  - Reflecting ties / patient flows between patients and providers at the zip code level
- **Plurality**
  - The highest percent of patients from one zip code went for their oral care in certain provider zip code(s)

**Example of Relational Matrices in New York City**
- Count-based matrix based on claims between zip code pairs
- Relational matrix based on plurality patient flow

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<tr>
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</table>
2. Social Network Analysis / Mapping

- **Mapping with UCINET/NetDraw** (one-mode analysis)
  - Identified relationship among zip codes (nodes/actors)
  - Created oral health rational service networks for 11 NYS regions

Adirondack Region
Patient-Provider Network
2. GIS Analysis / Mapping Initial RSAs

- **Spatial Analysis with ArcGIS**
  - Traveling time limited to **60 minutes** following roads and speed limits
  - GIS Network analysis generating “cookie cutters” for zip code pairs
2. GIS Analysis / Mapping Initial RSAs

- Mapping patient-provider networks, breaking regional boundaries
- **285** Initial RSAs were created statewide

**Adirondack Region**
**Initial Oral Health RSAs**

- Not very rational
- Holes and enclosed RSAs
- Undetermined areas
- Areas excluded by 60-minute traveling rule
- Need revision

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3. Revised RSAs Based on HRSA Guidelines

RSA Revision Rules:

- Contiguosity
- Non-overlapping
- Removing 60-minute limit
- Reasonable locales

Final Result:

- 178 Revised Oral Health RSAs statewide

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4. RSA Needs Assessment

Based on literature reviews, we used 6 demographic & 4 health indicators to determine relative need for each RSA

- **Demographic Indicators** *(ACS 2015 data)*
  - Percent of people Under 200% Poverty Level
  - Percent of racial/ethnic minorities
  - Percent of people who speak a language other than English at home
  - Percent of people enrolled in Medicaid

- **Health Indicators** *(NYS Medicaid/Department of Health 2015 data)*
  - Dental ER visits Per 10,000 Medicaid enrollees
  - Dental caries for Medicaid enrollees under age 18 per capita
  - Number of oral health providers per 10,000 Medicaid enrollees
  - Dental visits to primary care providers per 10,000 Medicaid enrollees
  - Percent of low birth weight
  - Percent of preterm birth

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4. Needs Assessment - Composite Indicator

Construct a Composite Indicator (CI) to Rank RSAs

• **Why using a CI?**
  
  o popularity, methodologically feasible, easy interpretation for stakeholders

• **Steps for CI ranking:**
  
  1. Transformed data for 10 indicators at the zip code level
  2. Correlation and outlier testing among 10 indicators
  3. Aggregated data for 178 revised RSAs after statistical corrections
  4. Two types of normalization methods, Z-score and Min-Max, were conducted
  5. Two weighting methods, equal weighting (EW) and principal components analysis (PCA), were applied
  6. Four CI ranking scores were generated by mix-matching normalization and weighting methods
  7. Robustness analysis tested on the average shift in rankings
  8. A final CI ranking from 1 to 178 were presented
## 5. Identifying High-Need Oral Health RSAs

### Composite Indicator Ranking for 20 Highest Need RSAs in NY

<table>
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<tr>
<th>RSA#</th>
<th>1. EW_Z-score</th>
<th>2. EW_MM</th>
<th>3. PCA_Z-score</th>
<th>4. PCA_MM</th>
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<td>13</td>
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<td>New York City</td>
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5. Identifying High-Need RSAs in Downstate NY
Findings

• Traveling patterns for NYS Medicaid patients do not follow geo-political boundaries, but follow actual supply of available dentists and means of transportations

• RSAs in rural areas were larger and tended to be composed of more zip codes, compared to those in urban areas

• RSAs in upstate NY were also larger than in downstate NY, which indicated a longer travel distance for upstate Medicaid patients seeking oral health services

• In New York City and other major metropolitan areas, RSAs were more localized and smaller than other regions, resulting from a larger number of providers and greater accessibility to public transportation
Findings: Most of the High-Need Oral Health RSAs are in New York City and Capital Region

RSAs ranked in the first quartile were considered High-Need RSAs

<table>
<thead>
<tr>
<th>PHIP Region</th>
<th># of Oral Health RSAs</th>
<th># of High Need RSAs</th>
<th>% of High Need RSAs</th>
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Findings: Most of the High-Need Oral Health Zip Codes are in Downstate New York

Zip codes that were covered under high-need RSAs were considered Oral Health High Need Zip Codes

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<th>PHIP Region</th>
<th># of Zip Codes</th>
<th># of Zip Codes in High Need RSAs</th>
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Next Steps

- **Work with State DOH**
  - Finalize statewide set of oral health RSAs
  - Identify high need areas with the most limited access to oral health services
    - Consider both high need indicators and local circumstances
  - Prepare OH shortage designation requests, starting with neediest areas
  - Work with local stakeholders
    - Review outcomes of designation submissions
    - Explore possible strategies to expand access to oral health services
      - Integration with primary care
      - Developing community based oral health programs
      - Using technology, i.e., teledentistry
Questions?

For more information, please email me at:
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