Lessons Learned from Needs Assessments on Rational Service Areas (RSAs) in New York

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Center for Health Workforce Studies

**CHWS** — established in 1996 — is an academic research center based at the School of Public Health at the University at Albany, SUNY

**Mission** — To provide timely, accurate information and conduct policy-relevant research about the health workforce

**Goal** — To assist health, professional, and educational entities to understand the supply, demand, distribution, and the use of health professionals
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Rational Service Areas (RSAs)

- RSAs are geographic areas that represent how and where the population residing within that area “reasonably” could or do seek certain health services.

HRSA requires all states to conduct Health Professional Shortage Area (HPSA) designations based on RSAs for:

- Primary Care
- Dental Health
- Mental Health

Statewide RSA Plan is a new HPSA funding requirement
RSA Projects in NY

RSA development:
- **Medicaid Claims** – 4M+ underserved population
- **Patient Flow** – pairing claims by patient/provider zip codes
- **Commuting Patterns** – roads and speed limits

<table>
<thead>
<tr>
<th>RSAs Project</th>
<th># of RSAs</th>
<th># of Claims</th>
<th>Data Source</th>
<th>Provider Type</th>
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<tr>
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<td>277</td>
<td>6.3M</td>
<td>2013 Outpatient</td>
<td>PC Physicians</td>
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<tr>
<td>Dental Health</td>
<td>178</td>
<td>1.9M</td>
<td>2015 General dentistry</td>
<td>Dentists incl. Pediatric dentists</td>
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<tr>
<td>Mental Health</td>
<td>107</td>
<td>0.3M</td>
<td>2017 MH services w/ER</td>
<td>Physicians, NPs &amp; PAs</td>
</tr>
</tbody>
</table>
Primary Care & Mental RSAs in NY

NYC PC RSAs

Mental Health RSAs

• RSA is an area with same color, consist of zip codes
• RSAs follow supply of providers & means of transportation

www.chwsny.org
Next Step: RSA Needs Assessment

- Understand service utilization
- Identify RSAs with highest need
- Serve HPSA designations
- Inform policy makers/stakeholders about focus areas

<table>
<thead>
<tr>
<th>RSAs Project</th>
<th># of RSAs</th>
<th>Needs Assessment Method</th>
<th># of Indicators</th>
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<tbody>
<tr>
<td>Primary Care</td>
<td>277</td>
<td>Rank each indicator &amp; combine quartile score</td>
<td>5 Health Indicators + 5 Demographic</td>
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<tr>
<td>Dental Health</td>
<td>178</td>
<td><strong>Composite Indicator</strong> (CI) ranking with <strong>revisit</strong></td>
<td>8 Health + 3 Demo + 1 Geographical</td>
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<tr>
<td>Mental Health</td>
<td>107</td>
<td>Improved CI ranking</td>
<td>3 Health Indicators + 11 Demographic</td>
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</table>
Composite Indicator Method

CI illustrates a comprehensive view on health needs that cannot be captured by only individual variable as it is --

• A multidimensional measure
  o Integrates all relevant indicators into one ranking

• Methodologically feasible
  o Widely used among OECD, UN, European countries
  o Robust though somewhat subjective

• Easy to interpret
  o Acceptable for stakeholder and lay audience
  o Effective for developing data-driven narratives
CI Ranking Steps

1. Literature Review
2. Choosing Indicators
3. Data Preparation (RSA level)
4. Normalization & Aggregation
5. Ranking & Robust Analysis
Example: Dental RSA Indicators

Geographic indicator
• Population density – Pop. / mi²

Demographic Indicators
• Percent of racial/ethnic minorities
• Percent of people not speaking English at home
• Percent of people enrolled in Medicaid

Dental Health Indicators
• Medicaid dental ED visits rate
• Medicaid dental visits rate to primary care services
• Dental providers per 10,000 Medicaid enrollees
• Dental provider Medicaid acceptance rate
• Percent of low birth weight
• Percent of pre-term birth
• Mental providers per 10,000 Medicaid enrollees
• Medicaid mental ED visits rate
Example: Dental RSA CI Ranking

- By mix-matching two normalization (Z score & Min-Max) and two weighing methods (Equal and PCA), median of four rankings were used to rank 178 dental RSAs.
- RSAs in the 1st quartile are of high need.

### Top 10 High Need Dental Health RSAs in New York

<table>
<thead>
<tr>
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<td>Mohawk Valley</td>
<td>Rural</td>
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Lessons Learned

1. Comprehensive literature reviews (LRs) are important.
   • What have been done?
   • How to identify needs? – primary care, dental, mental
   • Multi-dimensional aspects – socioeconomic, patient, provider
   • Set your boundaries – your goal/focus/timeline?

2. Indicator selection is crucial.
   • Rationalize your selection – LRs, norm, regulation?
   • Data availability – time, money, human capital, zip code level?

Dental Health Indicators
Percent of low birth weight
Percent of pre-term birth
Mental providers per 10,000 Medicaid enrollees
Medicaid mental ED visits rate
3. Test Indicators on correlation & compensability issue.
   - 2+ indicators measure the same dimension of need
     - % single female headed vs % household below 200% FPL
   - a surplus in one dimension can offset a deficit in another
     - % covered by private insurance vs % Medicaid coverage

4. The construction of CI involves stages where subjective judgement has to be made.
   - the selection of indicators
   - the treatment of missing values,
   - the choice of aggregation model,
   - the weights of the indicators, etc.
5. **Weighting should be minimized to maximize objectivity.**
   - Use equal weighting
   - Principle components analysis (PCA) / factor analysis
     o Assign statistical weights
     o summarize a set of indicators while preserving the maximum possible proportion of the total variation in the original data set

6. **Scientific data preparation is required.**
   - Outlier detection and handling
     o 0s on indicator(s) (e.g. Dental ER Visits) for less populated RSAs
   - Skewness of data
     o Square root, cube root, or logarithm (e.g. Population Density)
   - Data transformation
     o Normalization methods - Min-max, Z-score
Lessons Learned (cont’d)

7. Rank after aggregating normalized indicators is more unbiased, compared to rank each indicator beforehand.
   • Mental/Dental RSA ranking – four normalized ranks
   • PC RSA ranking – rank each indicator first, then combine

8. Sensitivity analysis is necessary to test the shifts in ranking to ensure robustness.

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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>
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</table>
9. To understand and interpret the needs correctly, CI deconstructing could be useful.
   • looking back at separate health indicator can help to extend the assessment to facilitate interpretation

10. While three RSA projects share similar demographic indicators, the differences and uniqueness in selected health indicators should be emphasized by researchers when comparing RSAs.

11. RSA needs assessment should be revisited and updated when significant health care environmental changes happen.
   • Population in-migration/out-migration
   • ACA, Medicaid expansion
   • HRSA HPSA new requirement
Implications

- A robust needs assessment on RSAs would serve as a solid foundation for HPSA designations.
- The evolving CI ranking methods on RSAs offer a comprehensive way to analyze health needs and access to care issues in New York.
- Future RSA needs assessments will be conducted according to the updated knowledge base.
- Understanding the challenges of conducting needs assessment on RSAs may facilitate future collaborations between state and local health agencies, communities and academic partners.
Questions?

• For more information, please email me at:
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