

Needs Assessment on Oral Health Rational Service Areas (RSAs) Using Composite Indicators in New York State

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ABSTRACT

Purpose: To conduct a needs assessment on Medicaid oral health rational service areas (RSAs) in New York State (NYS).

Background: A previous project at the Center for Health Workforce Studies (CHWS) created 178 oral health RSAs using Medicaid claims data, linking the zip codes where patients live to the zip codes of their general dentists. These oral health RSAs were ranked using the composite indicator (CI) method to assess the oral health needs of NYS Medicaid patients.

Methods: Based on literature review, 12 oral health indicators were identified. The data for the year of 2015 were drawn from the ESRI ArcGIS database, the American Community Survey, and the NYS Medicaid Data Warehouse. The needs score for each RSA was calculated using the CI method:

- (1) Data were cleaned at the zip code level and aggregated at the RSA level.
- (2) Correlation analyses were conducted to control for multicollinearity.
- (3) Indicators detected with outliers were transformed using natural logarithm.
- (4) Four CI rankings were calculated by mix-matching two normalization methods and two weighting methods.
- (5) A robustness analysis tested average shift in ranks to ensure CI consistency.
- (6) Final CI ranking for all RSAs were set using medians of 4 CI rankings.

Results: Oral health RSAs ranked in the first quartile (#1 to #44) were considered as high need RSAs. These high need RSAs covered nearly 4 million New Yorkers from 450 zip codes. The majority (77%) of high need RSAs were in Upstate NY. The Tug Hill Seaway and Capital Region had the highest percentages of high need RSAs, 80% and 43%, respectively.

Conclusions: The CI method provides a well-founded and robust ranking to assess RSAs. The scores potentially reflect access barriers to oral health services defined by social determinants of health, health indicators such as oral health ED visits, and a lack of dental providers. By integrating multi-dimensional concepts, the analysis can better assist policy makers in understanding Medicaid patients' access to care and their needs within certain areas.

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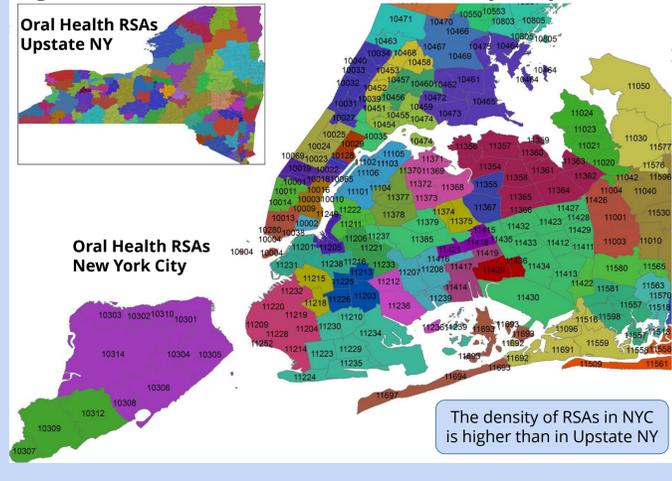
INTRODUCTION

Oral health RSAs are geographic areas (consisting of zip codes) within which most area residents seek most of their oral health services.¹

In a previous project, to understand the delivery of oral health services in NY, CHWS created 178 oral health RSAs (Figure 1) using over 1 million Medicaid claims data.

RSAs were created by linking the zip codes where patients live to the zip codes of their dentists.²

Figure 1. Oral Health RSAs in New York City & Upstate NY



METHODS

To assess the delivery of oral health services in NY and identify RSAs with high needs, a needs assessment was conducted using the **composite indicator (CI) method**.

A CI combines multi-dimensional indicators/variables into one integrated ranking system.

This project uses CI to rank NY oral health RSAs under 4 scenarios by utilizing 2 normalization methods and 2 weighting methods.

STEP 1: Literature Review

- Conducted to identify potential indicators with data available at the zip code level in 3 dimensions: **geography, demography, and oral health status**

STEP 2: Indicator Selection

12 indicators were selected based on Step 1:

- Geographic indicator**
 - Population density

METHODS (cont.)

Demographic Indicators

- Percent of racial/ethnic minorities
- Percent of people not speaking English at home
- Percent of people enrolled in Medicaid

Oral 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
- Medicaid mental ED visits rate
- Mental providers per 10,000 Medicaid enrollees
- Percent of low birth weight
- Percent of pre-term birth

STEP 3: Data Preparation

- Data Sources:** Zip code (ZTCA) level data in 2015
 - ESRI ArcGIS Shapefile
 - American Community Survey
 - NYS Medicaid Data Warehouse
 - NYS Department of Health
- Multicollinearity & Outlier Check** for all indicators
- Data Transformation:** Zip code level to RSA level

STEP 4: Normalization and Weighing

- Z-score and Min-Max methods** were used to standardize indicators, making them comparable.
- Equal Weighting and Principal Components Analysis** methods were used to assign weights to indicators.

STEP 5: Ranking RSAs

- Four CI ranking scenarios** (R1-R4, Table 1) were generated by mix-matching normalization (Z & MM) and weighting (EW & PCA) methods.
- Robustness analysis** tested the average shift in ranks.
- A RSA ranking was finalized to identify high need RSAs.

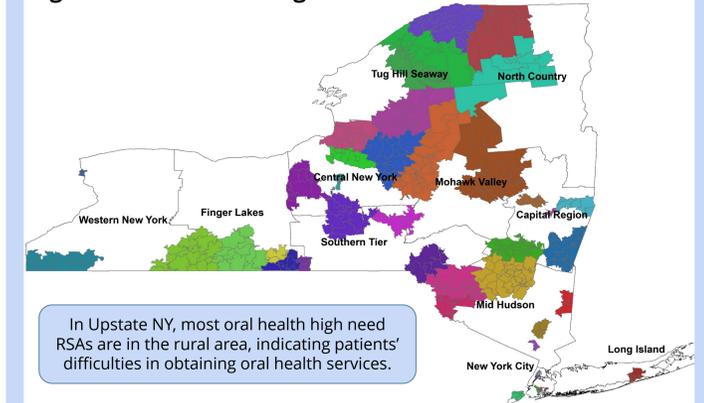
Table 1. Top 10 High Need Oral Health RSAs in New York

RSA#	R1: EW-Z	R2: EW-MM	R3: PCA-Z	R4: PCA-MM	Final Rank	DOH Region	R/U
4	177	178	177	178	1	Mid Hudson	Rural
96	178	177	178	177	1	Capital Region	Urban
178	176	176	176	175	3	Finger Lakes	Urban
176	175	174	175	174	4	Finger Lakes	Rural
98	174	173	174	172	5	Capital Region	Urban
114	167	175	172	176	5	North Country	Rural
103	173	172	173	173	7	Capital Region	Rural
25	171	171	171	164	8	New York City	Rural
104	169	169	168	169	9	Capital Region	Rural
60	172	167	170	160	10	New York City	Urban
92	164	170	167	170	10	Mohawk Valley	Rural

RESULTS

RSAs ranked in the first quartile are considered high need, resulting a total of 44 high need RSAs out of 178 (Figure 2).

Figure 2. Oral Health High Need RSAs in New York



Nearly 4 million New Yorkers from 450 zip codes were in high need RSAs. Tug Hill Seaway and Capital Region have the highest percentages of high need RSAs (Table 2).

Table 2. Distribution of Oral Health High Need RSAs by DOH Region

DOH Region	# of Oral Health RSAs	# of High Need RSAs	% of High Need RSAs
Capital Region	14	6	43%
Central New York	15	6	40%
Finger Lakes	17	3	18%
Long Island	27	1	4%
Mid Hudson	22	6	27%
Mohawk Valley	4	1	25%
New York City	43	9	21%
North Country	5	2	40%
Southern Tier	8	3	38%
Tug Hill Seaway	5	4	80%
Western New York	18	3	17%

CONCLUSIONS

- The needs assessment reflects access barriers to oral health services defined by social determinants of health, health-related indicators such as oral health ED visits, and a lack of oral health providers.
- The higher percent of high need RSAs in Upstate NY indicated residents' difficulties accessing oral services.
- This study can help policy makers better understand the delivery of oral health services and identify oral health care needs within certain areas.

REFERENCES

- Health Resources and Services Administration. State-Wide Rational Service Areas for Primary Care Services: Lessons from Six States. Feb, 2000.
- Center for Health Workforce Studies. Developing and Assessing Oral Health Rational Service Areas (RSAs) Using Medicaid Claims Data in New York State. AcademyHealth Annual Meeting, June, 2018.