SPATIAL ANALYSIS OF TENNCARE LOW-VOLUME PROVIDERS

BACKGROUND

The passage of the 2010 *Patient Protection and Affordable Care Act* (ACA) is one of the most significant health insurance expansion and market reforms since the country established Medicare and Medicaid in 1965. ACA has the twin goal of facilitating the access to healthcare as well as alleviating the financial burden one incurs when injured or sick. To achieve these goals, the ACA put in place three mechanisms to increase coverage for millions of Americans:

1. Market reforms implementation, that establish minimum standards for coverage;
2. Establishment of new health insurance marketplaces; and
3. Medicaid eligibility expansion to adults with incomes up to 138% of the federal poverty level (Keith and Lucia 2014, p. 9)[i].

Tennessee decided to steer clear of state exchanges so federal regulators had to directly enforce market reforms and operate health insurance marketplaces throughout Tennessee. However, federal regulators could not play a similar role when it came to Medicaid expansion. This is because, while upholding the ACA, the decision of the Supreme Court on June 28, 2012 in *National Federation of Independent Business v. Sebelius*, made the expansion of Medicaid a choice for states that wish to opt out of that provision.

Rather than pursuing the standard Medicaid expansion, Governor Bill Haslam unveiled a proposal called *Insure Tennessee* in December 2014 to expand Medicaid using a Section 1115 Waiver from the federal government. This waiver offers states greater flexibility in implementing pilot projects that still achieve Medicaid objectives. However, the state legislature rejected the plan.

As of November 2015, TennCare, Tennessee's state Medicaid program covers 1.48 million Tennesseans or 22% of the state's population.[ii] Parents with incomes up to 101% of the federal poverty line (FPL); pregnant women with incomes up to 200% of the FPL; older, blind, or disabled individuals who receive Supplemental Security Income; children whose parents earn up to 133% of the FPL; and certain other categories of individuals are eligible for such coverage.[iii]

PROJECT SCOPE

In 2014, Tennessee applied for and was awarded a $65 million State Innovation Models (SIM) grant by the Centers for Medicare and Medicaid Services (CMS) to fund a three-year payment and delivery system reform initiatives targeted at improving quality of healthcare while controlling costs.

These reform initiatives are promising because they aim to reduce costs for the neediest Tennessee patients, who currently account for a disproportionate amount of health care spending. For instance, the 22% of TennCare patients with common chronic conditions such as asthma, heart disease, and diabetes account for 55% of TennCare's spending. The 9% of patients with two or more chronic conditions account for 35% of spending alone.[iv] Moreover, the 5% most costly patients account for almost half of total adjusted spending and 75% of hospital inpatient care.[v] Lastly, the 20% of TennCare patients with behavioral health needs account for 39% of total spending.[vi] If successful, these initiatives could better manage care for Tennessee patients and the state could achieve dramatic cost savings overall.

To support the implementation of these reforms, TennCare officials asked a group of students in my cohort, including myself, to examine two strategies laid out in the SIM plan:

1. Implementation of Patient-Centered Medical Homes (PCMH); and
2. Episodes of Care.

TennCare particularly requested recommendations detailing how the state can more successfully engage low-volume providers in these reform efforts. My spatial analysis of low-volume practices in Tennessee focused exclusively on the first strategy: the implementation of PCMHs.

PROJECT DESCRIPTION

In order to make sound recommendations to TennCare, our group undertook a field trip to Tennessee in early November 2015 during which we gathered feedback from representatives of 13 organizations throughout the state, including government agencies, healthcare providers, payers, research institutions, and healthcare advocates.

Our conversations conveyed the following *key assumptions*:

- Rural providers can be used as a proxy for low-volume providers;
- Rural counties have greater health expenditures than urban ones;
- Behavioral health spending constitute a key driver of total health care costs;
- In-patient (IP) admissions and Emergency Room (ER) visits represent key drivers of total health care costs.

For the purpose of my project, I set out to map the geographic distribution of low volume providers, spending per patient for low volume practices, spending by practices, IP admissions and ER visits, as well as other factors affecting costs.

Available Data

We requested from TennCare claims data showing patient spending, IP and ER admission, practice size and spending, and behavioral health spending to analyze and better understand the demographics of low-volume providers and the challenges they face. We did so to ensure our recommendations would be rooted in the specific characteristics of TennCare providers and patients.

Unfortunately, TennCare was only able to provide us county-level information as opposed to zip code-level data, as requested. Such level of detail could have helped our group get a better sense of primary care and behavioral health practice distributions throughout Tennessee, which could have further informed our recommendations.

For example, population density in some parts of the county could have helped explain the location of practices within an area. It could have also help cluster some of that data on practices and perhaps suggest to TennCare where resources could be pooled, where networks could be facilitated, or where special interventions are needed for one reason or another. The same holds for instances of disease, spending, and age groups. While useful for the purposes of our report, county-level data made it challenging to compare, diagnose, and make relevant deeper analyses/recommendations to TennCare.

An initial search of Princeton University Library's geoserver for available data on Tennessee yielded the following results[vii]:

Title	Producer	Data Type
Tennessee Block Groups	Geographic Data Technology, Inc ESRI	Vector Digital Data
US Hospitals	US Geological Survey ESRI (contributor)	Vector Data Set
TN Counties	SimplyMap	Digital Vector Data

I also used the definition of metropolitan and nonmetropolitan counties from the Centers for Disease Control and Prevention (CDC) National Center for Health Statistics to define urban and rural counties.[viii] *Noncore* and *micropolitan* counties were designated as rural, while large metro, medium metro, or small metro counties were designated as urban.

Data Processing

A few issues came up while cleaning and processing the data in the Excel workbook TennCare sent our group. For instance, data was missing for some counties.

- The "Primary Practices" sheet was missing county names for 120 (2.82%) patients out of a total of 4,243. I removed that data from the sheet as there was no way to map them.
- There was also data missing for four patients in the "Top 15 members" sheet. I also excluded those from the analyses.
- I also removed data TennCare provided in the "Top 15 members" sheet for 2,619 patients (1.60%) living out-of-state as these patients do not fit in the scope of my project.
- All the sheets showed an asterisk next to Dekalb county. Given time constraints, I was unable to reach out to TennCare about this and simply guessed it was to perhaps differentiate with other Dekalb counties in Alabama and Georgia.
- In the big scheme of things, the cleaning process seemed unlikely to skew the results provided in the report. However, I thought it prudent to explain the manipulations I did that resulted in the maps produced.

DATA ANALYSIS AND FINDINGS

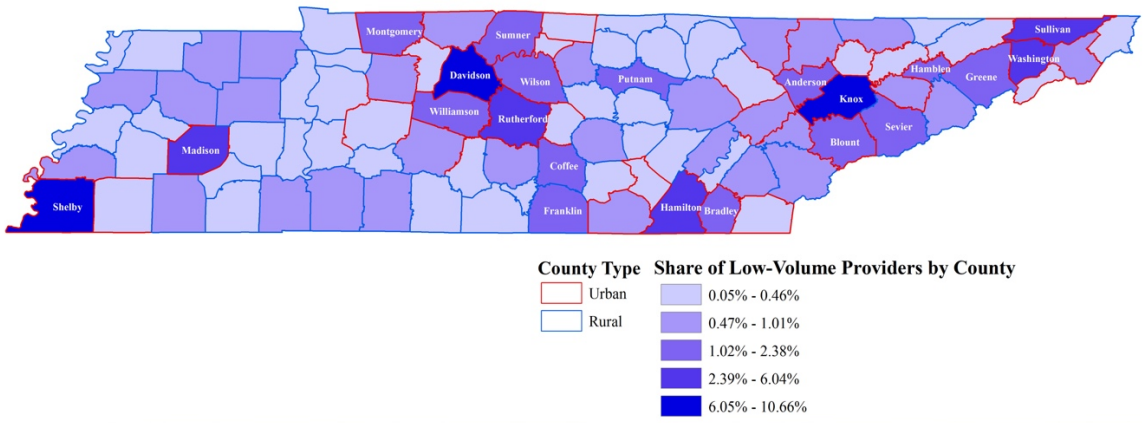
Mapping TennCare's claims data showed several important trends that helped highlight the distribution of providers and TennCare spending throughout Tennessee. When paired with descriptive statistics of TennCare providers, the spatial analyses below allowed for the following *key findings*:

- Low-volume providers are equally represented in rural and urban areas.
- Urban and rural areas do not show distinctive characteristics with regards to practice size.
- Low-volume practices tend to have higher per-member spending.
- There appears to be some geographic trends regarding per-member spending.
- Panel size is a statewide problem and not just a rural versus urban issue.
- ER visits are not necessarily correlated with high per-member spending.

Low-Volume Providers by County

Map 1 below reflects that large urban centers also have a high number of low-volume TennCare providers suggesting that where there are more TennCare patients, there are more TennCare providers with both low-volume and high-volume TennCare panels.

Map 1: Share of Low-Volume Providers by County

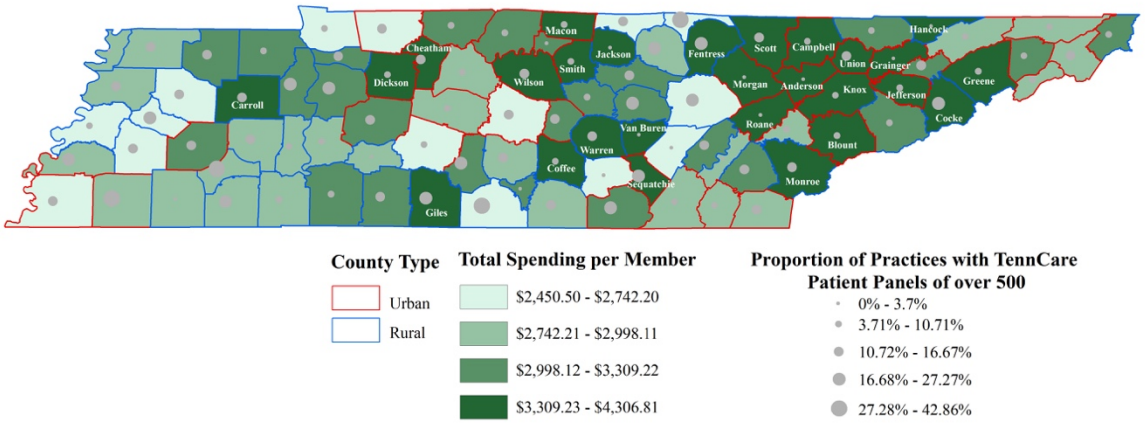


Practice Size Distribution and Per-Member Spending within Counties

The distribution of practice size by county, as illustrated in Map 2 below, confirms there are no clear divisions between urban and rural counties as far as the proportion of practices with low-volume TennCare patient panels is concerned. In fact, many rural areas actually have higher

percentages of practices with larger TennCare panels than do many urban counties. Practice size distribution also appears to be correlated, on average, with high per-member spending.

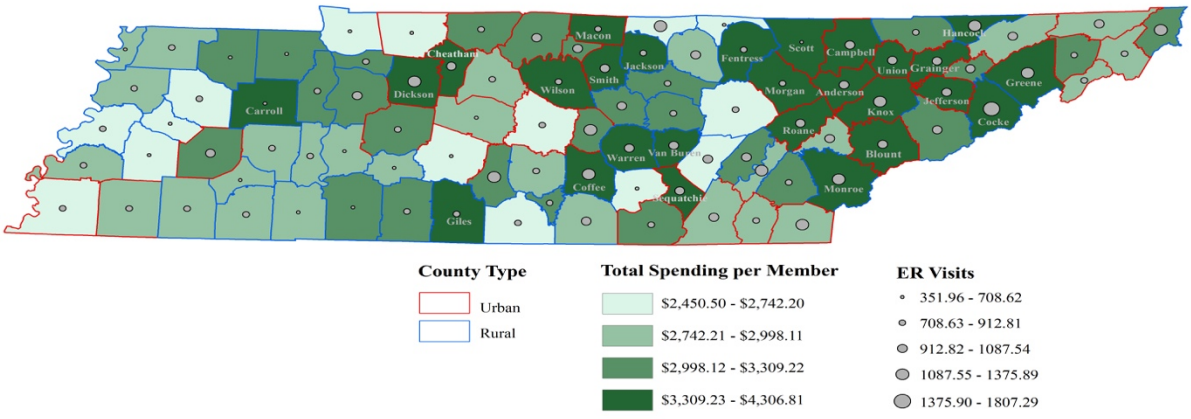
Map 2: Share of Low-Volume Practices and Per-Member Spending by County



Per-Member Spending and ER Visits by County

The northeast region of the state shows a greater concentration of counties with high per-member spending compared to other regions. However, high per-member spending is not always correlated with a county's urban or rural status as indicated in Map 3 below. Interestingly, there does not appear to be a clear correlation between ER visits and high per-member spending.

Map 3: Per-Member Spending and ER Admits by County

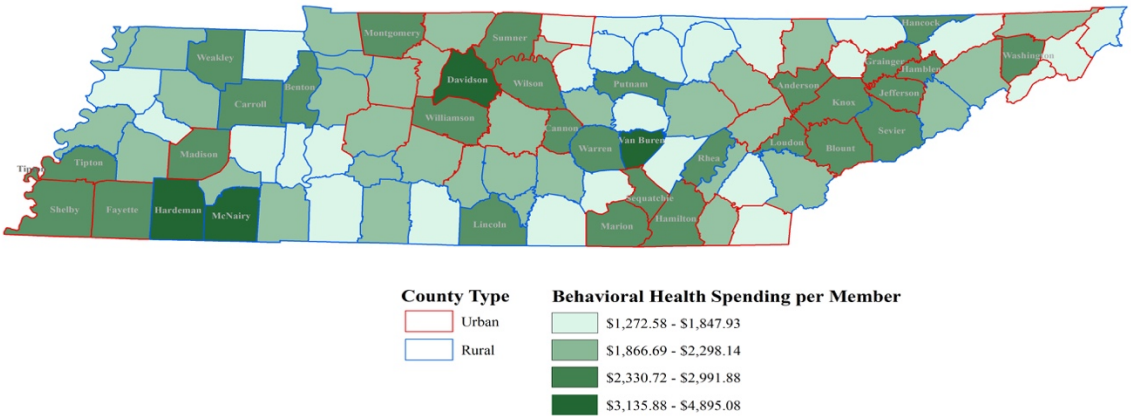


Behavioral Health Spending by County

High per-member behavioral health spending does appear to be correlated with urban counties with some exceptions. For example, Shelby County, with includes Memphis, the state's largest

urban center, has lower per-member behavioral health spending than nearby rural McNair County.

Map 4: Per-Member Behavioral Health Spending by County



CONCLUSION

The geographic trends depicted in these maps suggest there are few clear differences in TennCare patient costs between urban and rural counties. However, the data does indicate there is a greater concentration of low-volume providers in major urban areas, and that these providers have higher per-member costs, which has implications for implementing TennCare's reforms. Consequently, our report provided recommendations to TennCare that will help increase the successful participation of low-volume providers and help Tennessee achieve the full promise of the ACA and CMS' *Innovation Initiative*.

The report also suggested that several challenges remain concerning the engagement of low-volume TennCare providers. Given that these providers are prevalent in both urban and rural settings, TennCare will need to pay attention to both geographic settings as well as both high and low-volume practices for its payment and delivery system reform initiatives to be successful.

Lastly, there are two important caveats to highlight about the data and the analysis highlighted in this paper. First, the *low-volume* classification refers only to a practice's volume of TennCare patients, not to their overall patient panel size. In reality, the overall patient panel of a practice may be much larger even with a low-volume of Medicaid patients. Second, the definition of

urban and rural counties does not limit the definition of urban counties to those with major metropolitan areas such as Nashville, Memphis, Knoxville, and Chattanooga.

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[i] Implementing the Affordable Care Act: The State of States by Katie Keith and Kevin W. Lucia. The Commonwealth Fund. 2014 (last accessed on October 31, 2015) http://www.commonwealthfund.org/~/media/Files/Publications/Fund%20Report/2014/Jan/1727_Keith_implementing_ACA_state_of_states.pdf

[ii] Tennessee Division of Health Care Finance & Administration, "TennCare Enrollment Report for November 2015," November 2015, https://www.tn.gov/assets/entities/tenncare/attachments/fte_201511.pdf; US Census Bureau, "State and County QuickFacts: Tennessee."

[iii] Snyder et al., "Putting Medicaid in the Larger Budget Context"; TennCare, "TennCare Eligibility Reference Guide" (TennCare, Division of Health Care Finance & Administration, n.d.), https://www.tn.gov/assets/entities/tenncare/attachments/eligibilityrefguide.pdf; TennCare, "TennCare Medicaid: Eligibility," TennCare, Division of Health Care Finance & Administration, (n.d.), https://www.tn.gov/tenncare/article/tenncare-medicaid.

[iv] Ibid., 15.

[v] Ibid., 16–17.

[vi] Tennessee Division of Health Care Finance & Administration, "Provider Stakeholder Group Report (September 2015)," September 9, 2015, 21, http://www.tn.gov/assets/entities/hcfa/attachments/SepProviderMeeting15.pdf.

[vii] The TennCare data including the shape files I used to produce the maps in this report have been loaded under my NetID (\princeton\hrthomas) directory at \\lib-gisworks\projects\wws593n\2015 on the Map and Geospatial Information Center library server.

[viii] Franco SJ Ingram DD, "2013 NCHS Urban–Rural Classification Scheme for Counties," Vital and Health Statistics, 2 (National Center for Health Statistics, April 2014), http://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf.