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High-Risk Travel Distance and Number of Primary Care Visits in a North Carolina Medicaid Population

Abstract

Background: With nearly 20% of the U.S. population in rural areas, a lack of access to primary care may cause rural residents to forego recommended preventive care procedures, and suffer higher morbidity rates than their urban counterparts.

Methods: Medicaid billing data from 2009 to 2011 were analyzed to calculate the distance and duration that a Medicaid patient population had to travel when seeking primary care in the 29 rural counties of eastern North Carolina. Primary care codes were analyzed to detect any differences in access patterns for various complexity levels of physician visits. Data were also used to evaluate health professional shortage areas (HPSA) designations in eastern North Carolina based on current federal definition.

Results: There was a significant difference in patient visits when comparing HPSA-defined travel times of more or less than 20 miles or 30 minutes; however, the average patient received a sufficient number of primary care visits annually (average ~3) with distance and duration having limited effect on the amount of care the patients received.

Implications: As a designation criterion for underserved areas, the current HPSA definition may not adequately identify populations at risk.

Keywords

Primary care, access to care, health professional shortage areas, Health Resources and Services Administration, rural health

Cover Page Footnote

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INTRODUCTION

Various intrinsic factors limit access to primary care and lead to health disparities in rural areas.^{1,2} With nearly 20% of the U.S. population in rural areas, research indicates that a lack of access to primary care causes many rural residents to forego recommended preventive care procedures, and suffer higher morbidity rates than their urban counterparts as a result.³ In addition, only about 11% of our nation's physicians practice in these areas.²⁻⁴ This among other factors causes individuals who live in rural settings to have their healthcare access restricted due to fewer primary care options.^{1,5} Physicians and some medical policy officials consider primary care to be the most efficient form of population health management.⁶ Decreased access to primary care has aided in the decline of overall population health in these regions, and has created significant problems.¹ There is limited published data on the effect that distance and duration have on primary care access for rural patients, or the utilization of primary care resources.⁶

Another focus for this study was to assess whether the current definition for health professional shortage areas (HPSAs) represents a significant difference in services to rural populations. According to initial research by Cashion et al:

In an effort to increase access to health services the Health Resources and Services Administration (HRSA) established HPSAs. These are classified in three categories: (1) geographic area, (2) population groups, and (3) facilities.³

The current research seeks to study specifically the first HPSA category: Geographic Area HPSA designations. Those designations are defined by HRSA and included in initial research. HRSA defines a Geographic HPSA as an area where, under normal conditions, and utilizing primary road systems, any travel that exceeds 20 miles is a barrier to accessing primary care.³ The twenty-mile designation, determined by HRSA, is based on an approximate travel duration of 30 minutes when patients are traveling on primary roads within health professional shortage areas.³

The overall purpose of this study was to determine the effect of travel distance by HPSA definition of decreased access (>20 miles or >30 minutes) on the annual number of primary care visits for a rural eastern North Carolina Medicaid population.

METHODS

A data set of Medicaid billing information from the 29 counties of Eastern North Carolina was obtained through the North Carolina Office of Public Health. Billing data for a 3-year span (2009–2011) were included, covering approximately 154,805 individuals who sought care from their primary care physician. After stacking, geocoding was used via Google and Application Planning Interface (API).³

Physicians use ICD-9 coding through Current Procedural Terminology (CPT) linguistics. Face-to-face primary codes start with new-patient visits that consist of codes from 99201 to 99205.⁷ New-patient visits are measured from 20 minutes in length for low-or-moderate problems to 60 minutes for problems that are handled with high complexity. Once the patient is established in the record for that provider, any visit for primary care purposes is coded in a similar fashion using 99211–99215 as the existing patient code.⁸

Addresses of >250 miles were removed for statistical purposes, due to the expectation that those patients were not likely residents of North Carolina (fewer than 5000 patients). Those patients not listed with valid street addresses were also removed. After the use of API, the data were coded to show distance in miles and duration in minutes and totals for primary care visits. Primary care visits were divided into two categories: new-patient visits (99201–99205) and established patient visits (99211–99215) using Medicaid billing codes as described previously.

Descriptive statistics were calculated for distance traveled <20 miles and >20 miles, as well as duration traveled <30 minutes and >30 minutes.

RESULTS

As seen in the Appendix, independent samples t-test results show that patient visits by distance travelled (more or less than 20 miles) was significantly different between new and established patients: (new visit) 99201, 99202, 99203, 99204, 99205 ($\mu=2.92$; $p<0.0001$); (established patient) 99211, 99212, 99213, 99214, 99215 ($\mu=2.76$; $p<0.0001$). When distance was measured using the Tukey's Post Hoc test, there is a slightly linear relationship between distance of travel and the frequency with which patients sought primary care. However, there are no significant changes in the number of visits made by patients who went from 0 to 5 miles to see their providers (2.96 visits), and those who traveled more than 50 miles (2.67 visits). Established patients traveled farther to see their provider on average at each increment of mileage than did new patients.

The t-test for also showed that there was a significant difference in visits when patients traveled >20 miles versus those who did not (2.92 vs. 2.76, $p<0.0001$). Duration was also significant between patients who traveled >30 minutes, and those who traveled <30 minutes (2.79 vs. 2.90, $p<0.0001$). The duration differed from distance in that there is a strong linear relationship between established patients and travel distance in 15-minute increments.

IMPLICATIONS

The results do not strongly support the current HPSA designation criteria as a significant barrier to access to primary care. Patients who were ≥ 20 miles from their provider still sought a level of care that is close to three visits per year on average, and the difference in distance from their provider had little effect on the population access to primary care. Duration of travel proved to be more substantial, and had greater impact on the level of care this population received annually.

The results also show that the current HPSA designations for geographic HPSA counties and their use of county lines as limitation to access may not be accurate. The average patient in this study population accessed their primary care physician at least 2–3 times a year according to this analysis; however, there may be circumstances where this is a limitation to adequate patient access. This research supports that when designating HPSA counties, the distance traveled by patients to their primary care providers may be less relevant than the duration of their travel.

Our findings indicated that Medicaid patient populations in rural eastern North Carolina as a whole obtain a sufficient number of primary care visits on an annual basis regardless of travel

distance or duration. However, patients that have chronic conditions or additional special needs that require increased access to their primary care physicians may face obstacles with increased travel distance or duration. More should be done to assure access for the rural population within the region with such conditions that may need greater physician access.

SUMMARY BOX

What is already known about this topic? Extended travel distance and duration (>20 miles or >30 minutes) has been used by HRSA to identify populations at risk for inadequate health care.

What is added by this report? There was a significant difference found in primary care visits between populations by HPSA-defined travel distance (2.92 under 20 miles; 2.76 over 20 miles; $p<0.0001$) and duration (2.90 under 30 minutes; 2.79 over 30 minutes; $p<0.0001$); however, both populations averaged nearly three visits per year.

What are the implications for public health practice, policy, and research? As a designation criterion for underserved areas, the current HPSA definition may not adequately identify populations at risk and may need to be further refined to identify specific populations at risk due to travel distance or duration.

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APPENDIX

	Descriptive Statistics					Travel Distance				Travel Duration			
	Mean	SD	Median	Quantiles 90	Max	<20 Miles		>20 miles		< 30 min		>30 min	
New-patient code, established-patient code						Mean	SD	Mean	SD	Mean	SD	Mean	
99201, 99211	0.10	0.36	0.00	0.00	13.00	0.10	0.37	0.08	0.32	0.10	0.36	0.08	
99202, 99212	0.35	0.68	0.00	1.00	14.00	0.36	0.69	0.34	0.65	0.36	0.69	0.34	
99203, 99213	1.42	1.45	1.00	3.00	95.00	1.42	1.51	1.42	1.25	1.42	1.50	1.43	
99204, 99214	0.88	1.11	1.00	2.00	76.00	0.90	1.15	0.81	0.99	0.89	1.14	0.82	
99205, 99215	0.13	0.42	0.00	1.00	7.00	0.13	0.43	0.12	0.40	0.13	0.43	0.12	
Total Primary	2.88	2.80	2.00	6.00	187.00	2.92	2.92	2.76	2.44	2.90	2.89	2.79	
<i>p</i> -value							<i>p</i> <0.0001				<i>p</i> <0.0001		