ORIGINAL RESEARCH

Relationship Between Primary Care Physician Capacity and Usual Source of Care

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Background: **The NASEM Primary Care Report and Primary Care scorecard highlighted the importance of primary care physician (PCP) capacity and having a usual source of care (USC). However, research has found that PCP capacity and USC do not always correlate. This exploratory study compares geographic patterns and the characteristics of counties with similar rates of PCP capacity but varying rates of USC.**

Methods: **Our county-level, cross-sectional approach includes estimates from the Robert Graham Center and data from the Robert Wood Johnson County Health Rankings (CHR). We utilized conditional mapping methods to first identify US counties with the highest rates of social deprivation (SDI). Next, counties were stratified based on primary care physician (PCP) capacity and usual source of care (USC) terciles, allowing us to identify 4 types of counties: (1) High-Low (high PCP capacity, low USC); (2) High-High (high PCP capacity, high USC); (3) Low-High (low PCP capacity, high USC); and (4) Low-Low (low PCP capacity, low USC). We use *t* test to explore differences in the characteristics of counties with similar rates of primary care capacity.**

Results: **The results show clear geographic patterns: High-High counties are located primarily in the northern and northeastern US; High-Low counties are located primarily in the southwestern and southern US. Low-High counties are concentrated in the Appalachian and Great Lakes regions; Low-Low counties are concentrated in the southeastern US and Texas. Descriptive results reveal that rates of racial and ethnic minorities, the uninsured, and social deprivation are highest in counties with low rates of USC for both high PCP and low PCP areas.**

Conclusions: **Recognizing PCP shortages and improving rates of USC are key strategies for increasing access to high-quality, primary care. Targeting strategies by geographic region will allow for tailored models to improve access to and continuity of primary care. For example, we found that many of the counties with the lowest rates of USC are found in non-Medicaid expansion states (Texas, Georgia, and Florida) with high rates of uninsured populations, suggesting that expanding Medicaid and improving access to health insurance are key strategies for increasing USC in these states. (J Am Board Fam Med 2024;37:436–443.)**

Keywords: **Access to Care, Geographic Information Systems, Health Disparities, Maps, Primary Care Physicians, Primary Health Care, Workforce**

Introduction

The National Academies of Sciences, Engineering, and Medicine (NASEM) 2021 report focused on primary care described the rationale and implementation objectives for making high-quality primary care the foundation of the US health care system.[1] The 2021 NASEM report also called for the development of a national Primary Care (PC) Scorecard that would help establish relevant measures, determine benchmarks, and track progress in improving access to high-quality primary care.

Among the 5 key areas operationalized in the PC Scorecard were having a usual source of care and primary care workforce shortages.[2]

One of the primary objectives listed in the report involved improving access to high-quality primary care by ensuring that every person has a usual source of care (USC).[2] USC can be defined in different ways.[3–5] For example, the National Health

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Interview Survey (NHIS) asks about a usual place of care,[3] the Behavioral Risk factor Surveillance System (BRFSS) asks adults if they have 1 or more people they think of as their personal health care provider,[4] whereas the Medical Expenditures Panel Survey (MEPS) asks if there is a particular medical professional or place to go to if they were sick or in need of advice about his or her health.[5]

The literature supports that having a USC, particularly when the USC is specific person, contributes to better access to care,[6] fewer hospitalizations,[7] and higher rates of preventive care.[8–11] Individuals who are low-income, uninsured, or of a racial/ethnic minority are less likely to have USC, which can lead to disparities in health outcomes.[2,6,12] Rural residents are more likely to have a USC, though less likely to have physician as their USC.[13] Despite the evidence for USC improving access to care and related health outcomes, and the substantial improvements in health care access due to the Affordable Care Act, rates of USC have declined significantly over the past few decades.[2,4,14] This has also coincided with an increase in facility USC and decrease in person USC.[15]

A second well-documented barrier to achieving high-quality primary care is related to primary care workforce shortages and the maldistribution of the primary care physician (PCP) workforce across space.[2] The Association of American Medical Colleges (AAMC) projects a shortage of between 17,800 and 48,000 primary care physicians by 2034.[16] In addition to overall shortages, rural communities and areas with high rates of social deprivation experience disproportionate shortages of providers. For example, in rural areas there is an estimated 68 primary care physicians per 100,000 individuals compared with 84 per 100,000 people in urban areas in 2010.[17] Current evidence suggests that having providers in close geographic distance influences utilization and outcomes. Children living in areas with more pediatric providers had higher rates of vaccinations and among both children and for adults the number of primary care physicians within a neighborhood was positively associated with being seen by a primary care provider and having appropriate preventive care.[18–20] These findings extended beyond primary care and accessibility as higher primary care supply was associated with decreased emergency department (ED) visits and cancer mortality in some studies.[21–23] However, some work did not find any association between primary care supply and health outcomes like ED visits when controlling for other neighborhood-level factors.[24]

Despite the association of PCP capacity and having a usual source of care with positive health outcomes, research has found that PCP capacity and usual source of care do not always correlate, though much of this work has only been done at the state level.[15] For example, Kentucky has relatively high rates of USC but low rates of PCP capacity, whereas Alaska, Minnesota, and Colorado have high rates of PCP capacity but low USC. This may be because access to usual care encompasses additional, nonspatial characteristics between the provider and the patient; these characteristics include accommodation, which is when providers meet the expectations and desires or patients, and acceptability,[24] when providers are willing to take that specific type of patient. For example, in areas of high uninsured individuals, the density of providers may not be important if providers are unwilling to take uninsured or Medicaid patients.

Research is needed to better understand these geographic patterns of access to care at substate geographies. Identifying strategies for improving access to high-quality primary care will differ based on the supply of primary care physicians and rates of usual source of care, meaning that some areas will need to pursue strategies to grow their PCP capacity, whereas other areas will need to focus on ways to improve rates of USC based on other components of access, such as reducing uninsured rates. This research identifies and compares counties with similar PCP capacity but varying levels of USC. We focus only on high-need counties, defined as those in the top tercile for social deprivation (ie, counties that have the highest levels social deprivation), which has been utilized as an important measure related to access to care.[25] The results from this research will allow for targeted strategies to increase the number of primary care physicians and rates of usual source of care among socially deprived communities, that often experience high health disease burden.[26]

Methods

Data and Measures

Data for this county-level study come from a variety of sources, including from the Behavioral Risk factor Surveillance System (BRFSS),[27] the Robert Wood Johnson Foundation (RWJF) County Health Rankings (CHR),[28] and the American Community Survey (ACS).[29] Our primary measures of interest are the number of primary care physicians per

100,000 population (PCP capacity), the percentage of adults with a usual source of care (USC), and the social deprivation index (SDI).[30] We also explore descriptive statistics for several measures from the Centers for Medicare and Medicaid geographic variation public use file (PUF).[31]

This cross-sectional study utilizes conditional mapping approaches to stratify US counties by social deprivation (SDI), primary care physician (PCP) capacity, and USC terciles. Conditional mapping approaches stratify observations along vertical and/or horizontal axes by specific criteria resulting in multiple maps, where "each map shows the spatial distribution of the variable of interest, but only for those observations that fall into the associated categories of the condition variables."[32] Conditional maps, also known as micromaps,[33] have been used in health care research to highlight high-performing and priority areas in the Appalachian region.[34]

The purpose of our conditional mapping approach is to identify high social deprivation counties that are in the highest or lowest tercile (33rd percentile) for primary care capacity and usual source of care. Our first step is to stratify counties by social deprivation terciles; thus we are only looking at high-need counties, which are those in the top tercile for social deprivation (n = 1,037). Next, we focus on 4 types of counties: (1) those in the highest tercile for PCP capacity and in the lowest tercile for USC (High-Low; n = 114); (2) those in the highest tercile for PCP capacity and those in the highest tercile for USC (High-High; n = 106); (3) those in the lowest tercile for PCP capacity and in the highest tercile for USC (Low-High; n = 113); and (4) those in the lowest tercile for PCP capacity and in the lowest tercile for USC (Low-Low; n = 113). We also explore differences in counties with similar primary care capacity by using *t* test to compare High-Low counties with High-High counties and Low-High counties with Low-Low counties. All analysis were completed using GeoDa 1.20.0.22.[35]

Results

As displayed in Figure 1, the maps show clear geographic patterns. High-High Counties (high PCP capacity and high rates of USC) are located primarily in the eastern US, the Appalachian region, and in Arkansas. High-Low Counties (high PCP capacity and low rates of USC) are concentrated in the southeastern US, Texas, and in the southwestern US. Many of these counties are located in New Mexico, Arizona, Texas, along the West coast, and in Georgia and Florida. Figure 1 also displays low PCP capacity counties stratified by their rates of USC. The geographic patterns largely mirror the patterns found with high PCP capacity counties. Low-High (low PCP capacity and high rates of USC) counties are concentrated in Arkansas and the Appalachian region, particularly in Kentucky and Ohio. In contrast, Low-Low (low PCP capacity and low rates of USC) are concentrated in Texas, the southeastern US, particularly in Georgia and Florida, and South Dakota.

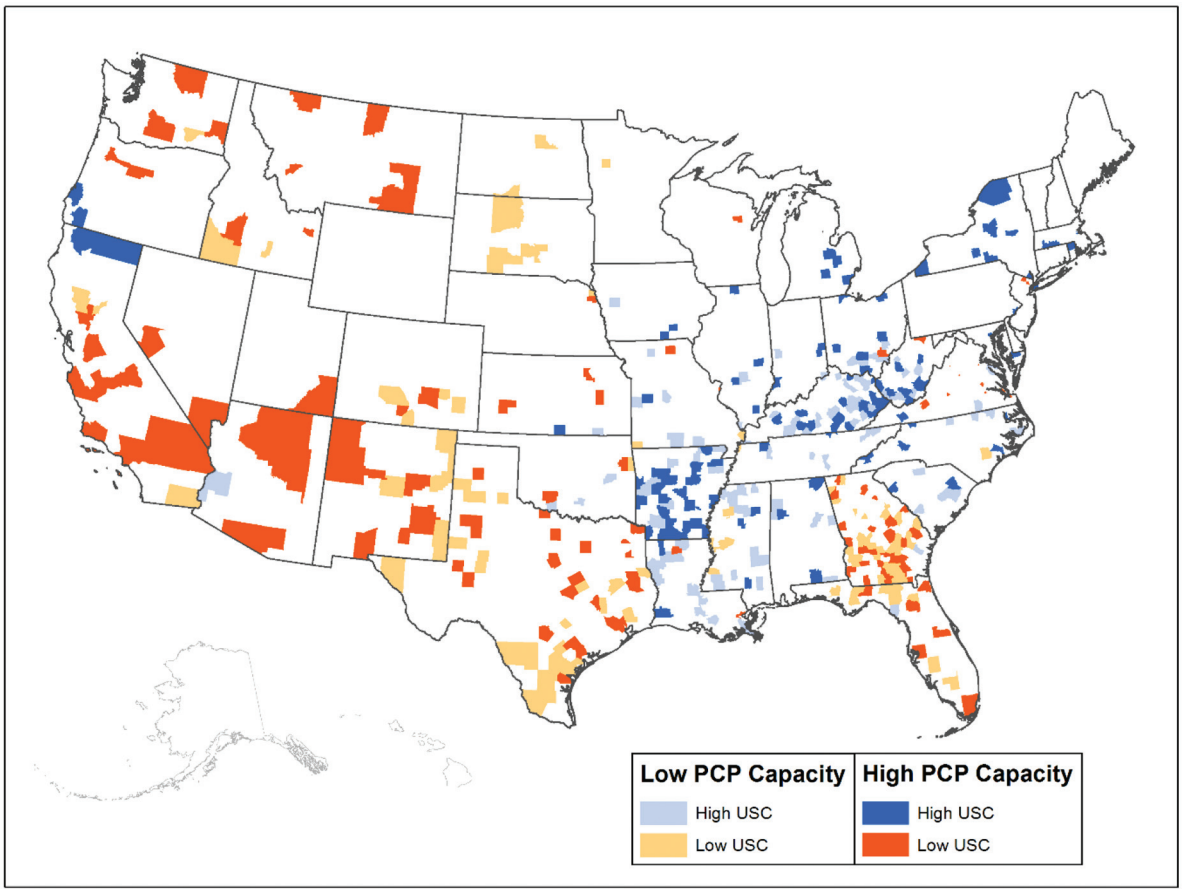
Table 1 displays the characteristics of high PCP capacity counties based on their levels of USC (High-High, High-Low). High-High counties are more likely to be in metropolitan areas and have significantly higher percentages of racial and ethnic minorities, levels of social deprivation, and uninsured populations. High-High counties are also less rural and have significantly lower smoking and diabetes rates, and significantly lower rates of Medicaid/Medicare dual-eligible populations. Further, these counties have significantly lower rates of preventable hospitalizations, emergency department visits, and visits to federally qualified health centers (FQHCs) or rural health clinics (RHCs).

Table 2 compares the characteristics of low PCP capacity counties by level of USC (Low-Low, Low-High). Similar to High-Low counties, Low-Low counties have significantly higher percentages of racial and ethnic minorities, rates of uninsured, and levels of social deprivation. These counties are primarily located in nonmetropolitan areas and their populations have significantly higher rates of morbidity (Hierarchical Condition Category [HCC] risk scores, diabetes). In comparison, Low-High counties are significantly more rural and have significantly higher smoking rates. Low-High counties also have significantly higher rates of primary care physicians, primary care providers, and family physicians, while also having significantly higher rates of visits to FQHCs/RHCs.

Discussion

It is clear from the NASEM Primary Care report and the Primary Care Scorecard that improving access to high-quality care is dependent on several factors, including increasing primary care physician (PCP) capacity and improving levels of usual source of care (USC).[1–2] This research explored the

Figure 1. Usual source of care by primary care physician capacity.



Note: This map displays high-need counties in the top and bottom tercile for primary care physician (PCP) capacity by levels of usual source of care. High USC counties are those in the top tercile for USC, while low USC counties are those in the bottom tercile for USC. High-need counties are defined as those in the top tercile for social deprivation (Robert Graham Center, 2017-2021).[30] PCP capacity is defined as the rate of primary care physicians per 100,000 population (County Health Rankings, 2023).[28] Usual source of care (USC) is defined as the percentage of adults that have one or more people they think of as their personal health care provider (Robert Graham Center, 2018).[27]

characteristics of counties with similar levels of PCP capacity but varying rates of USC, finding clear geographic and descriptive patterns for these counties. Counties with high or low rates of USC were primarily located in the same geographic region or state irrespective of levels of PCP capacity, suggesting that regional or state-level factors such as Medicaid expansion are driving levels of USC (more so than PCP capacity). Counties that have the lowest rates of USC are found in a few key states, particularly Texas, Georgia, and Florida. These states have among the highest rates of uninsured populations and none of these are Medicaid expansion states.[36] Table 1 provides some confirmation of this as low USC counties (in both low and high PCP capacity areas) have significantly higher rates of uninsured. This may suggest deficiencies in both the accommodation and affordability aspects of access to care, meaning that, despite a density of providers, uninsured patients have trouble finding a provider or cannot afford to seek care.[6–9] Further, these states, along with California and New Mexico (which also have low rates of USC) have the highest percentages of Hispanic populations, which have the lowest rates of USC compared with other racial and ethnic groups.[15] These lower rates of USC may suggest low acceptability of care among Hispanics, which includes barriers related to a lack of racial/ethnic and language concordance between patients and providers, concerns over documentation status, and other structural racism factors.[6,15,37,38] In addition, some research suggests that gains in insurance after Medicaid expansion was not as large for Hispanic individuals, which

Table 1. Characteristics of High Primary Care Physician Capacity (PCP) Counties

	All High-Need	High PCP–Low USC	High PCP–High USC
# Counties	1,037	114	106
# (%) Metro	310 (29.9%)	65 (57.0%)	39 (36.8%)
% Rural***	57.6	29.7	49.4
Race/Ethnicity			
% Black*	17.9	16.0	13.2
% Hispanic***	13.0	23.1	6.1
% Non-White***	30.3	39.3	21.7
Socio-Economic			
SDI***	80.1	83.6	75.8
Access to Care			
USC***	76.7	70.4	81.7
PCP Rate	44.8	79.0	75.5
Other PCP Rate	109.8	149.1	149.8
Family Physicians (FPs) per 100K	26.8	44.0	42.6
Hospital Beds per 100K	44,187	21,180	23,484
% Uninsured***	20.8	21.5	14.7
% Dual-Eligible***	22.9	20.8	23.5
% No Broadband	52.3	30.7	32.7
Utilization			
ACSCs Hospitalizations*	3,351	3,210	3,587
% Readmissions	17.9	17.5	18.2
ER Visits per 1000 Medicare FFS beneficiaries**	635	597	635
FQHC/RHC Visits per 1000 Medicare FFS beneficiaries***	1,399	778	1,308
Morbidity			
% Diabetes**	14.7	12.8	13.7
% Smokers***	21.5	18.3	21.0
Hierarchical Category Condition (HCC)	1.03	1.02	1.02

*p<=0.05; **p<=0.01; ***p<=0.001.
High-need counties (n = 1,307) are defined as counties in the top tercile for social deprivation.
Abbreviations: SDI, social deprivation index; USC, usual source of care.

may have resulted in differences in USC.[39] This is consistent with the literature on rates of USC for racial and ethnic disparities, as well as by insurance type, and rurality.[6,12,13] Finally, both low-PCP and high-PCP communities with a larger proportion of Black or non-White individuals experienced lower USC, suggesting that these individuals are experiencing greater barriers to care which may reflect continued consequences of structural racism. This may be because Black individuals lack trustworthy providers or live in communities where years of disinvestment have led to increased barriers to care.[40] In addition, in states that chose not to expand Medicaid, 6 in 10 individuals who would gain coverage under Medicaid are individuals of color.[41] Policies at the state level, like Medicaid expansion, or at the clinic level, like expanding language services, provide actionable ways to improve these disparities in USC.

Alternatively, we can examine the high USC counties to identify mechanisms that increase USC with or without high PCP density at the state level. For example, Medicaid expansion continues to demonstrate effects in high USC counties. High USC counties are concentrated in a few key states, including Kentucky and Arkansas, both of which were early adopters of Medicaid expansion, with research finding significant improvements in access to care after expansion.[39,42] Moreover, Table 1 shows that high PCP capacity and high USC counties have significantly higher rates of dual-eligible populations compared with high PCP capacity and low USC counties, which may be due to increases in insurance through Medicaid expansion. Although there were no significant differences in health care workforce capacity in high PCP capacity counties, the low PCP capacity counties had significant differences based on rates of primary

Table 2. Characteristics of Low Primary Care Physician (PCP) Capacity Counties

	All High-Need	Low PCP–Low USC	Low PCP–High USC
# counties	1,037	113	113
# (%) Metro	310 (29.9%)	24 (21.2%)	26 (23.0%)
% Rural	57.6	65.1	82.5
Race/Ethnicity			
% Black	17.9	18.1	14.8
% Hispanic***	13.0	28.0	3.1
% Non-White***	30.3	38.9	20.4
Socio-Economic			
SDI***	80.1	86.5	76.7
Access to Care			
USC***	23.3	69.2	81.3
PCP Rate per 100K***	44.8	13.7	17.8
Other PC Provider Rate per 100K*	109.8	69.6	82.9
Family Physicians (FPs) per 100K***	26.8	10.2	13.9
Hospital Beds per 100K*	44,187	82,872	59,498
% Uninsured***	20.8	29.1	17.4
% Dual-Eligible	22.9	26.3	25.4
% No Broadband	52.3	42.8	44.4
Utilization			
ACSCs Hospitalizations*	3,351	3,307	3,940
% Readmissions	17.9	17.4	18.4
ER Visits per 1000 Medicare FFS beneficiaries**	635	656	631
FQHC/RHC Visits per 1000 Medicare FFS beneficiaries**		1,427	1,909
Morbidity			
% Diabetes	14.7	15.8	15.6
% Smokers***	21.5	22.3	24.1
Hierarchical Category Condition (HCC)***	1.03	1.07	1.02

*p<=0.05; **p<=0.01; ***p<=0.001.
High-need counties (n = 1,307) are defined as counties in the top tercile for social deprivation.
Abbreviations: SDI, social deprivation index; USC, usual source of care; ACSCs, ambulatory care sensitive conditions; FQHC, federally qualified health centers.

care physicians, other primary care providers, and family physicians based on levels of USC. High USC counties had significantly higher rates for all provider types, while having significantly lower rates of hospital bed capacity and emergency department visits, which is consistent with the literature.[7]

One other factor that stands out in both low and high PCP capacity counties is the potential role of FQHCs and RHCs. Counties with high USC in both low and high PCP capacity counties had significantly higher rates of Medicare visits to FQHCs and RHCs. This may suggest a greater density of these types of providers in the area and could be related to changes in Medicaid expansion as evidence suggests that Medicaid is the largest source of FQHC revenue.[43] Subsequently, areas with a higher proportion of Medicaid insured individuals and fewer uninsured individuals are more likely to have a new FQHC.[44] The location of FQHC affects care as individuals who live closer to FQHCs are more likely to rely on FQHCs as a usual source of care.[45] Our work may suggest that FQHCs are an important element to ensuring access to usual care.

Although this research presents an innovative method for exploring the relationship between usual source of care and primary care physician capacity, it has a few limitations. First, the BRFSS data are self-reported and subject to recall bias, which may affect the reliability and validity of the data. Further, the phone-based BRFSS has experienced a decline in participation and has nonresponse rates (which could bias the estimates) that are higher among racial and ethnic minorities.[46] In

addition, the usual source of care measure from BRFSS does not distinguish by type of care (person, facility) and could include respondents indicating the emergency department as their usual source of care. Finally, our conditional mapping approach stratified counties by terciles; using other criteria to stratify counties could result in different results and is the subject of future research.

Ultimately, our evidence suggests that regional or state-level factors may drive access to usual care among communities with both low and high PCP availability. Our work also highlights that barriers to care remain for Black and minority individuals, suggesting that targeted solutions are needed. Future policies should work to improve access at these levels by policies such as expanding Medicaid or ensuring that services are suitable to all patients—of any language, ethnicity, or race.

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