The Supply of Primary Care Physicians[i] Across the United States

Background

The U.S. has struggled for years with a low supply of primary care physician (PCP) to meet patients' needs,[i] and some fear that the implementation of healthcare reform will exacerbate the problem.[ii] The Congressional Budget Office (CBO) estimated that the passage of the Affordable Care Act (ACA) would result in 32 million newly insured people by 2019.[iii] PCPs are typically the entry point to medical care, and with more people insured and able to access medical care there is a concern that the U.S. lacks sufficient numbers of PCPs to treat the growing patient population. One estimate claims that 4,300-7,000 additional PCPs will be needed to meet the expanding patient population[iv] while another claims the shortage could be as high as 20,400 physicians.[v] It is not only the growing number of insured that is thought to contribute to a higher demand for primary care, but also the strain of serving an aging and growing population. The Health Resources and Services Administration (HRSA) expects that 81 percent of the increase in demand for primary care can be attributed to those two population changes, with the remainder due to the growing insured population under the ACA.[v]

A second concern is that the distribution of PCPs across the country is unbalanced, with higher concentrations in urban and suburban areas compared with rural areas.[vi] I explored both the quantity and distribution of PCPs at the county-level in order to determine whether there is evidence to substantiate these two concerns.

Methods

The goals of this project were to 1) illustrate how equitable or inequitable the distribution of PCPs is across the U.S., and 2) show which counties face the greatest shortages.

HRSA's publicly available Area Health Resources File (AHRF) dataset was used to create a series of choropleth maps to illustrate both points. These data were last updated on March 31, 2015. The HRSA data was first used to understand which counties are considered to be Health Professional Shortage Areas (HPSAs). HRSA defines a HPSA as a county that has more than 3,500 patients per doctor, or more than 3,000 patients per doctor in designated "high-need" areas. The dataset contained county-level counts of PCPs and population estimates, which are presented in the top two maps. Those data were then used to calculate county-level PCP:patient ratios as seen in both the "PCP:Patient Ratio" and "2012 Health Professional Shortage Areas, by County" maps. To get the county-level PCP:patient ratios, the total population was divided by the total number of PCPs for each county, and any county with a ratio higher than 1:3,500 was labeled as a HPSA. More detail was provided in the PCP:Patient Ratio map, where three categories were created to show where there were favorable (1-1,799 patients per PCP), fair (1,800-3,500 patients per PCP), and unfavorable (>3,500 patients per PCP) PCP:patient ratios.

The dataset was then used to highlight the HPSA High-Need Areas, as presented in the penultimate map. A HPSA can be classified as having unusually high needs if it meets one or more of the following criteria: more than 20 percent of the population has incomes at or below 100% FPL, more than 100 births per year per 1,000 women ages 15-44, more than 20 infant deaths per 1,000 live births. Finally, the data were created to highlight the counties which were both persistently poor and designated as HPSA in order to explore whether there was any overlap, as seen in the final map.

Results

The two maps depicting county-level population estimates and PCP counts appear identical. Both split the data into quintiles and there are few discernible differences between them. For example, the counties with the highest population quintile appear to match the counties with the highest PCP quintile.

The next set of maps—PCP:Patient Ratio and 2012 Health Professional Shortage Areas —were created using the same data. There do not appear to be any shortages in New England and few in the western half of the country; most are concentrated in the South and Midwest. Interestingly, the high-need HPSA counties exhibit a different distribution. These areas are primarily concentrated along the South and West coasts, with a few other clusters in the Dakotas and the Midwest. In comparing this map with the PCP:patient ratio map, we can see that many of the high-need HPSA counties would not be considered HPSAs using the traditional ratio of 1:3,500, but these counties have a population with higher needs and thus need a higher than average number of PCPs to work with the patient population.

The final map overlaid the data on persistently poor counties with the HPSA data, and shows that there is a cluster of poor, HPSA counties in the South. Given their multiple disadvantages, these counties may be good places to direct resources.

Discussion

Given the strong resemblance between the first two maps—2013 Population Estimate and 2012 PCP Count—one might initially assume that the number of PCPs sufficiently covers the population in each area. However, those two maps alone do not tell the whole story; they don't tell you which counties might have higher needs due to higher infant mortality rates, higher poverty, or a higher elderly population. Breaking out those components into separate maps gives us further insight into where there is an unmet need for primary care.

Although HPSAs are spread across the country, it appears that the regions with the greatest unmet need are the South and lower-Midwest regions. These two regions exhibit the greatest prevalence of HPSAs and high-need HPSAs, persistently poor counties, and the worst PCP:patient ratios.

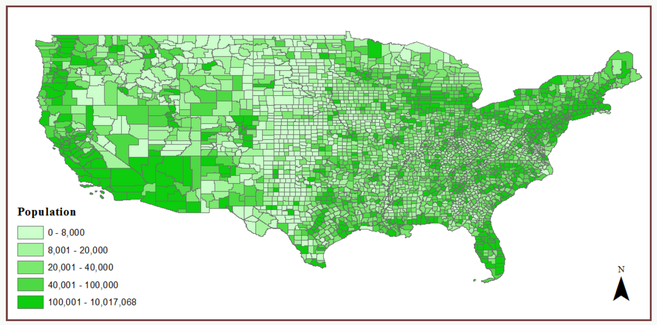
The Affordable Care Act created funding streams to expand access to primary care,[v] and these maps show where those efforts are most needed. HPSA counties, and counties with unfavorable or fair PCP:patient ratios could benefit from technology tools enabling remote medical care, and/or new care delivery strategies such as patient-centered medical homes (PCMHs). Those tools and alternative care delivery strategies could enable a more limited supply of physicians to care for a larger population, thereby expanding access to primary care in the underserved areas seen in these maps. This analysis shows which counties are in greatest need of attention and resources, and policymakers should use this analysis to help them make decisions on where to allocate resources to help expand access to primary care.

Limitations

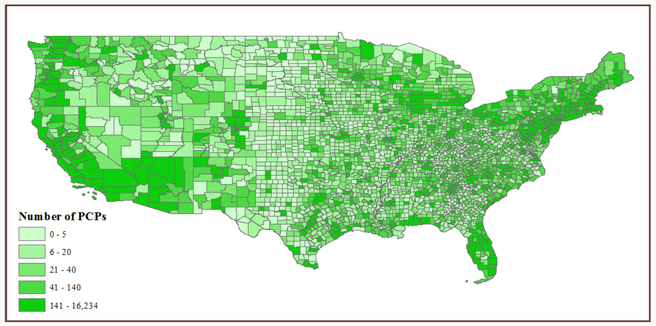
There are three important limitations to this work. First, I am not able to account for things like technology changes or changes in primary care delivery, which might make it possible for PCPs to become more efficient and work with higher patient caseloads. Second, the variable with data on the high-need HPSA areas was coded as "yes/no," which makes it impossible to show differences in the severity of a health professional shortage in the high-need areas. Finally, the American Medical Association (AMA) supplies HRSA with much of the data used in this analysis, and those data are imperfect. There is a time lag between when a physician's status changes and when it is updated in the AMA database, and some physicians choose not to respond to the AMA's request for information.

[i] Association of American Medical Colleges. 2010. The Impact of Health Care Reform on the Future Supply and Demand for Physicians Updated Projections Through 2025. Available at https://www.aamc.org/download/158076/data/updated_projections_through_2025.pdf
[ii] Gallegos A. 2014. Medical Experts Say Physician Shortage Goes Beyond Primary Care. Association of American Medical Colleges. Available at https://www.aamc.org/newsroom/reporter/february2014/370350/physician-shortage.html
[iii] Elmendorf D. 2010. H.R. 4872, Reconciliation Act of 2010. Congressional Budget Office and Staff of the Joint Committee on Taxation. Available at http://www.cbo.gov/sites/default/files/hr4872_0.pdf.
[iv] Hofer AN, Abraham JM, & Moscovice I. Expansion of coverage under the Patient Protection and Affordable Care Act and primary care utilization. *Milbank Q*. 2011;89(1):69–89.
[v] U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis. Projecting the Supply and Demand for Primary Care Practitioners Through 2020. Rockville, Maryland: U.S. Department of Health and Human Services, 2013.
[vi] Hing E, Hsiao CJ. State variability in supply of office-based primary care providers: United States, 2012. NCHS data brief, no 151. Hyattsville, MD: National Center for Health Statistics. 2014.

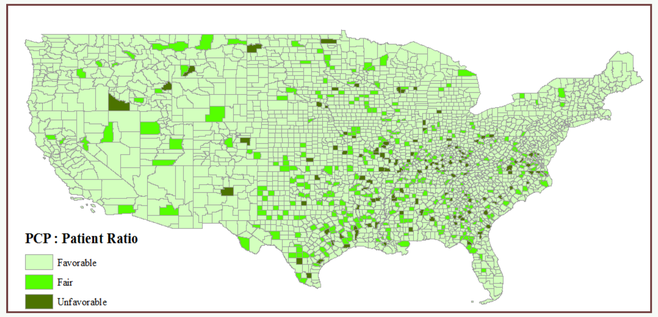
2013 Population Estimate, by County



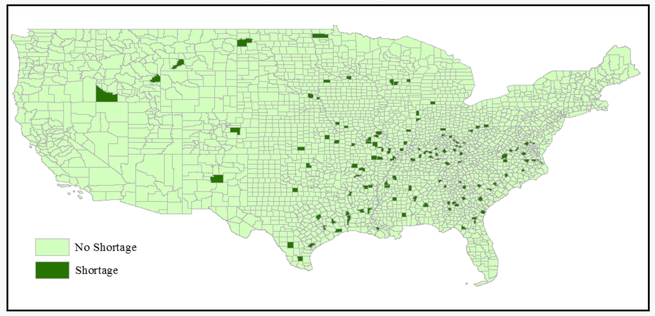
Number of PCPs in 2012, by County



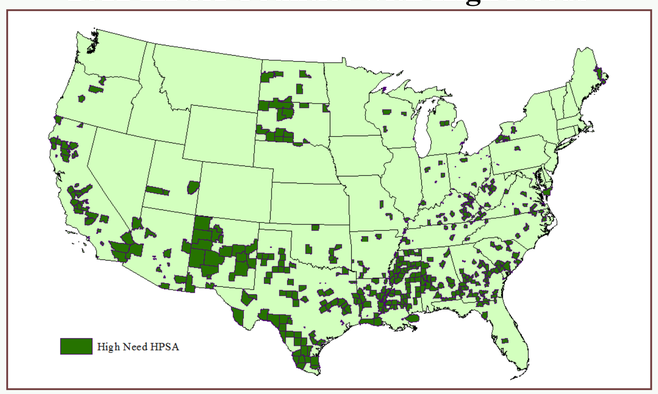
PCP : Patient Ratio



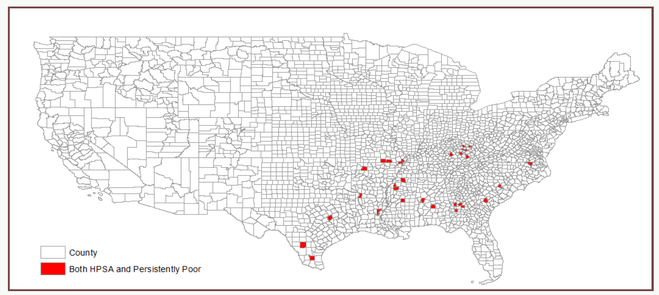
2012 Health Professional Shortage Areas, by County



2012 HPSA Counties with High Needs



Counties which were Persistently Poor and a HPSA in 2012



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Source: Health Resources and Services Administration, accessed March-April, 2015

[i] A doctor was counted as primary care physician if he/she practiced internal medicine, family medicine, or pediatrics.