Exceed Supply By More Than 10 Percent
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Seven Million Americans Live In Areas Where Demand For Primary Care May Exceed Supply By More Than 10 Percent

ABSTRACT The Affordable Care Act’s expansion of insurance coverage is expected to increase demand for primary care services. We estimate that the national increase in demand for such services will require 7,200 additional primary care providers, or 2.5 percent of the current supply. On average, that increased demand is unlikely to prove disruptive. But when we examined how this increased demand will be experienced in different areas of the country, we found considerable variability: Seven million people live in areas where the expected increase in demand for providers is greater than 10 percent of baseline supply, and forty-four million people live in areas with an expected increase in demand above 5 percent of baseline supply. These findings highlight the need to promote policies that encourage more primary care providers and community health centers to practice in areas with the greatest expected need for services.
The greater demand is likely to be manageable in most states with relatively small adjustments in the delivery system. The largest increases are estimated to occur in Texas (which has an estimated 5.3 percent increase in demand), Mississippi (4.8 percent), Nevada (4.5 percent), Idaho (4.4 percent), and Oklahoma (4.1 percent). Similarly, Leighton Ku and colleagues have observed that Georgia, Kentucky, Louisiana, Nevada, North Carolina, Oklahoma, and Texas have weak primary care capacity but are still expected to have large Medicaid expansions.

We hypothesize that the increases in demand will not be uniform across each state. Instead, it is more likely that increases will be greater than average in areas of a state with higher numbers of currently uninsured people or fewer primary care providers.

The goal of this study was to identify small areas expected to face large increases in demand for primary care services because of insurance coverage expansion, and to estimate the number of people living in such areas. Doing so will contribute to formulating policy responses, potentially including the targeting of National Health Service Corps Scholarship and Loan Repayment Program funds to those areas, or providing additional incentives through vehicles such as the Medicare Physician Bonus Payment Program.

Study Data And Methods

OVERVIEW We used primary care service areas as our small areas of analysis. These areas were originally defined by David Goodman and colleagues from Dartmouth Medical School, using Medicare claims data to reflect use patterns for primary care services. We estimated the number of uninsured in each primary care service area in 2010, the number of people expected to gain insurance following full implementation of the Affordable Care Act, and the increase in demand for primary care visits expected as a result of the increased coverage.

We then calculated how many primary care providers would be needed to meet this demand, using an estimate of average visit volume per provider. Finally, we related the new demand for primary care providers to estimates of the 2010 supply of primary care physicians, nurse practitioners, and physician assistants. In the following sections, we provide more details regarding each step of the analysis.

ESTIMATING THE NUMBER OF NEWLY INSURED PEOPLE IN PRIMARY CARE SERVICE AREAS Our uninsurance estimates at the level of the primary care service area are based on the 2007 model-based county-level Small Area Health Insurance Estimates developed by the Census Bureau. These estimates draw on the data about the nonelderly population—people under age sixty-five—collected for the March 2008 Current Population Survey annual social and economic supplement. County-level sample sizes from these data are small, however, and some counties are not sampled at all. The model-based Small Area Health Insurance Estimates use regression methods and a variety of external data to produce county-level estimates from the individual-level Current Population Survey data, with smaller confidence intervals than estimates computed directly from the Current Population Survey data.

We identified the counties associated with each primary care service area using a crosswalk file of county data to primary care service area data from the Dartmouth Atlas of Health Care. Some of the areas are entirely within a single county. For areas drawn from multiple counties, we used the crosswalk file to compute preliminary uninsurance estimates at the area level as the weighted averages of the uninsurance rates for the counties from which the areas’ populations are drawn.

These results, however, do not take account of the factors that can lead to substantial differences in uninsurance rates among primary care service areas in the same county. We therefore computed adjustment factors for median income, race and ethnicity (percentage black and percentage Hispanic), sex (percentage male), and age (percentages ages 0–17, 18–34, and 45–64) from the March 2008 Current Population Survey. The size of the adjustment factors are shown in Appendix Exhibit 1A.

The twelve primary care service areas in Chicago illustrate the differences in estimation methods (Exhibit 1). Adjusted uninsurance rates vary from 14 percent to 26 percent for the Chicago areas. We believe that these estimates are more realistic than the estimates available from the Dartmouth Atlas website, which adjust for age and sex only and consequently show a much narrower range, from 16 percent to 19 percent.

ESTIMATING THE NUMBER OF UNINSURED PEOPLE IN PRIMARY CARE SERVICE AREAS Our uninsurance estimates at the level of the primary care service area are based on the 2007 model-based county-level Small Area Health Insurance Observations from the 2003–06 Medical Expenditure Panel Surveys.
Visit frequencies to physicians, nurse practitioners, and physician assistants vary by insurance status (see Exhibit 1A in the online Appendix).\textsuperscript{12} We used those differences in visit frequency to calculate the surge in demand for services among the newly insured in 2014. We assumed that the visit rates for the newly insured would be equal to the rates for the currently privately insured, and that the baseline visit rates of the newly insured would be equal to those of the currently uninsured.\textsuperscript{15} Based on observations from the National Ambulatory Medical Care Survey, the total number of ambulatory care visits was reduced by 50 percent to reflect the estimated proportion of visits that are for primary care, in contrast to those that are for specialty care.\textsuperscript{16}

**Demand For Primary Care Providers** To transform the number of expected primary care visits into the demand for primary care providers, we inferred that the average primary care provider has 3,500 visits in a year, just as Hofer and colleagues did, based on observations from Medical Group Management Association surveys.\textsuperscript{6}

**Baseline Supply Of Primary Care Providers** Data on primary care physician supply at the level of the primary care service area came from the 2007 American Medical Association’s Physician Masterfile. We adjusted the number of primary care physicians in the file downward by 13.2 percent to fit the Department of Health and Human Services’ 2010 national estimate of these physicians (205,000) and applied this adjustment uniformly to all primary care service areas.

We estimated nurse practitioner and physician assistant supply at the primary care service area level based on the analysis of the 2010 National Plan and Provider Enumeration System Downloadable File (Stephen Petterson, Robert Graham Center, personal communication, March 30, 2011).

To estimate the number of these ancillary providers dedicated to primary care service, Robert Graham Center analysts used the co-location of these providers with physicians to assess their specialty of practice. If nurse practitioners or physician assistants worked alone or at the same address as a primary care physician, then they were identified as primary care providers. For sites where there were physicians with a mixture of specialty practices, ancillary providers were assigned the proportion of primary care full-time equivalents based on the mix of primary care physicians and specialty physicians at the site.

**Outcomes Of Interest** This study reports on the numbers of additional visits that will be made and of primary care providers who will be needed with insurance expansion at the national, state, and primary care service area levels. We also express the needed number of additional primary care providers as the proportion of the 2010 primary care provider supply, using increases above 5 percent and above 10 percent as thresholds.

To illustrate the variation that our study found among primary care service areas for a metropolitan area, we display results for Chicago.
(Exhibit 1).

**PRIMARY CARE SERVICE AREAS WITH HIGH DEMAND FOR PRIMARY CARE PROVIDERS**

Finally, we considered the characteristics of primary care service areas that had an expected increase in primary care provider demand with insurance expansion of more than 5 percent. Characteristics of interest included number of providers per 100,000 residents, median income, proportion black, and proportion Hispanic.

**LIMITATIONS** In this study the current primary care physician supply was based on the American Medical Association Masterfile, which is known to lag in tracking changes in the licensing of new physicians, the retirement of older physicians, and changes in practice specialty. These limitations could lead to inaccuracies in the estimated number of primary care providers for small areas.

This study assumed that the supply of primary care providers in an area is an important determinant of whether patients in that area have access to primary care services. From patient surveys, we know that a high concentration of primary care providers does not necessarily correlate with a greater number of visits with a personal physician or time spent with a physician.

The study findings were also based on the assumption that the relationship among patients, providers, and visit frequency will remain stable over time. However, the number of visits that patients have with a provider may change as new models of care become increasingly popular. For example, the patient medical home model may reduce visit frequency by encouraging the use of electronic communication.

A related limitation of our study is that there is considerable uncertainty regarding how much the use of primary care services will increase as uninsured people gain coverage in 2014. We assumed that the newly insured will behave like people who currently have private insurance. From the Medical Expenditure Panel Survey, we know that the privately insured have the highest level of primary care use, followed by Medicaid patients and the uninsured.

Our assumption could have led us to overestimate the primary care activity of the newly insured. However, prior research has shown that the currently uninsured have a high illness burden, which suggests that their future demand for primary care could be higher than that of people who are currently privately insured. The uncertainty surrounding the behavior of the newly insured could affect our conclusions regarding the overall expected need for primary care services and providers. Nonetheless, it is unlikely to alter our conclusions regarding the variation in expected need across primary care service areas.

This study assumes that all states will participate in the Affordable Care Act’s expansion of Medicaid eligibility. However, the Supreme Court’s June 28, 2012, decision in *National Federation of Independent Business v. Sebelius* in effect made Medicaid expansion optional for states, since the decision held that the Department of Health and Human Services cannot reduce a state’s existing Medicaid funding if the state does not participate.

If a state chooses not to participate, the overall increase in demand for primary care providers will be less than if it decided to participate. In addition, the local distribution of that increase will be affected by states’ decisions about participation.

**Study Results**

In 2010 the US population was 309 million, 270 million of whom were under sixty-five and approximately 50 million of whom were uninsured. The overall number of primary care providers was estimated to be 290,000, including 205,000 primary care physicians. The US population made an estimated 542 million primary care visits in 2010.

The US population in 2010 was spread across 5,620 primary care service areas that had at least one primary care provider (Exhibit 2). The average area had a total population of 54,021. On average, the areas had 87 primary care providers per 100,000 residents. However, that figure ranged from a low of 6 to a maximum of 1,178.

Forty-two percent of primary care service areas were designated as Health Professional Shortage Areas by the Health Resources and Services Administration in 2010. That designation serves as the foundation for determining the eligibility of health professionals in an area for programs such as the National Health Service Corps Scholarship and Loan Repayment Program.

With the anticipated expansion of coverage to twenty-nine million currently uninsured Americans, we estimated that the overall increased demand for primary care services would translate into an additional 25.7 million primary care visits (Exhibit 3). These visits would require the services of 7,200 primary care providers—a number of providers that is 2.5 percent of the 2010 supply of primary care providers, or 3.5 percent of the 2010 supply of primary care physicians.

When we examined the distribution of the effect across states, we found that the proportional need—that is, the additional percentage of the existing primary care provider supply required to serve the newly insured—ranged from
0.7 percent to 5.0 percent of the 2010 baseline provider supply for individual states (see Exhibit 2A in the Appendix). When we examined the distribution of the effect across primary care service areas, we found that the proportional need for additional primary care providers ranged from 0 to 76.0 percent, with only twelve areas having a proportional need for primary care providers of greater than 30 percent. Nearly forty-four million Americans live in primary care service areas with a proportional need of more than 5.0 percent and almost seven million live in areas with a proportional need of greater than 10.0 percent (Exhibit 3). For a listing of these areas, see Exhibit 3A in the Appendix.

At the city level, the variation in the expected need for providers can be seen across neighborhoods. In Chicago, for example, we found that the proportional increase in demand for providers ranged from 0.5 percent to 9.8 percent (Exhibit 1). The two neighborhoods with the highest expected proportional need were located in the southeast and west sides of the city. The southeast neighborhood is predominantly black (96 percent), with a median income of $34,000. The west-side neighborhood is predominantly Hispanic (63 percent), with a median income of $32,927.

The Chicago analysis provides us with some sense of the differences among primary care service areas with low, moderate, and high expected demand for primary care providers that we see at the national level. Primary care service areas with an expected need for providers above 5.0 percent had smaller populations, fewer providers per 100,000 population, lower median incomes, and higher proportions of blacks and Hispanics, compared to areas with lower expected needs (see Exhibit 5A in the Appendix).

Discussion
We forecast that the overall national increase in demand for primary care providers resulting from a substantial expansion of health insurance coverage will be relatively modest. However, forty-four million Americans live in primary care service areas that are expected to see more than a 5 percent increase in demand for primary care providers relative to baseline supply. And seven million people live in the areas that we forecast will see more than a 10 percent increase in demand.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean or number</th>
<th>SD or percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population</td>
<td>54,021</td>
<td>96,737</td>
</tr>
<tr>
<td>Population under age 65</td>
<td>47,332</td>
<td>83,043</td>
</tr>
<tr>
<td>Uninsured</td>
<td>8,759</td>
<td>19,156</td>
</tr>
<tr>
<td>Insured</td>
<td>38,572</td>
<td>68,718</td>
</tr>
<tr>
<td>Areas that are Majority HPSAs</td>
<td>2,334</td>
<td>42%</td>
</tr>
</tbody>
</table>

**PROVIDERS PER 100,000 POPULATION**

<table>
<thead>
<tr>
<th>Type of provider</th>
<th>Number</th>
<th>SD or percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary care providers</td>
<td>87</td>
<td>58</td>
</tr>
<tr>
<td>Primary care physicians (family medicine, internal medicine, pediatrics)</td>
<td>52</td>
<td>41</td>
</tr>
<tr>
<td>Primary care nurse practitioners</td>
<td>22</td>
<td>26</td>
</tr>
<tr>
<td>Primary care physician assistants</td>
<td>13</td>
<td>19</td>
</tr>
</tbody>
</table>

**Source** Authors’ analysis. **Notes** Characteristics shown are those of the 5,620 primary care service areas with at least one provider. There were 922 areas with no primary care providers at baseline; they contained 5.1 million people, or 1.7 percent of the total US population. Nurse practitioner and physician assistant data are based on 2010 National Plan and Provider Enumeration System data. A primary care service area is identified as a Majority Health Professional Shortage Area (HPSA) when more than half of the population lives in a primary care HPSA. SD is standard deviation.
The state-level findings of this study are generally consistent with prior studies examining the maldistribution of primary care of the US physician workforce.23,24 The list of states that our analysis suggests will face the largest proportional increase in demand for primary care providers is generally similar to the lists suggested by the analyses of Hofer and colleagues2 and Ku and colleagues4 (for those lists, see Exhibit 4A in the Appendix).5 However, we also found that small areas with a greater need for primary care services and providers, although concentrated in certain states, can be found in forty-seven states.

The results of this study suggest that promoting and refining policies related to the distribution of primary care providers and community health centers may be as important as policies aimed at increasing the overall supply of primary care providers. The Affordable Care Act specifically mandated that the Health Resources and Services Administration establish a new, comprehensive methodology for designating a Health Professional Shortage Area and a Medically Underserved Population (used as a basis for awarding grants to community health centers). This new methodology will play a critical role in addressing the local variation that we observed in expected provider need.

Along with federal workforce policies, state and local government health care policies might also benefit from considering these small area forecasts. For example, the forecasts could guide decisions regarding the location of county or city outpatient facilities.

Despite the limitations of our analysis and the uncertainties surrounding the full implementation of the Affordable Care Act, this study highlights the major local variation in the expected need for primary care services and providers with insurance coverage expansion. Policy decisions regarding the allocation of resources are highly complex and must account for many factors beyond the number of uninsured and the current supply of providers. Future policy research is needed to determine the implications of current and anticipated supply and demand for primary care services for decisions regarding the location of federal primary care provider service support.

The views expressed in this article are those of the authors and do not necessarily represent the views of the Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services. [Published online February 20, 2013]

NOTES

6 Hofer AN, Abraham JM, Moscove I. Expansion of coverage under the Patient Protection and Affordable Care Act and primary care utilization. Milbank Q. 2011;89(1):69–89.
7 To calculate the national percentage increase in demand for primary care physicians and providers (including nurse practitioners and physician assistants), we used national estimates of the number of primary care physicians and providers based on discussions conducted within the Department of Health and Human Services between January and May 2011.
9 Through the Physician Bonus Payment Program, Medicare provides a 10 percent bonus for services provided in Health Professional Shortage Areas.
12 To access the Appendix, click on the Appendix link in the box to the right of the article online.
13 Congressional Budget Office. Cost estimate for the amendment in the nature of a substitute for H.R. 4872, incorporating a proposed manager’s amendment made public on March 20, 2010. Washington (DC): CBO; 2010 Mar 10. To calculate the percentage insured under the Affordable Care Act, we used...
numbers from this forecast for 2016, when the law appeared to have a steady-state effect. In that year fifty-two million people are forecast to be uninsured had the Affordable Care Act not been passed. With the law, thirty million of those fifty-two million are forecast to be insured.


15 Our analysis does not account for the differential health status of the uninsured. Analyses from the Medical Expenditure Panel Survey have suggested that after age is controlled for, the uninsured are sicker than the insured. Roehrig C. Health status of the uninsured and implications for physician requirements under expanded coverage. Oral presentation at: AcademyHealth Annual Research Meeting; 2011 Jun 13; Seattle, WA.


ABOUT THE AUTHORS: ELBERT S. HUANG & KENNETH FINEGOLD

In this month’s *Health Affairs*, Elbert Huang and Kenneth Finegold report on their estimate of the need for more primary care providers as the Affordable Care Act expands health insurance coverage. Overall, the authors calculated that the national increase in demand for primary care services may require a 2.5 percent increase in the supply of providers—but they also found wide disparities across parts of the country, with as many as seven million people living in areas where the supply would have to increase by more than 10 percent. The authors write that their analysis supports the need to improve the distribution of primary care and to encourage more primary care providers and community health centers to practice in areas with the greatest expected growth in services.

Huang is an associate professor of medicine at the Pritzker School of Medicine, University of Chicago. He is also director of the Center for Translational and Policy Research of Chronic Diseases, Department of Medicine, University of Chicago, and director of the Quantitative Methods and Engagement Cores at the Chicago Center for Diabetes Translation Research. Previously, he served as a senior adviser in the Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services.

Huang’s research focuses on medical decision making for elderly patients with type 2 diabetes, for which uncertainty exists about how to best individualize diabetes treatments based on clinical parameters and patient preferences. He earned a master’s degree in public health and a medical degree from Harvard University.

Finegold is a social science analyst in the Division of Health Care Financing Policy, Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services. He works with the Centers for Medicare and Medicaid Services in implementing the Affordable Care Act’s Medicaid provisions, and he coauthored and managed the briefs on the Affordable Care Act and women, African Americans, Latinos, and Asian Americans and Pacific Islanders for that office.

At the Department of Health and Human Services, he has served as acting director of the ten-person Division of Health Care Access and Coverage, which is responsible for policy analysis and research on Medicaid; the Children’s Health Insurance Program; nongroup coverage, including Affordable Insurance Exchanges; employer-sponsored insurance; and essential health benefits. He earned a doctorate in political science from Harvard University.