

Working Paper Series
Congressional Budget Office
Washington, D.C.

Projecting Demand for the Services of Primary Care Doctors

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Working Paper 2017-03

May 2017

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The authors thank the following staff of the Congressional Budget Office: Jessica Banthin, Tom Bradley, Tamara Hayford, Lori Housman, and Lyle Nelson for their helpful comments; Linda Bilheimer, Philip Ellis (formerly of CBO), Jeffrey Kling, and David Weaver for their technical assistance and guidance; Julie Somers (formerly of CBO) for modeling assistance; Benjamin Layton for fact-checking; and Benjamin Plotinsky for editing. The authors also wish to thank Amitabh Chandra of Harvard University, Christopher Conover of Duke University, Atul Grover of the Association of American Medical Colleges, and Stephen Petterson of the Robert Graham Center for their helpful comments and suggestions.

Abstract

Policymakers and other observers have raised concerns that demand for primary care services will exceed supply, which could adversely affect people's health and might also increase total spending on health care. Defining demand as the amount of primary care that people received, we estimate that the general U.S. population demanded about \$70 billion worth of services from primary care doctors in 2013. After being adjusted for general price inflation, that represents a 15.5 percent increase since 2003—when demand totaled about \$61 billion (in 2013 dollars). We defined demand in the future as the amount of primary care physicians' services that the population (given its size, age distribution, and insurance status) would receive if the volume and intensity of services used per person grew at the same rate that they did from 2003 to 2013—and also if growth in the prices of primary care services matched economywide inflation. We expect that such demand will increase by 18.0 percent between 2013 and 2023, to about \$83 billion (also in 2013 dollars). Overall population growth accounts for about half of that increase, with population aging, gains in insurance coverage, and other sources of growth in the volume and intensity of services used per person each playing important but smaller roles. However, larger gains in health insurance coverage and more rapid population aging explain why the percentage increase in demand during the 2013–2023 period is somewhat larger than the increase during the previous decade. Whether the supply of primary care services will rise to meet the demand is unclear, but such an analysis is beyond the scope of this paper. Nevertheless, we outline a number of ways in which supply might respond to the rising demand for primary care with and without federal intervention, though we do not attempt to quantify them.

Those calculations reflect the projections of health insurance coverage that the Congressional Budget Office made in March 2016 and thus capture the effects of the Affordable Care Act that the agency expected at that time. Changes to that law, including its repeal or replacement, would yield different levels of insurance coverage and thus different effects on demand for primary care. Nonetheless, the calculations in this paper illustrate the relationship between coverage and demand and indicate which factors affecting future demand, coverage among them, are stronger and which are weaker.

Keywords: demand for health care, health insurance coverage, physician workforce, population aging, population growth, primary care

JEL Classification: I11, I18, J11

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Summary

Primary care physicians may be thought of as the doctors who are usually contacted first by patients, except in emergencies. Their responsibilities can include identifying, diagnosing, and treating a wide range of health problems; providing preventive care; ensuring continuity of care; and coordinating the care that is provided to their patients by other doctors. They therefore play an important role in determining spending on all health care, not just on primary care.

Many policymakers and other observers worry that future demand for the services of primary care doctors will significantly exceed the quantity of services that those doctors will supply, potentially limiting access to care and raising total costs. That concern is of importance to the federal government, which affects both the supply of such care and the demand for it—for example, by supporting graduate medical education to train doctors, funding health clinics that provide primary care, and providing insurance coverage through Medicare and Medicaid.

To help inform that subject, we have made fairly mechanical projections of demand for the services of primary care doctors over the 2013–2023 period. We chose that 10-year period to capture the impact of the Affordable Care Act’s (ACA’s) major provisions governing insurance coverage, most of which went into effect in 2014. We defined demand in the future as the amount of those services that the population would receive if the volume and intensity of services used per person grew at the same rate that they did from 2003 to 2013—and also if growth in the prices of primary care services matched economywide inflation.¹ In our analysis, the four key drivers of demand are the size of the population, the share of the population that is elderly, the share of the population that has health insurance, and other factors affecting the volume and intensity of primary care services used per person.² (Although we have incorporated the Congressional Budget Office’s March 2016 current-law baseline projections of population growth, aging, and health insurance coverage into our work, we refer to the projections in this paper as mechanical because they are based only on the four key drivers, not on explicit modeling of individual behavior that would affect the demand for primary care.)

We project that demand for the services of primary care doctors will rise by 18.0 percent between 2013 and 2023 (see Table 1). That increase is caused primarily by growth in the size of the population. However, larger gains in health insurance coverage and more rapid aging of the population explain why the increase is expected to be larger than the 15.5 percent rise of the previous decade.

¹ Volume refers to the number of services used in delivering health care. Intensity refers to the complexity of a service, including the length of time that it takes, the severity of the illness that it addresses, and the quantity of resources required for treatment.

² The share of the population that is elderly and the share of the population that has health insurance affect the volume and intensity of primary care services used per person. However, when this paper refers to volume and intensity used per person, those effects have been excluded.

Table 1.
Components of Past and Projected Growth in Demand for the Services of Primary Care Doctors

Component	2003–2013		2013–2023	
	Increase in Demand Attributable to Each Component	Share of the Total Increase in Demand Attributable to Each Component	Increase in Demand Attributable to Each Component	Share of the Total Increase in Demand Attributable to Each Component
Population Growth	9.0	58	8.7	48
Increase in Share of Population That Is Elderly	2.0	13	3.2	18
Gains in Health Insurance Coverage	0.1	1	2.1	12
Growth in Volume and Intensity ^a	<u>4.3</u>	<u>28</u>	<u>4.0</u>	<u>22</u>
All Components	15.5	100	18.0	100

Source: Authors' calculations.

Numbers may not add up to totals because of rounding. Each effect includes a proportional share of the interaction effects that would result from the simultaneous change of all the factors.

a. This component consists of growth in volume and intensity per person that is not accounted for by population aging or by gains in health insurance coverage.

Those calculations are based on CBO's projections of insurance coverage as of March 2016 and thus reflect the agency's estimates of the effects of the ACA on coverage at that point.³ Since March 2016, however, CBO has updated those projections of insurance coverage. Moreover, changes to the ACA, including its repeal or replacement, would yield different levels of insurance coverage and thus different effects on demand for primary care. Nevertheless, the calculations shown here illustrate the effects of coverage on demand for the services of primary care physicians and also indicate the relative importance of coverage changes and other factors that are likely to influence demand in the future. In our analysis, we have assumed that increases in the volume and intensity of services used per person that stem from sources other than aging

³ As referred to in this paper, the ACA comprises the Patient Protection and Affordable Care Act (Public Law 111-148), the health care provisions of the Health Care and Education Reconciliation Act of 2010 (P.L. 111-152), and the effects of subsequent judicial decisions, statutory modifications, and administrative actions.

and insurance coverage will be the same over the 2013–2023 period as they were in the 2003–2013 period, so that factor plays an important but similar role in the growth of demand for both periods.

Projecting drivers of demand is inherently hard, and making predictions about growth rates for volume and intensity per person is especially challenging. For example, changes in technology, methods of care delivery, and the prevalence of various diseases could influence volume and intensity but are difficult to predict. Similarly, future population growth, population aging, and insurance coverage could differ from our estimates—because of unexpected changes in the economy, demographics, or other factors. To illustrate that uncertainty, we conducted a few sensitivity tests, varying future rates of insurance coverage, how much health care would be used by people gaining coverage, and how quickly volume and intensity might increase for other reasons. Those changes affected our estimates of future demand to some extent, but our main conclusions generally hold.

Our analysis has some other limitations. We use estimates of past *spending* on the services of primary care doctors to estimate both past and future demand for those services—so to the extent that demand exceeded consumption in the past, we have understated the level of future demand. Our analysis excludes primary care provided by nonphysicians (such as nurse practitioners and physician assistants) and by doctors who are not primary care physicians; also, it includes specialty care provided by primary care physicians. And our estimates are based on survey data with relatively small samples.

Acknowledging those limitations, we estimate that total demand for the services of primary care doctors will rise from \$70.4 billion in 2013 to \$83.1 billion in 2023. (The 2023 figure is expressed in 2013 dollars and thus excludes the effects of economywide inflation.)

Whether the supply of those services will rise to meet the demand is beyond the scope of this paper. Nevertheless, we outline a number of ways in which supply might respond without federal intervention, though we do not attempt to quantify them. Prices for primary care services in the private sector or Medicaid and salaries for primary care doctors might rise, encouraging those doctors to work longer hours and also, in the long run, encouraging more medical students to enter primary care. Primary care physicians might use new models of care to serve more patients and deliver care more effectively. And greater use of telehealth might help accommodate demand in areas where primary care doctors are especially scarce.

We also outline some federal policies that might increase the supply of services from primary care doctors. Such options include paying more for primary care through Medicare or Medicaid; subsidizing more residencies in primary care; helping repay loans held by medical students who agree to pursue primary care; and making it easier for foreign doctors to practice in the United States. A full analysis of those options, however, is also beyond the scope of this paper.

The total supply of primary care could increase through providers other than doctors. Depending on states' laws, practices might rely more on nurse practitioners and physician assistants to provide primary care; similarly, the number of retail clinics, which are usually staffed by nurse practitioners and physician assistants and generally provide primary care, could grow. Federal policies also might make it easier for nurse practitioners and physician assistants to provide primary care.

A related question is whether primary care providers will be located where they are needed. Using a county-level analysis, we estimate that demand will grow more quickly in metropolitan counties than in other counties, because of faster population growth in the metropolitan counties. Like the analysis in the rest of this paper, the county-level analysis reflects CBO's March 2016 baseline projections for insurance coverage.

Past Demand for the Services of Primary Care Doctors

We estimate that the civilian noninstitutionalized population of the United States demanded about \$70.4 billion worth of services from primary care doctors in 2013, up from about \$60.9 billion (in 2013 dollars) in 2003. Those estimates of demand represent the amount that was spent on office visits to those doctors. As a result, the estimates do not include two other circumstances that might also be defined as demand for care: When people wanted to see a primary care doctor but were unable to schedule an appointment, and when people were deterred from seeking care by the cost of the services. That is, for the purposes of this analysis, we have defined demand as the number and mix of services that people are actually willing and able to obtain, given their own health, health insurance, income, and other characteristics, as well as the prices of those services. Also, because visits to primary care doctors vary in their length, intensity, and quality—and thus vary in their cost and price—we chose to measure demand using the total dollar value of the services obtained rather than the quantity of visits observed.

To generate the estimates of demand, we used data from the Medical Expenditure Panel Survey (MEPS), which provides information about medical care for a nationally representative sample of the civilian noninstitutionalized population in the United States. Specifically, we defined primary care doctors as those who practiced general and family medicine, general internal medicine, and pediatrics. We then counted all spending for the office-based visits that patients received from those doctors, according to the MEPS.

That method could yield an overestimate or an underestimate of total demand for primary care, but on balance, it probably yields an underestimate. On the one hand, our analysis overstates past demand for primary care to the extent that the physicians included in our definition also provided specialty care. Over time, the share of services provided by those doctors that represents specialty care has probably increased, because a larger share of the doctors are pursuing specialties, such as pediatric oncology. On the other hand, some primary care is provided by other types of doctors (such as obstetricians and gynecologists) and by nonphysicians (such as nurse practitioners and physician assistants)—but those providers also deliver specialty care, and

determining what share of their services constitutes primary care is difficult. We have therefore not estimated how much primary care they provide. As a result, our analysis understates total demand for primary care to the extent that such care was provided by specialists, nurse practitioners, and physician assistants. (Appendix A provides background information on the current supply of primary care physicians, nurse practitioners, and physician assistants and on the training required for those positions.)

We used the MEPS data to derive estimates of per capita demand for the services of primary care doctors in 2003 and 2013 (see Table 2). To express the 2003 estimate in 2013 dollars, we adjusted it with the price index for personal consumption expenditures (PCE price index), which indicates that overall prices grew by about 23 percent over the 2003–2013 period. We found that in 2013 dollars, per capita demand for primary care increased only slightly—from \$213 in 2003 to \$226 in 2013, for an average annual growth rate of 0.6 percent. Using the PCE price index yields figures that reflect the cost of visits to primary care doctors in terms of the other goods and services that patients must forgo. However, those figures may not reflect the true change in the quantity and mix of primary care services that were demanded because price growth for those services differed from the economywide rate of price growth—as the next part of our analysis revealed.

Table 2.
Past Per Capita Demand for the Services of Primary Care Doctors

	2003		2013
	2003 Dollars	2013 Dollars	2013 Dollars
People Younger Than 65	151	186	200
People 65 or Older	333	409	382
People of All Ages	173	213	226
Memorandum:			
PCE Price Index	n.a.	1.23	1.00

Source: Authors' calculations, which were based on the 2003 and 2013 Medical Expenditure Panel Survey (MEPS) and data from the Commerce Department's Bureau of Economic Analysis.

We express demand in 2013 dollars by using the price index for personal consumption expenditures (PCE price index).

n.a. = not applicable.

Because we wanted to estimate the effects of aging on the demand for primary care doctors, we also examined demand separately for those younger than 65 and for those 65 and older. Measured in nominal dollars, per capita demand for primary care doctors grew between 2003

and 2013 for both age groups. Once we adjusted for general price inflation, however, we found that per capita spending for the elderly fell. One reason for that finding is that payment rates for physicians under Medicare, which covers nearly all elderly people, grew very slowly over the period. The annual payment updates, which are set by law, ranged between no increase and a 2.2 percent increase; the cumulative increase over 10 years was about 6 percent, which was substantially less than the economywide rise in prices.⁴ (We return to that issue below when we consider how to project the future growth of demand.)

To generate estimates of total demand nationwide, we multiplied per capita spending (in 2013 dollars) by CBO's estimates of the civilian noninstitutionalized population. Even though CBO's population estimates for 2003 and 2013 are somewhat lower than the estimates in the MEPS, we used CBO's figures in order to generate totals that were consistent with the projections for future demand presented below—which also use CBO's population projections. We estimate that in the civilian noninstitutionalized population, demand for services from primary care doctors rose from \$60.9 billion in 2003 (in 2013 dollars) to \$70.4 billion in 2013—an increase of 15.5 percent, for an average growth rate of 1.5 percent per year. (To put those figures in context, spending on such care accounted for about 5 percent of all expenditures on personal health care over that decade.)

The past growth of demand for primary care can be explained by the same four factors that we expect to account for future growth. Those factors are the overall growth of the population; changes in the population's age composition (because the elderly use more services than the nonelderly do); changes in insurance coverage (because the insured tend to use more services than the uninsured do); and other factors affecting the volume and intensity of services used per person. Over the 2003–2013 period, population growth accounted for 58 percent of the overall increase in demand for primary care (see Table 1). The aging of the population and growth in volume and intensity per capita accounted for nearly all of the remaining growth (13 percent and 28 percent, respectively); the rate of insurance coverage did not change substantially over that period, and thus that factor had a negligible effect on demand for primary care.

⁴ Average prices for all physicians' and clinical services increased by about 19 percent over the same period; see Centers for Medicare & Medicaid Services, "National Health Expenditure Data—Historical" (accessed February 28, 2016), Table 23 in NHE Tables, <http://go.usa.gov/cznrx>. That figure reflects prices paid by Medicare and by other public and private insurers and thus implies that prices outside Medicare increased by 22 percent between 2003 and 2013. If we had adjusted the per capita amounts for 2003 by 22 percent for those under 65 and by 6 percent for those 65 and older, the adjusted values would have been \$185 and \$353, respectively. Per capita demand would therefore have increased between 2003 and 2013 for both age groups, rather than falling for the elderly. The average demand in 2003 for all ages would have been \$205 and the inflation-adjusted growth rate between 2003 and 2013 would have been about 0.9 percent per year (instead of the 0.6 percent that we calculated when using the PCE index). We also found in the MEPS data that the average number of visits to primary care doctors per capita fell over the 2003–2013 period to a similar degree for both elderly and nonelderly patients, a finding that supports the argument that past growth in per capita spending differed by age group primarily because of differences in the growth of prices. However, we were unable to estimate directly how much the volume or intensity of services per visit might have changed, which could also have differed by age group.

Future Demand for the Services of Primary Care Doctors

If current law remained generally unchanged, demand for primary care doctors would be expected to rise over the next decade because of population growth, population aging, gains in health insurance coverage resulting mostly from the ACA, and growth in the volume and intensity of services used per person. We defined future demand as the amount of primary care physicians' services that the population (given the first three of those factors) would receive if the volume and intensity of services used per person grew at the same rate that they did from 2003 to 2013—and also if growth in prices matched economywide inflation. We project that such demand would rise by 18.0 percent between 2013 and 2023; of that increase, 8.7 percentage points would be caused by a larger population, 3.2 percentage points by an older population, 2.1 percentage points by higher rates of insurance coverage, and 4.0 percentage points by other sources of growth in volume and intensity per person (see Table 1).⁵ An 18.0 percent increase over 10 years translates into \$83.1 billion in demand for the services of primary care doctors in 2023, as measured by the total dollar value of the services demanded and expressed in 2013 dollars.

Those estimates include interaction effects. For example, the effect of a growing population on demand for primary care is amplified by the fact that the population is also getting older. Similarly, the effect of increasing the share of the population that has insurance is larger because the total population is also growing. Such interaction effects represent about 5 percent of the projected change in demand for primary care between 2013 and 2023 (or 0.8 percentage points of the 18.0 percent total growth that we project). Interaction effects can be identified separately—or, as in the analysis presented here, they can be divided up and allocated among the four factors in proportion to the share of projected growth attributable to each factor.

The Centers for Medicare & Medicaid Services (CMS) projects that a broader measure, total spending on all physicians' and clinical services, will grow more than twice as fast as the 18.0 percent that we project for primary care—by about 50 percent between 2013 and 2023, after being adjusted for general price inflation.⁶ Similarly, the increase in such spending of about 30 percent between 2003 and 2013 is almost double the 15.5 percent increase in spending on the services of primary care doctors that we estimated for that decade. Both measures of spending are expected to grow faster during the later decade than during the earlier one as a result of faster population aging and larger increases in insurance coverage.

⁵ We chose that 10-year period to capture the impact of the ACA's major provisions governing insurance coverage that were projected in CBO's March 2016 baseline. In 2013, most of those provisions had not yet been implemented, so our estimates of insurance coverage in that year do not include the effects of such provisions, as our estimates of coverage in 2023 do.

⁶ See Centers for Medicare & Medicaid Services, "National Health Expenditure Data—Projected" (accessed April 5, 2017), NHE Historical and Projections 1960–2025, <http://go.usa.gov/czHbY>.

Population Growth

CBO estimates that the population of the United States will grow by 8.2 percent between 2013 and 2023, slightly more slowly than in the previous 10 years (see Table 3).⁷ By itself, that growth would lead us to estimate an 8.2 percent increase in demand for the services of primary care doctors. As we noted above, however, the effect of population growth on demand is amplified when the other drivers of demand are changing at the same time, and we have allocated the resulting interaction effects proportionally. As a result, we estimate that population growth will raise demand by 8.7 percent over the 10-year period.

Table 3.
Past and Projected Population of the United States

	2003	2013	2023	2003–2013	2013–2023
	Population (Millions) ^a			Change (Percent)	Change (Percent)
People Younger Than 65	252	269	278	6.5	3.5
People 65 or Older	34	43	60	26.5	37.5
People of All Ages	286	312	338	8.9	8.2
	Share of Population (Percent)			Change (Percentage Points)	Change (Percentage Points)
People Younger Than 65	88.0	86.1	82.3	-1.9	-3.8
People 65 or Older	12.0	13.9	17.7	1.9	3.8

Source: Congressional Budget Office.

a. The civilian noninstitutionalized population of the United States.

Population Aging

Between 2013 and 2023, the population younger than 65 is expected to grow by 9 million—or by 3.5 percent, a rate lower than the 6.5 percent observed in the previous decade (see Table 3). In contrast, because of the aging of the baby boomers, the number of elderly people is expected to grow by 16 million—or by 37.5 percent, a rate much higher than the previous decade’s 26.5 percent. As a result, the elderly will account for 18 percent of the population in 2023, an increase of nearly 4 percentage points. We also estimate that demand for primary care by the elderly will

⁷ The population estimates throughout this paper are of the civilian noninstitutionalized population.

be about 90 percent higher than demand by the nonelderly.⁸ The resulting increase in demand for primary care would be 3.0 percent; allocating the interaction effects proportionally increases that figure to 3.2 percent.

In making those projections, we assumed that per capita demand would grow at the same rate for those 65 and older and for those under 65 (holding other factors, such as rates of insurance coverage, equal). As this paper mentioned above, spending on primary care visits grew more slowly for the elderly than for the nonelderly between 2003 and 2013, but a substantial reason for that difference was that the growth of Medicare’s payment rates for doctors was held down by legislation.

Gains in Health Insurance Coverage

If current law does not change, more people will have insurance in 2023 than in 2013; mostly because of the ACA, the share of the nonelderly population that is insured is expected to rise by about 10 percentage points during that period. (CBO does not anticipate significant changes in health insurance coverage among the elderly, nearly all of whom are covered by Medicare.) And people who gain insurance coverage consume more health care than they did previously—about 40 percent more, in our assessment. The result, we estimate, will be an increase in demand for the services of primary care doctors of 2.1 percent (including interaction effects). Changes to the ACA, including its repeal or replacement, would yield different levels of insurance coverage from those projected under current law and thus different effects on the demand for primary care. But if that happened, the estimates shown here would still be useful, because the effects on demand can be scaled up or down depending on whether the gains in insurance are higher or lower than the ones used in this paper.⁹ We also tested the sensitivity of our results to different estimates of the extent of future Medicaid expansion under the ACA and of the increase in demand for primary care among those gaining insurance coverage.

Projected Increase in the Share of the Population With Insurance Coverage. In March 2016, CBO and the staff of the Joint Committee on Taxation estimated that the rate of insurance coverage among the nonelderly would increase from 80.3 percent in 2013 to 90.1 percent in 2023 (see Table 4).¹⁰ That estimate reflected the agencies’ expectations of various determinants of insurance coverage—including whether people will buy health insurance, given the types and

⁸ That estimated difference in demand between the elderly and the nonelderly is from 2013. Because the available sample from the MEPS is small, our estimates of per capita spending on primary care for nonelderly and elderly people vary substantially from year to year between 2003 and 2013, and we might have estimated a different effect of aging on demand if we had used data from a different year.

⁹ Specifically, our analysis shows that for every 1 percentage-point increase in insurance coverage, demand for primary care increases by about 0.2 percent.

¹⁰ That estimate is based on CBO’s March 2016 baseline budget projections. See Congressional Budget Office, *Federal Subsidies for Health Insurance Coverage for People Under Age 65: 2016 to 2026* (March 2016), www.cbo.gov/publication/51385.

costs of insurance available, and whether employers will offer it. The estimate also reflected the agencies' expectation that some states will not expand their Medicaid programs as the ACA allows them to and that other states that have not undertaken Medicaid expansions yet will do so over the next decade. Specifically, CBO estimated that the states that had expanded Medicaid by early 2016 accounted for about half of the population potentially eligible for that expansion, and the agency projected that the share would rise to 80 percent by 2026. If the ACA had never been enacted, economic and demographic changes would have increased insurance coverage only somewhat; most of the expected gain in coverage can therefore be attributed to the ACA. (During the previous decade, when few provisions of the ACA were in effect, the rate of insurance coverage changed by only a small amount.)

Table 4.
Past and Projected Insurance Status of the Nonelderly Population

	2003	2013	2023
Share of the Nonelderly Population (Percent)			
Insured	79.7 ^a	80.3	90.1
Uninsured	20.3 ^a	19.7	9.9
Nonelderly Population (Millions)			
Insured	201	216	251
Uninsured	<u>51</u>	<u>53</u>	<u>27</u>
Total	252	269	278

Source: Authors' calculations, which were based on data from the Congressional Budget Office's March 2016 baseline projections (calculated in collaboration with the Joint Committee on Taxation) and from the 2013 National Health Interview Survey (NHIS).

The nonelderly population is the population of noninstitutionalized civilians younger than 65 in the United States.

a. To estimate the rate of insurance coverage in 2003, we took the 3.1 percentage-point difference between the estimates by CBO and from the NHIS of the share of uninsured people in 2013 (a year when rates from both sources were available) and adjusted the NHIS's 2003 rates by that difference.

The Effect of Gaining Insurance Coverage on Health Care Use. How much health care would be used by people who gained insurance coverage? According to several studies that CBO examined in a 2008 report, people without insurance use between 50 percent and 70 percent as much health care overall as insured people with similar observable characteristics do.¹¹ Some of

¹¹ See Congressional Budget Office, *Key Issues in Analyzing Major Health Insurance Proposals* (December 2008), pp. 71–76, www.cbo.gov/publication/41746. In that analysis, CBO sought to compare the use of services by insured and uninsured people who had the same demographic characteristics and health status.

that disparity results from the very fact that the uninsured lack coverage. However, some of it results from differences in preferences or other unobservable characteristics between the insured and the uninsured—and those differences would remain even after the uninsured obtained coverage.

To determine what share of the overall difference in use stems from those factors, we relied on that 2008 review of the literature, which concluded that uninsured people who gained coverage would use between 75 percent and 95 percent as much health care as similar people who were already insured. That result would apply not only to health care in general but also to primary care specifically, we assumed for this analysis.

The midpoints of those two ranges are 60 percent and 85 percent. We therefore estimated that people gaining coverage (who are called the “newly insured” in this paper) would increase their demand for primary care from 60 percent of the amount used by the already insured to 85 percent—an increase of about 40 percent.¹²

The Effect of Gains in Insurance Coverage on the Demand for Primary Care. We estimate that the projected gains in health insurance coverage will increase demand for primary care by 2.1 percent by 2023. The calculation of that estimate is somewhat complex but can be explained as follows. We began with the projected increase in insurance coverage mentioned above: about 10 percentage points for the nonelderly population. We also found that the people gaining coverage would, before they gained it, represent about 6.5 percent of the total demand among people younger than 65. Demand among those newly insured people increases by about 40 percent, we estimate, so total demand among people under the age of 65 would rise by about 3 percent (or 40 percent of 6.5 percent). Demand by the nonelderly population represents about 75 percent of total demand for primary care, so the aggregate effect on demand would be a 2.1 percent increase (about 75 percent of 3 percent). That figure includes interaction effects, which are small.

Sensitivity of Results to Different Values for Key Parameters. Varying our expectations of how much primary care would be used by the newly insured slightly affected the expected

¹² Those relationships suggest that in 2013, per capita spending on primary care among the nonelderly was \$218 for people who would have had insurance even if the ACA had not been enacted, \$185 for the newly insured, and \$131 for the uninsured. (In 2013, there were few newly insured people, because most of the coverage provisions of the ACA had not yet taken effect.) To find those values, we began with the average spending on primary care among the nonelderly, which was \$200 in 2013 (see Table 2). That \$200 represented a weighted average of spending for the three groups. We then solved for spending among the insured by using the share of the nonelderly population in each of the three groups and the relationships in spending among the groups:

$$Spending^{insured} = \frac{\$200}{Share^{insured} + 0.60 * Share^{uninsured} + 0.85 * Share^{newly\ insured}}$$

We made the simplifying assumption that the relationships in the *use* of health care among the three groups were equal to the relationships in spending.

increase in demand for primary care. We considered a case in which the newly insured used as much primary care as did people who already had insurance (an assumption made in many other studies). In that case, the projected gains in health insurance coverage would increase demand for primary care by 3.4 percent between 2013 and 2023—about 1.3 percentage points more than in our base case. We also considered a case in which the newly insured used just 70 percent as much primary care as did people who already had insurance.¹³ In that case, gains in coverage would increase demand for primary care by 0.9 percent between 2013 and 2023—about 1.3 percentage points less than our base case.

Similarly, when we varied our projection of the share of the population living in states that would expand Medicaid, the expected increase in demand for primary care changed only slightly. Again, we considered two cases. In the first, we projected that no more states would expand Medicaid than those that had done so when CBO made its March 2016 baseline projections—that is, when about half of the potentially eligible population was living in states that had expanded Medicaid.¹⁴ In that case, 9.2 percent of the nonelderly population would gain insurance coverage by 2023, rather than the 9.8 percent of our base case, which would be equivalent to 1.7 million fewer people; as a result, demand for primary care would be 0.1 percentage points lower than in the base case. The second case, in which we projected that all states would expand Medicaid by 2023, had the opposite effect on health insurance coverage: 11.3 percent of the nonelderly population (or 4.0 million more people) would gain coverage by 2023, and demand for primary care would be 0.3 percentage points higher than in the base case.

Growth in Volume and Intensity

A factor that has driven up demand for health care generally during the past few decades is the increasing volume and intensity of services used per person; that trend also seems to have had some effect on demand for primary care. The overall upward trend itself has a variety of causes, including the emergence of new medical technologies, rising personal income, and changes in

¹³ The percentages in the scenarios were chosen to be equally distant from the 85 percent incorporated in our base case: The first is 15 percentage points above, the second 15 percentage points below.

¹⁴ See Congressional Budget Office, *Federal Subsidies for Health Insurance Coverage for People Under Age 65: 2016 to 2026* (March 2016), www.cbo.gov/publication/51385.

the population's health.¹⁵ In recent years, however, the growth of overall spending on health care has slowed, partly because the growth of volume and intensity has slowed.¹⁶

For a number of reasons, predicting how volume and intensity will evolve in the near future is hard, both for health care generally and for primary care specifically. Anticipating the progress of technology and care delivery is difficult, as is determining how much that progress might affect the demand for primary care. Furthermore, growth in volume and intensity may be dampened if the supply of physicians limits access to care. (That supply is hard to predict, and this paper has not tried to account for it.)

The Effect of Growth in Volume and Intensity on the Demand for Primary Care. In light of the uncertainties involved, we decided to adopt a simple assumption: that growth in the volume and intensity of services used per person over the next decade would match the growth observed between 2003 and 2013. To derive that rate, we started with the change in per capita spending for primary care between 2003 and 2013 and factored out the estimated effects of aging, gains in insurance coverage, and price inflation to see how much of the growth in per capita spending on primary care since 2003 remained.¹⁷ According to our calculations, that residual growth—which we attribute to increases in volume and intensity—was 3.8 percent between 2003 and 2013.

¹⁵ See Bipartisan Policy Center, *What Is Driving U.S. Health Care Spending? America's Unsustainable Health Care Cost Growth* (September 2012), <http://tinyurl.com/jfh84g6>; Sheila Smith, Joseph P. Newhouse, and Mark S. Freeland, "Income, Insurance, and Technology: Why Does Health Spending Outpace Economic Growth?" *Health Affairs*, vol. 28, no. 5 (September/October 2009), pp. 1276–1284, <http://dx.doi.org/10.1377/hlthaff.28.5.1276>; and Congressional Budget Office, *Technological Change and the Growth of Health Care Spending* (January 2008), www.cbo.gov/publication/41665.

¹⁶ Some observers attribute the slowdown in spending to economic factors and others to structural changes in the delivery of health care, both of which could affect volume and intensity. See, for example, John Holahan and Stacey McMorrow, *The Widespread Slowdown in Health Spending Growth: Implications for Future Spending Projections and the Cost of the Affordable Care Act* (Robert Wood Johnson Foundation and Urban Institute, April 2015), <http://tinyurl.com/hdul336>; Micah Hartman and others, "National Health Spending in 2013: Growth Slows, Remains in Step With the Overall Economy," *Health Affairs*, vol. 34, no. 1 (January 2015), pp. 150–160, <http://dx.doi.org/10.1377/hlthaff.2014.1107>; David Dranove, Craig Garthwaite, and Christopher Ody, "Health Spending Slowdown Is Mostly Due to Economic Factors, Not Structural Change in the Health Care Sector," *Health Affairs*, vol. 33, no. 8 (August 2014), pp. 1399–1406, <http://dx.doi.org/10.1377/hlthaff.2013.1416>; and Amitabh Chandra, Jonathan Holmes, and Jonathan Skinner, "Is This Time Different? The Slowdown in Health Care Spending," *Brookings Papers on Economic Activity* (Fall 2013), pp. 261–323, <http://tinyurl.com/zt8w5v2>. However, one recent study has found that health care spending accelerated in 2014 and 2015. See Sean P. Keehan and others, "National Health Expenditure Projections, 2015–25: Economy, Prices, and Aging Expected to Shape Spending and Enrollment," *Health Affairs*, vol. 35, no. 8 (August 2016), pp. 1522–1531, <http://dx.doi.org/10.1377/hlthaff.2016.0459>.

¹⁷ Our analysis quantifies changes in demand by considering changes in spending in constant dollars. That measure hinges on the accuracy of price growth—so if the true increase in prices for primary care is greater than the increase that the PCE deflator corrects for, our calculation will have overestimated growth in the volume and intensity of primary care services used per person, and vice versa. An alternative approach would consider changes in the number of primary care visits, rather than in spending, though that approach would account only for volume, not for intensity.

By itself, a 3.8 percent increase in the volume and intensity of primary care services used per person would raise demand for primary care by the same percentage between 2013 and 2023. Adding the portion of the interaction effects that we attribute to growth in volume and intensity brings the total increase to 4.0 percent.

Sensitivity of Results to Different Assumptions. Varying our expectations of how much the volume and intensity of primary care services used per person would grow affected the expected increase in demand for primary care. We considered a case in which volume and intensity grew by 1.9 percent, or 50 percent more slowly than during the 2003–2013 period. In that case, growth in volume and intensity would raise demand by 2.0 percent between 2013 and 2023, including the interaction effects—about 2 percentage points less than in our base case. We also considered a case in which volume and intensity grew by 5.8 percent, or 50 percent more quickly than they did between 2003 and 2013. In that case, growth in volume and intensity would raise demand by 6.1 percent between 2013 and 2023—about 2 percentage points more than in our base case.

Aggregate Effect on Demand

Between 2013 and 2023, according to our calculations, the factors just discussed would increase demand for primary care by 18.0 percent. Population growth would account for 48 percent of the growth in demand, aging for 18 percent, gains in insurance coverage for 12 percent, and the growth of volume and intensity for 22 percent (see Table 1). That projected growth rate would be higher than the 15.5 percent rate estimated for the 2003–2013 period. Population growth would affect demand largely as it did in the earlier decade, as would growth in volume and intensity, but the effects of population aging and of gains in insurance coverage would be stronger. Even so, the gains in coverage would have a relatively small effect on overall demand.

Measured in 2013 dollars, demand would rise by \$12.7 billion—from \$70.4 billion to \$83.1 billion. Part of that rise reflects an increase in the population of 26 million people (from 312 million to 338 million); the rest reflects an increase in average demand per capita of \$20 (from \$226 to \$246), which would result from population aging, gains in insurance coverage, and growth in volume and intensity. On its own—that is, if per capita demand did not change—an increase in the population of 26 million people (multiplied by the 2013 per capita demand of \$226) would increase total demand by \$5.8 billion, nearly half of the overall \$12.7 billion increase (see Table 5). Aging would account for about \$7 of the \$20 increase in per capita demand, and multiplying that \$7 by 338 million people yields an increase in total demand of \$2.3 billion. Gains in insurance coverage would further increase demand by about \$4 per capita—or by a total of \$1.5 billion when multiplied by 338 million people. Finally, growth in volume and intensity would increase per capita demand by about \$9, generating an increase in total demand of \$3.1 billion. (When making those calculations, we have allocated the interaction effects in a different way—so the shares of the total increase we have attributed to each factor differ slightly from the allocation shown in Table 1.)

Table 5.
Components of Projected Growth in Demand for the Services of Primary Care Doctors

2013 Dollars		
Component	Explanation	Increase in Demand Between 2013 and 2023 Attributable to Each Component
Population Growth	\$226 per capita for 26 million more people	\$5.8 billion
Increase in Share of Population That Is Elderly	\$7 more per capita for 338 million people	\$2.3 billion
Gains in Health Insurance Coverage	\$4 more per capita for 338 million people	\$1.5 billion
Growth in Volume and Intensity ^a	\$9 more per capita for 338 million people	<u>\$3.1 billion</u>
Total		\$12.7 billion

Source: Authors' calculations.

We express demand in 2013 dollars by using the price index for personal consumption expenditures (PCE price index). The effects in this table were computed sequentially. As a result, the interaction effects were not allocated in the same way as in Table 1, in which a proportional approach was used.

a. This component consists of growth in volume and intensity per person that is not accounted for by population aging or by gains in health insurance coverage.

Projected changes in demand for primary care over the 2013–2023 period can also be explained in terms of changes in the size of different groups of people and changes in per capita spending for those groups (see Table 6). Population growth is expected to occur both among those under age 65 and those 65 and older, but the number of uninsured people under 65 is expected to decline, mostly because of the ACA. We have assumed in our analysis that other factors causing growth in volume and intensity will affect demand among all demographic groups equally. However, per capita demand among insured people under 65 is also affected by the influx of newly insured people into that group, and we estimate that those newly insured people will demand fewer services than will those who were previously insured. As a result, the percentage increase in per capita demand for the insured population under 65 is slightly smaller than the percentage increase for the other two groups. Demand for primary care for all people under age 65 is projected to increase from \$53.8 billion to \$59.4 billion, representing 71 percent of total demand in 2023 (down from 76 percent in 2013); correspondingly, demand for those 65 or older will increase from \$16.6 billion to \$23.7 billion, accounting for 29 percent of total demand in 2023 (up from 24 percent in 2013).

Table 6.
Changes in Projected Population and in Demand for the Services of Primary Care Doctors,
by Group

Group	2013	2023	2013–2023	2013	2023	2013–2023	2013	2023	2013–2023
	Number of People (Millions)	Change (Percent)	Per Capita Demand (2013 dollars)	Change (Percent)	Total Demand (Billions of 2013 dollars)	Change (Percent)			
People Younger Than 65, Insured	216	251	16.2	217	222	2.1	46.9	55.6	18.6
People Younger Than 65, Uninsured	53	27	-48.1	131	136	3.8	6.9	3.7	-46.1
People Younger Than 65, All	269	278	3.5	200	213	6.6	53.8	59.4	10.3
People 65 or Older	<u>43</u>	<u>60</u>	37.5	382	397	3.8	<u>16.6</u>	<u>23.7</u>	42.8
Total	312	338	8.2	226	246	9.0	70.4	83.1	18.0

Source: Authors' calculations.

We express demand in 2013 dollars by using the price index for personal consumption expenditures (PCE price index).

Yet another way to examine growth in demand for primary care is to exclude the effects of population growth. Such a measure may be a more useful indicator of the challenges that rising demand could create, because population growth can also increase the number of physicians available to meet that demand. (A variety of other factors will affect the future supply of doctors, but they are beyond the scope of this analysis.) If the effects of population growth are excluded, demand for primary care would grow not by 18.0 percent but by 9.0 percent. That estimate too is larger than the corresponding estimate for the previous decade (6.0 percent). According to our estimates for the 2013–2023 period, growth in the volume and intensity of services would account for 43 percent of the increase in demand per capita, population aging would account for 34 percent, and increases in insurance coverage would account for the remaining 23 percent.

Projecting changes in demand for primary care at the national level is useful, but it may mask local differences. Those differences could be particularly important if demand grew more

quickly in places with fewer primary care providers, such as rural areas. We therefore projected demand for primary care at the county level as well (see Appendix B). In our projections, the average increase in demand for primary care between 2013 and 2023 is higher in metropolitan counties than in other counties. The reason is that population growth, the main driver of demand, is expected to be higher in metropolitan counties.

Comparison With Other Studies

Several other studies have estimated how much demand for primary care might increase in the coming decade, but the ones most comparable with ours found somewhat smaller effects. Those studies differ from each other and from our analysis in many respects, including the drivers of demand that they examine, the methods and data that they use, the age of the population that they study, the periods that they consider, and the outcome measures that they employ (for example, the number of primary care physicians or the number of visits to those physicians). Among the studies that we reviewed, we focused on four that accounted for population growth, aging, and higher rates of insurance.¹⁸ To make those studies' findings comparable with ours, we converted them to represent a 10-year period when necessary and found that they implied increases in demand ranging from 12 percent to 17 percent.¹⁹ Again, our finding is that demand would increase by 18.0 percent.

One key reason for the differences between those studies' results and ours is that those studies did not account separately for growth in the volume and intensity of services used per capita.²⁰ If we had similarly assumed no growth in volume and intensity, our estimate for the change in demand between 2013 and 2023 would have been 13.6 percent—in the range of the other studies.

Another reason the results differ is that those studies generally shared the assumption that the newly insured would use as many services as would similar people who already had private insurance. Two of the studies included the additional assumption that all states would expand

¹⁸ See Tim Dall and others, *The Complexities of Physician Supply and Demand: Projections From 2013 to 2025* (submitted by IHS Inc. to the Association of American Medical Colleges, March 2015), <http://tinyurl.com/ork8rpe> (PDF, 1 MB); Health Resources and Services Administration, National Center for Health Workforce Analysis, *Projecting the Supply and Demand for Primary Care Practitioners Through 2020* (November 2013), <http://go.usa.gov/x9JaX>; Timothy M. Dall and others, "An Aging Population and Growing Disease Burden Will Require a Large and Specialized Health Care Workforce by 2025," *Health Affairs*, vol. 32, no. 11 (November 2013), pp. 2013–2020, <http://dx.doi.org/10.1377/hlthaff.2013.0714>; and Stephen M. Petterson and others, "Projecting U.S. Primary Care Physician Workforce Needs: 2010–2025," *Annals of Family Medicine*, vol. 10, no. 6 (November/December 2012), pp. 503–509, <http://dx.doi.org/10.1370/afm.1431>.

¹⁹ The Dall studies cited in the previous footnote estimated changes to demand over 12 years (from 2013 to 2025); we converted those results to 10-year changes by multiplying them by 10/12.

²⁰ Three of the studies estimated current demand for primary care as a function of demographic characteristics, the number of chronic conditions, and smoking and obesity rates. Although changes in those measures of health over time could yield growth in volume and intensity, those studies assumed that those rates would be constant over time within demographic groups. In our analysis, that effect is included in the estimate of population growth and aging.

Medicaid. Therefore, the studies' estimates of the increase in demand for primary care resulting from gains in health insurance coverage, ranging from about 2 percent to 4 percent, tended to be larger than our estimate of 2.1 percent. If we had adopted those two assumptions, our estimate of the increase in demand stemming from gains in coverage would have been 3.9 percent.

Three other studies focused exclusively on the impact of the ACA on primary care, concluding that the law would increase primary care visits by 4 percent to 8 percent.²¹ Because of the differences in data and methods that those three studies employed, accounting for the differences between their results and ours is difficult.

Limitations of This Study

Our approach has at least four limitations. First, we rely on projections of the size of the population, the age distribution of the population, health insurance coverage, and the volume and intensity of primary care services used per person, all of which are uncertain. The projections of growth in per capita volume and intensity are particularly uncertain.

Second, our analysis focuses only on primary care physicians and thus reflects an imperfect measure of primary care services. Specifically, we define primary care services as including all office-based services provided by physicians who practice general and family medicine, general internal medicine, or pediatrics. Our analysis therefore includes services that are provided by primary care physicians but are not primary care. At the same time, it does not include primary care provided by specialist physicians or by nonphysicians. The share of primary care services provided by nonphysicians has probably increased over time (along with the supply of those providers), so the overall increase in demand for all primary care may have been larger in the past decade, and may be larger in the next decade, than we have estimated. In effect, our method incorporates the assumption that trends in the provision of primary care will allow the volume and intensity of services used per person of a given age group and a given insurance status to continue to grow at their historical rate.

Third, our method of quantifying demand for the services of primary care physicians may bias our projections downward. In particular, we use estimates of past spending to measure past demand and then use those estimates to project future demand. If past spending was lower than it would otherwise have been because of supply constraints, our estimates of past and future demand would be too low. However, if those constraints did not become tighter or looser

²¹ See Sherry Glied and Stephanie Ma, *How Will the Affordable Care Act Affect the Use of Health Care Services?* (Commonwealth Fund, February 2015), <http://tinyurl.com/hbezvt5>; Elbert S. Huang and Kenneth Finegold, "Seven Million Americans Live in Areas Where Demand for Primary Care May Exceed Supply by More Than 10 Percent," *Health Affairs*, vol. 32, no. 3 (February 2013), pp. 614–621, <http://dx.doi.org/10.1377/hlthaff.2012.0913>; and Adam N. Hofer, Jean Marie Abraham, and Ira Moscovice, "Expansion of Coverage Under the Patient Protection and Affordable Care Act and Primary Care Utilization," *The Milbank Quarterly*, vol. 89, no. 1 (March 2011), pp. 69–89, <http://dx.doi.org/10.1111/j.1468-0009.2011.00620.x>.

between 2013 and 2023, our estimates of the *growth* of past and future demand would not be biased.

Finally, limited sample sizes in the MEPS may have affected our estimates. Because of those limited sample sizes, our calculations of per capita spending on primary care by age group often fluctuate substantially from year to year.

Ways That the Supply of Primary Care Services Might Increase

Whether the supply of primary care services will be sufficient to meet the increased demand is uncertain. A frequently voiced concern is that a gap between supply and demand could affect people's health, if limited access to prevention or to timely treatment of common illnesses led to more serious health conditions; another concern is that health care spending could rise. A number of studies have found that areas with more primary care physicians per capita, or higher proportions of doctors who are primary care physicians, are ranked more highly on measures of health and in some cases have lower health care spending (at least in Medicare).²² However, those studies are not able to determine whether more primary care is the cause of those desirable outcomes. And one recent study found that the relationship between the number of primary care physicians and Medicare spending at the state level disappeared once the analysis accounted for other differences among states, such as rates of diabetes and insurance. Furthermore, the study found that spending on other health care was higher in states with more primary care doctors.²³

We do not enter that debate in this paper, but we do outline a number of ways in which supply might respond to the rising demand for primary care. (We do not attempt to quantify those increases in supply.) Primary care supplied by doctors might increase without federal intervention if:

²² See, for example, Leiyu Shi, "The Impact of Primary Care: A Focused Review," *Scientifica*, vol. 2012, <http://dx.doi.org/10.6064/2012/432892>; Chiang-Hua Chang and others, "Primary Care Physician Workforce and Medicare Beneficiaries' Health Outcomes," *JAMA*, vol. 305, no. 20 (May 25, 2011), pp. 2096–2104, <http://dx.doi.org/10.1001/jama.2011.665>; Mark W. Friedberg, Peter S. Hussey, and Eric C. Schneider, "Primary Care: A Critical Review of the Evidence on Quality and Costs of Health Care," *Health Affairs*, vol. 29, no. 5 (May 2010), pp. 766–772, <http://dx.doi.org/10.1377/hlthaff.2010.0025>; and Katherine Baicker and Amitabh Chandra, "Medicare Spending, the Physician Workforce, and Beneficiaries' Quality of Care," *Health Affairs*, published online April 2004, <http://dx.doi.org/10.1377/hlthaff.w4.184>. A more recent study that focused on Medicare beneficiaries showed that increases in primary care supply were associated with fewer deaths, fewer hospitalizations for ambulatory care sensitive conditions, and (depending on the measure of supply) fewer visits to emergency departments; see Chiang-Hua Chang, A. James O'Malley, and David C. Goodman, "Association Between Temporal Changes in Primary Care Workforce and Patient Outcomes," *Health Services Research* (June 3, 2016), <http://dx.doi.org/10.1111/1475-6773.12513>.

²³ Louise Sheiner, "Why the Geographic Variation in Health Care Spending Cannot Tell Us Much About the Efficiency or Quality of Our Health Care System," *Brookings Papers On Economic Activity* (Fall 2014), pp. 1–52, <http://tinyurl.com/jaylzs6>.

- Prices for those services in the private sector or Medicaid rose, or salaries for primary care doctors rose;
- The use of new models of care allowed doctors to serve more patients and deliver care more effectively; or
- Greater use of telehealth accommodated demand in areas where primary care doctors were especially scarce.

Federal policies that might increase the amount of primary care supplied by doctors include:

- Paying more for primary care through Medicare or Medicaid;
- Subsidizing more residencies in primary care;
- Helping repay loans held by medical students who agree to pursue primary care; and
- Reducing restrictions for foreign doctors to practice in the United States.

In addition, the total supply of primary care services could increase more quickly than it has historically if nurse practitioners and physician assistants provided more of the care that doctors currently deliver (letting doctors provide more primary care services), or if the number of retail clinics, which are usually staffed by nurse practitioners and physician assistants, grew. Those changes could happen without federal intervention. There are also federal policies that might make it easier for nurse practitioners and physician assistants to provide primary care.

Increases in the Supply of Services Provided by Primary Care Doctors That Might Occur Without Federal Intervention

As demand for primary care rises, the amount of primary care supplied by doctors might rise in response, even though the number of primary care doctors is largely fixed in the short run. Doctors might work longer hours or spend a larger share of their time on primary care, especially if prices for primary care increased. The spread of new payment and delivery models and advances in technology that facilitate the delivery of care could also lead to increases in the supply of primary care. Whether such changes (some of which are already occurring) could boost supply enough to meet the expected rise in demand is unclear, although several recent studies suggest that they could.²⁴

Price Increases. Higher demand might drive up prices for primary care and salaries for primary care doctors, encouraging them to work longer hours or to shift the mix of services that they provided from specialty to primary care. Alternatively, higher prices might encourage primary care doctors to spend less time with each patient and thus to see more patients in total. In the long

²⁴ See Linda V. Green, Sergei Savin, and Yina Lu, “Primary Care Physician Shortages Could Be Eliminated Through Use of Teams, Nonphysicians, and Electronic Communication,” *Health Affairs*, vol. 32, no. 1 (January 2013), pp. 11–19, <http://dx.doi.org/10.1377/hlthaff.2012.1086>; and David I. Auerbach and others, “Nurse-Managed Health Centers and Patient-Centered Medical Homes Could Mitigate Expected Primary Care Physician Shortage,” *Health Affairs*, vol. 32, no. 11 (November 2013), pp. 1933–1941, <http://dx.doi.org/10.1377/hlthaff.2013.0596>.

run, higher prices might also encourage more medical students to enter primary care. Although changes in federal law might be needed to increase Medicare's payment rates for primary care (as this paper discusses below), the prices negotiated by private insurers and the Medicaid fees set by state governments could increase without federal action.²⁵

New Models That Encourage Collaboration. Some new payment and delivery models emphasize greater collaboration among providers, which could increase the supply of primary care by making it more efficient, more broadly provided, and more lucrative. One prominent example of those models is the patient-centered medical home (PCMH), a type of primary care practice in which a physician leads a team of providers—such as other physicians, nurses, nutritionists, pharmacists, and social workers—who deliver and coordinate care for patients.²⁶ To the extent that such a model, because of better coordination, could provide the same value to patients with fewer hours from providers, it would allow doctors to increase their supply of services. PCMHs might also increase the supply of primary care services by using a broader mix of providers.²⁷ Insurers may offer practices an incentive to adopt the model by paying them a fee for coordinating each patient's care, although some other payment arrangements have been proposed as well.²⁸ The federal government has already established PCMH pilot programs, and it allows states to establish PCMHs for Medicaid enrollees with certain chronic conditions.

Telehealth. Telehealth (or telemedicine) refers to the remote diagnosis and treatment of patients. It could be an especially helpful way to increase the supply of primary care in areas with few primary care physicians. Medicare already pays for certain telehealth services if the beneficiary lives in a designated rural area or in a county outside a metropolitan statistical area.²⁹ The Medicaid programs in 48 states and the District of Columbia likewise pay providers for certain

²⁵ For a broader discussion, see Congressional Budget Office, *Key Issues in Analyzing Major Health Insurance Proposals* (December 2008), Chapter 5, www.cbo.gov/publication/41746.

²⁶ For more information about PCMHs, see Samuel T. Edwards and others, "Patient-Centered Medical Home Initiatives Expanded in 2009–13: Providers, Patients, and Payment Incentives Increased," *Health Affairs*, vol. 33, no. 10 (October 2014), pp. 1823–1831, <http://dx.doi.org/10.1377/hlthaff.2014.0351>.

²⁷ One study suggests that an increase in PCMHs could reduce the need for primary care physicians; see David I. Auerbach and others, "Nurse-Managed Health Centers and Patient-Centered Medical Homes Could Mitigate Expected Primary Care Physician Shortage," *Health Affairs*, vol. 32, no. 11 (November 2013), pp. 1933–1941, <http://dx.doi.org/10.1377/hlthaff.2013.0596>.

²⁸ See, for example, M. Bailit, K. Phillips, and A. Long, *Paying for the Medical Home: Payment Models to Support Patient-Centered Medical Home Transformation in the Safety Net* (Safety Net Medical Home Initiative, October 2010), www.co.fresno.ca.us/viewdocument.aspx?id=47520 (PDF, 565 KB).

²⁹ See Centers for Medicare & Medicaid Services, *Telehealth Services* (December 2015), <http://go.usa.gov/cua93> (PDF, 787 KB); and Congressional Budget Office, "Telemedicine," *CBO Blog* (July 29, 2015), www.cbo.gov/publication/50680.

telehealth services.³⁰ Private insurers have also been expanding their coverage of telehealth in an effort to improve access to care.

Federal Policies That Might Increase the Supply of Services Provided by Primary Care Doctors

There are several widely discussed policy options that the federal government could adopt to try to increase the supply of primary care and help meet the expected rise in demand. The government could boost Medicare and Medicaid payment rates for primary care; focus more federal funding of graduate medical education on primary care; expand loan repayment assistance programs; or loosen restrictions that keep many immigrant physicians from practicing in the United States.

Though we describe those options briefly below, we do not evaluate them. Still, we can point out that the timing of the options' effects on supply—which is just one of the many considerations that an evaluation of the options would have to take into account—would vary. For instance, because training new doctors takes time, shifting the focus of education funding would not change the number of primary care physicians for several years. Loosening restrictions on immigrant doctors would probably affect the workforce more quickly.

Fees Paid by Medicare and Medicaid. Medicare and Medicaid generally pay lower fees for primary care than for other services. Although that disparity is supposed to reflect differences in the complexity of the services and in the training required to provide them, the Medicare Payment Advisory Commission has suggested that Medicare's fee schedule undervalues primary care services.³¹ The disparity contributes to large discrepancies in compensation between primary care physicians and specialists. If the federal government increased payment rates for primary care services in Medicare and Medicaid, the compensation of primary care physicians would rise in relation to that of specialists, potentially increasing the number of medical school students and residents who decided to enter primary care.

Recent legislation has already increased Medicare payments to primary care providers in two ways. First, the ACA boosted Medicare payment rates for certain primary care services by 10 percent from 2011 through 2015.³² In 2012, for instance, the eligible providers received about

³⁰ See National Conference of State Legislatures, "State Coverage for Telehealth Services" (accessed March 7, 2016), <http://tinyurl.com/gnxkj2d>.

³¹ See Medicare Payment Advisory Commission, "Per Beneficiary Payment for Primary Care," in *Report to the Congress: Medicare and the Health Care Delivery System* (June 2014), <https://go.usa.gov/x5UEy> (PDF, 2 MB). Under a budget neutrality requirement in current law, Medicare's fees for primary care services could be increased, but only if fees for other services were lowered correspondingly.

³² For a description of provisions in the ACA related to primary care, see Melinda Abrams and others, *Realizing Health Reform's Potential: How the Affordable Care Act Will Strengthen Primary Care and Benefit Patients, Providers, and Payers* (Commonwealth Fund, January 2011), <http://tinyurl.com/hgno5zm>.

\$3,900, on average.³³ Second, since 2015, Medicare has paid monthly fees to doctors who manage care for patients with two or more chronic conditions, such as heart disease, diabetes, and depression.³⁴

Medicaid's fees for primary care services are particularly low. One study found that in 2012, Medicare's fees for some primary care services were about 70 percent higher than Medicaid's fees.³⁵ The ACA temporarily funded an increase in some Medicaid payment rates, requiring fees for certain primary care providers, which are generally set by states, to be at least equal to Medicare fees in 2013 and 2014.³⁶ The new requirement would increase the average Medicaid fee for primary care by about 73 percent, according to the study, and fees in some states would more than double. Although that federal increase has expired, a number of states have used their own funds to keep financing the higher fees.

Graduate Medical Education. The federal government currently supports graduate medical education by funding residencies. Of that funding, the greater part—in 2016, more than \$10 billion—flows through Medicare and Medicaid, but funding also comes through discretionary appropriations. States, private insurers, and private companies fund residencies as well, directly or indirectly.

In the past, the federal government did not specify the types of residency that it would fund; recently, however, it has begun to do so. For instance, the ACA requires a large share of Medicare-funded residency slots that are not filled at some hospitals to be redistributed to other hospitals and stipulates that most of those slots must be used for residencies in primary care or general surgery.³⁷ The ACA also provided new grants to medical and nursing schools to develop programs that try to improve the diversity, supply, and distribution of the primary care workforce. And the Veterans Access, Choice, and Accountability Act of 2014 directed the Veterans Administration to increase its number of residency positions by up to 1,500 over five years, particularly in primary care, mental health, and other specialties that the Secretary of

³³ See Medicare Payment Advisory Commission, "Per Beneficiary Payment for Primary Care," in *Report to the Congress: Medicare and the Health Care Delivery System* (June 2014), <https://go.usa.gov/x5UEy> (PDF, 2 MB).

³⁴ Centers for Medicare & Medicaid Services, "Policy and Payment Changes to the Medicare Physician Fee Schedule for 2015" (October 31, 2014), <http://go.usa.gov/cuadd>. According to the 2016 fee schedule, those fees range from about \$32 to \$41, depending on the site of care.

³⁵ See Stephen Zuckerman and Dana Goin, *How Much Will Medicaid Physician Fees for Primary Care Rise in 2013? Evidence From a 2012 Survey of Medicaid Physician Fees* (Kaiser Family Foundation, December 2012), <http://tinyurl.com/zcn43dk>.

³⁶ See Melinda Abrams and others, *Realizing Health Reform's Potential: How the Affordable Care Act Will Strengthen Primary Care and Benefit Patients, Providers, and Payers* (Commonwealth Fund, January 2011), <http://tinyurl.com/hgno5zm>.

³⁷ See Elayne J. Heisler, *Physician Supply and the Affordable Care Act*, Report for Congress R42029 (Congressional Research Service, January 2013).

Veterans Affairs deemed appropriate.³⁸ Further steps like those would help increase the supply of primary care doctors.

Loan Repayment Assistance. The federal government already finances a number of loans and scholarship programs to encourage medical students to practice primary care. For example, the Primary Care Loan program provides long-term, low-interest-rate loans to full-time medical students who demonstrate financial need; those students must agree to complete a primary care residency within four years of graduation and to practice primary care for the life of the loan.³⁹ And the National Health Service Corps offers loan repayment assistance to licensed primary care providers who serve in places designated as health professional shortage areas.⁴⁰ To further expand the pool of primary care physicians, the government might offer such assistance to more providers who entered primary care or place fewer restrictions on where they worked.

Immigration. Foreign-trained physicians account for about one-fourth of active doctors in the United States, but they must fulfill a range of requirements in order to practice here.⁴¹ They must complete a residency program in the United States or Canada to be licensed to practice (just as domestically trained physicians must). To enter such a residency, they must first obtain certification through the Educational Commission for Foreign Medical Graduates. If they are not U.S. citizens, they must also obtain a visa and may still face restrictions on their subsequent ability to practice in the United States. For instance, the J-1 visa requires holders, unless they obtain a waiver, to return to their country for two years once they complete a residency. An alternative is the H-1B visa for temporary workers in specialty occupations, but it is difficult to obtain—the total number of such visas is capped—and allows holders to remain in the United States for no more than six years.⁴² And those seeking employment-based permanent resident visas (also known as green cards) may face long delays, because there are caps on the number of such visas granted to immigrants from each country.

Several proposals have sought to ease some of those restrictions. Examples include permanently reauthorizing a program that allows each state to grant 30 waivers of the J-1 visa's two-year out-of-country requirement; increasing the number of those waivers; exempting physicians from the

³⁸ See Department of Veterans Affairs, “Veterans Access, Choice and Accountability Act of 2014” (accessed February 11, 2016), <http://go.usa.gov/cur3G> (PDF, 329 KB).

³⁹ For more information, see Health Resources and Services Administration, “Primary Care Loans” (accessed June 1, 2016), <http://go.usa.gov/curx9>.

⁴⁰ For more information, see Health Resources and Services Administration, “National Health Service Corps” (accessed March 29, 2017), <https://bhwhrsa.gov/loansscholarships/nhsc>.

⁴¹ For more information, see American Medical Association, “International Medical Graduates” (accessed February 20, 2017), <http://tinyurl.com/jdou53p>.

⁴² Physicians who work at academic institutions and at government or nonprofit research institutes are exempt from the H-1B cap.

caps on employment-based green cards; and allowing foreign-trained physicians to become eligible for green cards if they serve for five years in an area with few doctors.⁴³ Such steps would increase the supply of primary care physicians.

Increases in the Supply of Services Not Provided by Primary Care Doctors That Might Occur Without Federal Intervention

About half of all physician assistants and nurse practitioners practice primary care; they could assume larger roles, thereby increasing the total supply of such care. (Appendix A further examines the number of physician assistants and nurse practitioners who specialize in primary care, their required training, and their scope of practice.) One study has found that a primary care doctor can care for more patients if certain preventive and chronic care services are delegated to nonphysicians.⁴⁴ Another has found that, in response to expansions in Medicaid coverage that increased demand for dental services, dentists used hygienists more, a step that allowed the dentists to see more patients.⁴⁵

Retail clinics and other nurse-managed health centers could also increase the provision of primary care, thus limiting the need for more primary care physicians.⁴⁶ A few studies indicate that greater use of retail clinics and nonphysicians may increase total use of health care, in part because more tests are ordered and more patients are referred to specialists for follow-up care.⁴⁷ On net, however, they probably help supply meet demand for primary care.

⁴³ Two recent bills containing some of those proposals are the Conrad State 30 and Physician Access Act, S. 1189, 114th Cong. (2015), and the Doctors Helping Heroes Act of 2015, H.R. 1272, 114th Cong.

⁴⁴ Justin Altschuler and others, “Estimating a Reasonable Patient Panel Size for Primary Care Physicians With Team-Based Task Delegation,” *Annals of Family Medicine*, vol. 10, no. 5 (September/October 2012), pp. 396–400, <http://dx.doi.org/10.1370/afm.1400>.

⁴⁵ Thomas C. Buchmueller and others, *How Do Providers Respond to Public Health Insurance Expansions? Evidence From Adult Medicaid Dental Benefits*, Working Paper 20053 (National Bureau of Economic Research, April 2014), www.nber.org/papers/w20053.

⁴⁶ Some states’ scope-of-practice laws limit the services that nonphysicians can provide on their own, however. For an overview of such policies, see Tracy Yee and others, *Primary Care Workforce Shortages: Nurse Practitioner Scope-of-Practice Laws and Payment Policies*, Research Brief 13 (National Institute for Health Care Reform, February 2013), <http://tinyurl.com/zawuhxc>.

⁴⁷ Alnoor Hemani and others, “A Comparison of Resource Utilization in Nurse Practitioners and Physicians,” *Effective Clinical Practice*, vol. 2, no. 6 (November/December 1999), pp. 258–265, <http://ecp.acponline.org/novdec99/hemani.pdf> (97 KB); Danny R. Hughes, Miao Jiang, and Richard Duszak, Jr., “A Comparison of Diagnostic Imaging Ordering Patterns Between Advanced Practice Clinicians and Primary Care Physicians Following Office-Based Evaluation and Management Visits,” *JAMA Internal Medicine*, vol. 175, no. 1 (January 2015), pp. 101–107, <http://dx.doi.org/10.1001/jamainternmed.2014.6349>; and J. Scott Ashwood and others, “Retail Clinic Visits for Low-Acuity Conditions Increase Utilization and Spending,” *Health Affairs*, vol. 35, no. 3 (March 2016), pp. 449–455, <http://dx.doi.org/10.1377/hlthaff.2015.0995>.

Federal Policies That Might Increase the Supply of Services Not Provided by Primary Care Doctors

Payment policies in federal health care programs make it more difficult for nurse practitioners and physician assistants to provide primary care to enrollees.⁴⁸ For example, Medicare will not pay for home health care or durable medical equipment that a nurse practitioner has ordered for a patient, even if that nurse practitioner is the patient's sole provider of primary care. Moreover, Medicare generally pays nurse practitioners 85 percent of the fee that a physician would receive for the same service. Changing such payment policies could expand the role played by nurse practitioners and physician assistants. It could also spur private plans, which often place similar limits on nonphysicians' authority, to adjust their own payment policies.

Scope-of-practice laws, which explicitly limit the activities of nurse practitioners and physician assistants, are generally set at the state level. In certain circumstances, however, federal programs are exempt from those laws. For instance, at Medicare-certified rural health clinics, nurse practitioners are given the same scope of practice that physicians have and are paid at the same rate. Increasing the number of such arrangements, or more broadly overriding state scope-of-practice laws, could boost the supply of primary care to help meet the expected increase in demand.

⁴⁸ For an overview of such policies, see Tracy Yee and others, *Primary Care Workforce Shortages: Nurse Practitioner Scope-of-Practice Laws and Payment Policies*, Research Brief 13 (National Institute for Health Care Reform, February 2013), <http://tinyurl.com/zawuhxc>.

Appendix A: Background on the Supply of Primary Care

This appendix offers background information on the current supply of primary care providers and on the path to becoming a primary care provider.

The Primary Care Workforce

In 2013, about 280,000 physicians practiced primary care—specifically, general and family medicine, general internal medicine, and pediatrics.¹ That number represented about a third of all active doctors, a share that had been stable for the previous two decades. However, the share of active physicians who were in primary care subspecialties (for example, pediatric cardiology) increased over the same period, from 5 percent in 1990 to 10 percent in 2013, probably lowering the amount of primary care services provided by all primary care doctors.

About 56,000 nurse practitioners and 30,000 physician assistants were practicing primary care in 2010.² As of 2017, scope-of-practice laws in 22 states and the District of Columbia allowed nurse practitioners to diagnose patients, treat them, and prescribe medication without a supervising physician; another 16 states allowed nurse practitioners to perform only some of those activities without a supervising physician.³ Physician assistants, by contrast, are required in all states to practice medicine under the supervision of a licensed physician.

Primary care physicians are not evenly distributed across the country or within states. Their distribution partly reflects the distribution of the population as a whole but differs from it in some respects. Primary care physicians are most heavily concentrated, in relation to the population, in the mid-Atlantic states and the Northeast, and they mostly practice in urban areas. However, they are more likely to work in rural areas than specialists are, just as primary care nurse practitioners and physician assistants are more likely to work in rural areas than primary care physicians are.⁴

As of January 2017, the Health Resources and Services Administration had designated 6,626 areas as health professional shortage areas (HPSAs) for primary care; those areas contained

¹ That number is based on calculations from National Center for Health Statistics, *Health, United States, 2015*, DHHS Publication 2016-1232 (May 2016), Table 85, www.cdc.gov/nchs/data/abus/abus15.pdf (13 MB).

² Those figures represent about half of all the nurse practitioners and physician assistants practicing medicine in 2010. See Agency for Healthcare Research and Quality, *The Number of Nurse Practitioners and Physician Assistants Practicing Primary Care in the United States*, AHRQ Publication 12-P001-3-EF (October 2011), <http://go.usa.gov/curFH>.

³ See American Association of Nurse Practitioners, “State Practice Environment” (accessed March 21, 2017), <http://tinyurl.com/hu9ye4z>.

⁴ See Agency for Healthcare Research and Quality, *Distribution of the U.S. Primary Care Workforce*, AHRQ Publication 12-P001-4-EF (January 2012), <http://go.usa.gov/curJ4>.

about a fifth of the U.S. population.⁵ In such areas, there are generally more than 3,500 people per primary care physician.

Primary Care Education and Training

The process of educating and training new physicians is long. After getting a four-year college degree, usually with a pre-med or related major, a prospective primary care physician generally spends four years in medical school and then enrolls in a three-year residency program. (Residency programs for specialists tend to be longer; some last up to seven years.)

In 2015, there were almost 43,000 physicians in primary care residencies, which accounted for about 35 percent of all residencies.⁶ Those figures have been stable over the past few years. Between 1998 and 2005, however, the number of internal medicine residents who decided that they would proceed to practice regular primary care rather than a primary care subspecialty fell.⁷ More recently, graduating medical students who are about to begin primary care residencies have indicated in surveys that they are somewhat less likely to pursue subspecialties afterward than their predecessors were.⁸ Also in 2015, graduates of foreign medical schools held about one-third of primary care residencies.

Surveys have found that a new doctor's choice of specialty is determined by many factors, including the doctor's expectations about income.⁹ A doctor seeking high income might well be deterred from choosing primary care, which pays less than half of what some specialists earn, on average. According to one recent survey, doctors specializing in family medicine, pediatrics, and internal medicine were near the bottom of the physicians' compensation distribution in 2016, earning between \$204,000 and \$222,000; orthopedists were at the top, earning \$443,000; and most other specialties fell in between.¹⁰

⁵ See Health Resources and Services Administration, "Preformatted Reports—Shortage Areas, Health Professional Shortage Area (HPSA)—Detail Primary Medical Care—Designated HPSA Statistics" (accessed March 21, 2017), <https://go.usa.gov/x5UpC>.

⁶ See Sarah E. Brotherton and Sylvia I. Etzel, "Graduate Medical Education, 2015–2016," *The Journal of the American Medical Association*, vol. 316, no. 21 (December 6, 2016), pp. 2291–2310, <http://dx.doi.org/10.1001/jama.2016.13513>.

⁷ See Thomas Bodenheimer, "Primary Care—Will It Survive?" *The New England Journal of Medicine*, vol. 355, no. 9 (August 31, 2006), pp. 861–864, <http://dx.doi.org/10.1056/NEJMp068155>.

⁸ See Association of American Medical Colleges, *Medical School Graduation Questionnaire: 2014 All Schools Summary Report* (July 2014), <http://tinyurl.com/gokvw4u> (PDF, 178 KB).

⁹ See Robert Graham Center, *Specialty and Geographic Distribution of the Physician Workforce: What Influences Medical Student and Resident Choices?* (March 2009), p. 34, <http://tinyurl.com/goqft3c> (PDF, 589 KB).

¹⁰ See Carol Peckham, *Medscape Physician Compensation Report 2016* (Medscape, April 2016), <https://tinyurl.com/ko9lla6>. A similar gap is reported in Merritt Hawkins, *2016 Review of Physician and Advanced Practitioner Recruiting Incentives* (2016), <https://tinyurl.com/lyp7or6> (PDF, 1.5 MB).

Another factor that probably influences a doctor's choice of medical specialty is the size of his or her outstanding student loans, although studies differ about how large a role those loans play.¹¹ According to one survey, the relationship may be surprising: residents with high debt are *more* inclined than other residents to pursue primary care.¹² That may be because primary care residencies tend to be shorter than other residencies, allowing residents to finish their training, start earning higher salaries, and pay off their debt more quickly. In any case, one recent study showed that physicians' debt typically equals only a modest share of their income, regardless of their specialty.¹³

Becoming a physician assistant or a nurse practitioner takes less time than becoming a primary care physician does. To become a physician assistant, one must get a bachelor's degree (usually with a pre-med or related major), complete a three-year master's program, pass the Physician Assistant National Certifying Exam, and get a state license. Physician assistants may continue their training and specialize in such fields as emergency medicine, surgery, and acute care.¹⁴ To become a nurse practitioner, a student must become a registered nurse through a bachelor's or vocational training program, complete a two-year master's program in nursing, pass a national certification examination, and get a state license. Nurse practitioners too may specialize, becoming acute care nurse practitioners or clinical nurse specialists, for example.¹⁵ In 2015, the average annual compensation for physician assistants and nurse practitioners was about \$100,000.¹⁶

¹¹ See, for example, James Rohlfing and others, "Medical Student Debt and Major Life Choices Other Than Specialty," *Medical Education Online*, vol. 19 (November 2014), <http://dx.doi.org/10.3402/meo.v19.25603>; Julie P. Phillips and others, "Medical Student Debt and Primary Care Specialty Intentions," *Family Medicine*, vol. 42, no. 9 (October 2010), pp. 616–622, <http://tinyurl.com/jjx3xz2> (PDF, 447 KB); Robert Graham Center, *Specialty and Geographic Distribution of the Physician Workforce: What Influences Medical Student and Resident Choices?* (March 2009), <http://tinyurl.com/goqft3c> (PDF, 589 KB); and Marc J. Kahn and others, "Is Medical Student Choice of a Primary Care Residency Influenced by Debt?" *Medscape General Medicine*, vol. 8, no. 4 (2006), <http://tinyurl.com/h4mbmc5>.

¹² Andrew K. Diehl and others, "Predictors of Final Specialty Choice by Internal Medicine Residents," *Journal of General Internal Medicine*, vol. 21, no. 10 (October 2006), pp. 1045–1049, <http://dx.doi.org/10.1111%2Fj.1525-1497.2006.00556.x>.

¹³ James A. Youngclaus and others, "Can Medical Students Afford to Choose Primary Care? An Economic Analysis of Physician Education Debt Repayment," *Academic Medicine*, vol. 88, no. 1 (January 2013), pp. 16–25, <http://dx.doi.org/10.1097/ACM.0b013e318277a7df>.

¹⁴ See American Academy of Physician Assistants, "Become a PA" (accessed June 1, 2016), www.aapa.org/Become-a-PA/.

¹⁵ See American Association of Nurse Practitioners, "FAQs" (accessed June 1, 2016), www.aanp.org/education/faqs.

¹⁶ See Bureau of Labor Statistics, "Occupational Employment and Wages, May 2015" (accessed June 1, 2016), www.bls.gov/oes/current/oes291171.htm and www.bls.gov/oes/current/oes291071.htm.

Appendix B: Local Growth in Demand

In the main body of this paper, we project changes in demand for primary care at the national level. However, analyses at the county level present a more nuanced picture, and current data about counties are relatively easy to obtain in most cases.¹ In this appendix, therefore, we examine the extent to which changes in demand might vary among counties.

Specifically, we calculated changes in future demand for counties of three kinds: those in metropolitan areas, those adjacent to metropolitan areas, and those in rural areas. The nine rural-urban continuum codes established by the Department of Agriculture (USDA) distinguish counties on the basis of whether they belong to a metropolitan area (as defined by the Office of Management and Budget), whether they are adjacent to a metropolitan area, and the size of their urban populations.² For the sake of simplicity, we chose to ignore that last criterion and to classify counties only according to their metropolitan status and their adjacency to metropolitan areas. The first of our groups, which we call “metropolitan,” consists of counties within metropolitan areas (that is, those to which the USDA has assigned codes 1, 2, and 3).³ The second, which we call “adjacent,” consists of counties that are not in metropolitan areas but are adjacent to them (those with codes 4, 6, and 8). The third, “rural,” consists of counties that are neither metropolitan nor adjacent to metropolitan areas (those with codes 5, 7, and 9). Although each group contains about one-third of all counties, the U.S. population is heavily concentrated in the first group: In 2013, 85 percent of the population lived in metropolitan counties, 10 percent in adjacent counties, and 5 percent in rural counties.

We estimate that between 2013 and 2023, demand for primary care will increase by about 19.2 percent in metropolitan counties, 11.0 percent in adjacent counties, and 10.8 percent in rural counties. (Because metropolitan counties contain so much of the population, the changes in those counties have an outsize effect on the national average.) The differences between those rates of growth in demand would be driven by the same four factors discussed in the body of the paper:

¹ County-level analysis is not perfect. In some areas, people often travel across county lines to receive primary care; in others, counties are so large or hard to traverse that people seldom travel across them. As a result, what county-level analysis reveals about demand for primary care may not apply precisely to all parts of a given county.

² For more information about the codes, see Department of Agriculture, “Rural-Urban Continuum Codes” (May 2013), <http://go.usa.gov/cu8YT>. For more information about the Office of Management and Budget’s definitions, see Office of Management and Budget, *Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas, and Combined Statistical Areas, and Guidance on Uses of the Delineations of These Areas*, Bulletin 13-01 (February 2013), <https://go.usa.gov/x5E8r> (PDF, 5 MB).

³ In general, populous urban and suburban counties are part of metropolitan areas and would therefore be classified as metropolitan in this paper. For example, the Washington, DC, metropolitan area comprises Calvert, Charles, Frederick, Montgomery, and Prince George’s Counties in Maryland; Arlington, Clarke, Fairfax, Fauquier, Loudoun, Prince William, Spotsylvania, Stafford, and Warren Counties in Virginia; and Jefferson County in West Virginia, as well as the District of Columbia and the cities of Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, and Manassas Park in Virginia.

population growth, population aging, gains in insurance coverage, and growth in the volume and intensity of primary care services used per person. The main reason for the metropolitan counties' higher growth in demand is their higher projected population growth. Aging is projected to increase demand more in adjacent or rural counties than in metropolitan ones; gains in insurance coverage, by contrast, will have a similar effect on demand in all three types of counties, as will growth in volume and intensity.⁴

Population Growth and Aging by County Type

The Congressional Budget Office projects that the noninstitutionalized U.S. population will grow by about 8.2 percent between 2013 and 2023, from 312 million people to 338 million. However, the agency does not project population at the state or county level, and neither does the Census Bureau. We therefore set out to construct county-level population estimates that were consistent with CBO's national figure.

First, we generated state-level estimates of the elderly and nonelderly populations in 2023. To do that, we used estimates of the states' 2010, 2020, and 2030 populations by the Weldon Cooper Center for Public Service at the University of Virginia.⁵ Those estimates take into account state-level trends in birth, death, and migration rates over the past 30 years. We used the estimates to derive growth rates between 2013 and 2023 for each state's elderly and nonelderly populations, and we applied those growth rates to the states' 2013 populations.⁶ (We derived separate growth rates for the elderly and nonelderly populations because the elderly tend to use more primary care.) We adjusted the results by a constant factor to maintain consistency with CBO's estimates of the elderly, nonelderly, and total national populations.

We then generated the county-level population projections by taking each county's 2013 population, according to the Census Bureau, and applying that county's growth rate over the 2003–2013 period to the 2013–2023 period.⁷ The resulting county-level population projections are thus based on the assumption that recent trends will persist through 2023. That step was done separately for the elderly and nonelderly populations. Finally, we adjusted those population projections by a constant factor for each state to maintain consistency with the state population projections that we had already estimated.

⁴ As in the rest of the paper, those calculations reflect the projections of health insurance coverage that the Congressional Budget Office made in March 2016 and thus capture the effects of the Affordable Care Act that the agency expected at that time. Changes to that law, including its repeal or replacement, would yield different levels of insurance coverage and thus different effects on demand for primary care.

⁵ See Weldon Cooper Center for Public Service, "National Population Projections" (May 2016; accessed April 27, 2017), <http://tinyurl.com/hpu39av>.

⁶ We also created state-level population projections on the basis of each state's growth rate between 2003 and 2012. The resulting projections were similar.

⁷ See Census Bureau, cc-est2015-alldata.csv (accessed May 4, 2017), <https://go.usa.gov/x5fKG>.

According to our county-level projections, population growth between 2013 and 2023 will average 9.5 percent in metropolitan counties, 0.9 percent in adjacent counties, and 1.0 percent in rural counties—but with significant variation in each category (see Table B-1). Among all counties, those in the 10th percentile of projected population growth are projected to shrink by 8.3 percent, and those in the 90th percentile are projected to grow by 14.5 percent. Also, although the share of the population that is elderly will increase, on average, in all three types of counties, the increase will be smaller in metropolitan counties than in rural and adjacent ones.

Table B-1.
Past and Projected Population of the United States, by Type of County

Type of County	Number of Counties	2013		2023		2013–2023	
		Population (Millions) ^a		Change (Percent)	Change, 10th Percentile (Percent)	Change, 90th Percentile (Percent)	
Metropolitan	1,166 ^b	266	292	9.5	-4.1	22.0	
Adjacent	1,027	30	30	0.9	-8.8	8.7	
Rural	<u>949</u>	<u>16</u>	<u>16</u>	1.0	-10.4	9.3	
All	3,142	312	338	8.2	-8.3	14.5	

Source: Authors’ calculations, which were based on data from the Census Bureau, the Congressional Budget Office, and the Weldon Cooper Center for Public Service.

County types are based on 2013 rural-urban continuum codes developed by the Department of Agriculture. Counties assigned codes 1, 2, and 3 are categorized here as “metropolitan”; those assigned codes 4, 6, and 8, as “adjacent”; and those assigned codes 5, 7, and 9, as “rural.”

a. The civilian noninstitutionalized population of the United States.

b. One small metropolitan county was excluded from the analysis because of problems with data.

Gains in Health Insurance Coverage by County Type

To estimate the effects of health insurance status on demand for primary care at the county level, we projected the number of people in three categories: people who will lack insurance over the next 10 years; “newly insured” people (that is, those who will gain insurance—mostly because of the Affordable Care Act, or ACA, though economic and demographic changes will also contribute); and people who would have had insurance in the absence of the ACA. CBO generates projections of those groups for the nation as a whole, but not for smaller areas, so we used several other data sources to allocate CBO’s projected total changes among counties.

First, we estimated the rates of insurance coverage that would have existed in 2023 if the ACA had not been enacted. Because of economic and demographic changes, CBO’s national projections of those rates differ slightly from the rates in 2013; we made equivalent adjustments

to state insurance rates. Then we adjusted those state insurance rates by a single factor for all the states to be consistent with CBO's national projections. We used a similar method at the county level.

Next, we used other research to project the rates of insurance coverage that will exist in 2023. We used estimates from the Urban Institute to project each state's net change in uninsured people as a result of the ACA, which differed according to whether a state had expanded Medicaid under that law.⁸ To project increases in county-level insurance coverage that were consistent with those state estimates, we used results from a microsimulation model by the Lewin Group for use by its parent company, UnitedHealth Group.⁹ We thus had estimates of the number of already insured, newly insured, and uninsured people by county in 2023. Once again, we adjusted the county-level estimates to be consistent with the state and national estimates.

In general, the projected increases in insurance coverage vary somewhat by county type. Insurance coverage is expected to increase by 9.6 percentage points in metropolitan counties, 11.1 percentage points in adjacent counties, and 11.8 percentage points in rural counties (see Table B-2). Among all counties, insurance rates in counties at the 10th percentile of estimated increases in insurance coverage are projected to grow by 6.1 percentage points, and rates in counties in the 90th percentile are projected to grow by 17.9 percentage points.

⁸ Those estimates were made after June 2012, when the Supreme Court allowed states to decide whether to expand their Medicaid programs. See John Holahan and others, *The Cost and Coverage Implications of the ACA Medicaid Expansion* (Kaiser Family Foundation, November 2012), <http://tinyurl.com/jpt57y7>.

⁹ See UnitedHealth, Center for Health Reform and Modernization, *Modernizing Rural Health Care: Coverage, Quality and Innovation*, Working Paper 6 (July 2011), Appendix 2, <http://tinyurl.com/zolxval>.

Table B-2.
Past and Projected Insurance Status of the Nonelderly Population, by Type of County

Type of County	2013	2023	2013–2023		
	Share of the Population That Was Insured (Percent)	Share of the Population That Will Be Insured (Percent)	Change (Percentage Points)	Change, 10th Percentile (Percentage Points)	Change, 90th Percentile (Percentage Points)
Metropolitan	80.4	90.0	9.6	5.8	15.9
Adjacent	80.1	91.2	11.1	6.6	17.6
Rural	79.4	91.2	11.8	6.5	20.4
All	80.3	90.1	9.8	6.1	17.9

Source: Authors’ calculations, which were based on data from the Congressional Budget Office, the Urban Institute, and UnitedHealth.

The nonelderly population is the population of noninstitutionalized civilians younger than 65 in the United States.

County types are based on 2013 rural-urban continuum codes developed by the Department of Agriculture. Counties assigned codes 1, 2, and 3 are categorized here as “metropolitan”; those assigned codes 4, 6, and 8, as “adjacent”; and those assigned codes 5, 7, and 9, as “rural.”

Growth in Volume and Intensity by County Type

Because comprehensive county-level data on the use of primary care services are difficult to obtain, we had no basis for varying the estimated growth rate of the per capita use of those services by county. We therefore assumed that in all three types of counties, the volume and intensity of primary care services used per person would grow at the same rate as the national rate, increasing by 3.8 percent between 2013 and 2023.

Aggregate Effect on Demand by County Type

Over the next decade, the variation among county types in population growth, aging, and gains in insurance coverage is expected to result in varying demand for primary care. Demand is expected to grow by 19.2 percent in metropolitan counties, 11.0 percent in adjacent counties, and 10.8 percent in rural ones (see Table B-3).

The drivers that are responsible for the largest share of the increase in demand vary by the type of county. In metropolitan counties, the effect of population growth on demand is expected to dwarf the other effects. In the nonmetropolitan counties, population aging and growth in volume and intensity will be the strongest drivers of increases in demand. Greater insurance coverage is not the strongest driver in any type of county, but it will play a similar role in all counties.

Table B-3.
Components of Projected Growth in Demand for the Services of Primary Care Doctors, by
Type of County

Percent						
Type of County	Population Growth	Increase in Share of Population That Is Elderly	Gains in Health Insurance Coverage	Growth in Volume and Intensity ^a	All Components	
Increase in Demand Attributable to Each Component						
Metropolitan	10.0	3.1	2.1	4.0	19.2	
Adjacent	0.9	4.0	2.2	3.9	11.0	
Rural	1.0	3.6	2.3	3.9	10.8	
All	8.7	3.2	2.1	4.0	18.0	
Share of the Total Increase in Demand Attributable to Each Component						
Metropolitan	52	16	11	21	100	
Adjacent	9	36	20	35	100	
Rural	9	33	22	36	100	
All	48	18	12	22	100	

Source: Authors' calculations.

County types are based on 2013 rural-urban continuum codes developed by the Department of Agriculture. Counties assigned codes 1, 2, and 3 are categorized here as "metropolitan"; those assigned codes 4, 6, and 8, as "adjacent"; and those assigned codes 5, 7, and 9, as "rural."

Each effect includes a proportional share of the interaction effects that would result from the simultaneous change of all the factors. The slightly different effects of volume and intensity on demand for the three types of counties are due to those interaction effects.

a. This component consists of growth in volume and intensity used per person that is not accounted for by population aging or by gains in health insurance coverage.