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RESEARCH ARTICLE

Expanding Federal Funding to Community Health Centers Slows Decline in Access for Low-Income Adults

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Objective. To identify the impact of the Health Center Growth Initiative on access to care for low-income adults.

Data Sources. Data on federal funding for health centers are from the Bureau of Primary Health Care's Uniform Data System (2000–2007), and individual-level measures of access and use are derived from the National Health Interview Survey (2001–2008).

Study Design. We estimate person-level models of access and use as a function of individual- and market-level characteristics. By using market-level fixed effects, we identify the effects of health center funding on access using changes within markets over time. We explore effects on low-income adults and further examine how those effects vary by insurance coverage.

Data Collection. We calculate health center funding per poor person in a health care market and attach this information to individual observations on the National Health Interview Survey. Health care markets are defined as hospital referral regions.

Principal Findings. Low-income adults in markets with larger funding increases were more likely to have an office visit and to have a general doctor visit. These results were stronger for uninsured and publicly insured adults.

Conclusions. Expansions in federal health center funding had some mitigating effects on the access declines that were generally experienced by low-income adults over this time period.

Key Words. Health centers, access to care, primary care, safety net

Federally funded health centers, authorized under section 330 of the Public Health Service Act, provide primary care, as well as some dental and behavioral health services, to residents of medically underserved areas.[1] Federal funding for the health center program increased from $1.3 billion in 2002 to ~$2 billion in 2007 under President Bush's Health Center Growth Initiative (HCGI) (U.S. Department of Health and Human Services [U.S. DHHS],

Health Resources and Services Administration [HRSA], Bureau of Primary Health Care 2008). Over this period, the HCGI provided grants to support 1,236 new or expanded health center sites. As part of the HCGI, a priority was placed on including oral and behavioral health services in all new sites and additional funding was available to add these services to existing sites (Shi, Lebrun, and Tsai 2010).

Community health centers (CHCs), along with those centers that serve migrant and homeless populations and those living in or near public housing, served over 20 million patients in 2011. Health center users are predominantly low-income with roughly three-quarters of patients uninsured or covered by Medicaid (U.S. Department of Health and Human Services [U.S. DHHS], Health Resources and Services Administration [HRSA], Bureau of Primary Health Care 2011). In the current economic climate, health centers have become an increasingly important part of the health care safety net for low-income individuals (National Association of Community Health Centers [NACHC] 2009). As low-income adults gain coverage under the Affordable Care Act (ACA), health centers are expected to play a significant role in serving the newly insured population.

Health centers bill third-party payers and require contributions from uninsured patients based on their ability to pay. However, federal funding to the centers is critical to their ability to provide primary care services as HRSA grants represent about 20 percent of an average health center's budget. In this article, we explore whether the HCGI funding expansion improved access to care for low-income adults. We examine the effects of the HCGI on the likelihood of having a usual source of care, various types of visits, and unmet health care needs. We focus on low-income adults because they are more likely to have coverage and access problems than children and because they are the primary targets of the ACA coverage expansion. Beyond measures aimed at capturing access to primary care, we also include measures of dental and mental health care because there was an explicit focus in the HCGI on improving access to oral and behavioral health services. Building on the HCGI, the ACA included $11 billion of mandatory funding for health centers over the period 2011–2015. By identifying the effects of the HCGI, this study will provide

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insight as to the potential for the continuation of this policy approach to succeed in expanding access to care.

Literature Review

Recent work by LoSasso and Byck (2010) examined the impact of federal funding increases from 1996 to 2006 on the availability of health centers and the services they provide. They found that increases in federal funding had a significant positive impact on the number of health center sites provided by a grantee as well as on the provision of behavioral health services and the staffing levels of both physician and nonphysician employees. Shi, Lebrun, and Tsai (2010) also found evidence that the increased funding led to large increases in the number of patients served by the centers.

Previous research has explored the effects of safety net availability and capacity on measures of access to care, unmet needs, and utilization. Brown et al. (2004) examined the impact of the number of health centers on indicators of having a usual source of care and at least one physician visit for low-income individuals. They found that, regardless of insurance, the number of health centers per low-income resident had a positive impact on the probability of having a physician visit. Gresenz, Rogowski, and Escarce (2006, 2007) examined the impact of distance from a safety net provider on measures of access, use, and expenditures for uninsured children and adults in rural and urban locations. They found that living closer to a health center results in more visits for both children and adults in rural areas. These results were not significant for the uninsured in urban areas, but they found that safety net funding improves access for the urban uninsured.

Cunningham and Hadley (2004) and Hadley and Cunningham (2004) examined the effects of distance to health center sites as well as federal grant revenue on access and use for low-income individuals. Furthermore, they considered the fact that health centers tend to locate in areas with limited access to care, which results in a bias against finding a positive effect on access. By addressing this potential endogeneity of the health center measures using instrumental variable methods, the authors found stronger positive impacts of the safety net on access. Their results showed that shorter distances to health center sites result in improved access for uninsured individuals (Hadley and Cunningham 2004).

The existing literature therefore supports the notion that health centers improve access to care for low-income individuals. All of the above

studies predate the HCGI, however, and all take a cross-sectional approach to examining the impact of health centers on access and use. Moreover, not all studies include insured individuals in their population of interest. Given that almost 60 percent of health center users had public or private insurance, and that this share is likely to grow under the ACA, understanding the effects of health center expansion on access for insured adults will be important. This study contributes to the existing literature by examining the most recent health center expansion, identifying the effects using changes in funding within markets over time, and including a focus on low-income insured individuals.

METHODS AND DATA

A person's ability to access health care services is influenced by a variety of factors. The individual-level characteristics that influence access have been well established and include income, health insurance coverage, and health status, as well as age, race, education, and employment status (Aday and Andersen 1974; Andersen 1995). Many studies have also emphasized the importance of characteristics of the health care market on individual measures of access (Grumbach, Vranizan, and Bindman 1997; Cunningham and Kemper 1998; Cunningham 1999; Andersen et al. 2002). Such characteristics may include the size of the low-income and minority populations, as well as the availability and capacity of safety net and other providers (Davidson et al. 2004). Support for the safety net is expected to improve access to care, with stronger improvements for those with public or no insurance. We test this hypothesis by examining whether such support, in the form of federal funding for CHCs, improves access to care for low-income adults.

Empirical Approach

We estimate person-level models of access and utilization as a function of individual- and market-level characteristics. Measures of health care access and utilization, as well as other individual-level characteristics, are obtained from the 2001–2008 National Health Interview Surveys (NHIS). We obtain data on health center funding from HRSA's Uniform Data System (UDS) while other market-level characteristics are from the Area Resource File.

We use two alternative approaches for estimating the effects of CHC grant funding on access:

$$y_{imt} = X_{imt}\boldsymbol{\beta}_1 + Z_{mt-1}\boldsymbol{\beta}_2 + \boldsymbol{\beta}_3 Funding_{mt-1} + \tau_t + \varepsilon_{imt} \quad (1)$$

$$y_{imt} = X_{imt}\boldsymbol{\beta}_1 + Z_{mt-1}\boldsymbol{\beta}_2 + \boldsymbol{\beta}_3 Funding_{mt-1} + \tau_t + \gamma_m + \varepsilon_{imt} \quad (2)$$

where y is an indicator of access to care for individual i, in market m, at time t. $\mathbf{X}$ represents a vector of individual-level characteristics, including age, gender, race, marital status, education, work status, income relative to poverty, insurance coverage, and health status, while $\mathbf{Z}$ is a vector of time-varying market-level characteristics, including the proportion of the population in poverty, percent minority, and the supply of primary care physicians. The variable of interest is *Funding*, which is a measure of federal funding to health centers per person in poverty in market m, at time $t - 1$. The health center funding and other market-level characteristics are lagged 1 year because the access questions refer to access over the past 12 months and because the effects of funding expansions are unlikely to occur immediately.

In model (1), we identify the effects of funding on access to care using variation in funding between markets, while controlling for trends over time (τ_t). In model (2), we exploit the variation in funding changes within markets over time. The latter approach uses market-level fixed effects (γ_m) to control for unobservable time-invariant market characteristics that may affect access. This reduces the potential for biased estimates resulting from the fact that markets with high levels of federal health center funding often have poorer access to care.

We estimate linear probability models on binary measures of access to care, including indicators of unmet need due to cost as well several indicators of utilization. These measures are discussed in more detail below. We also estimate models that include interactions of the key health center funding variable with indicators of insurance coverage. We limit our sample to nonelderly adults ages 19–64 with family incomes below 200 percent of the federal poverty level and exclude observations from Alaska because of extreme outlier values of health center funding changes over time. Standard errors are clustered at the market level and adjusted for the multiple imputation of income on the NHIS.

Market Definition

We define health care markets for this analysis using the Dartmouth Atlas hospital referral regions (HRRs). There are about 300 HRRs containing the entire population of the United States and designed to measure the market for tertiary hospital services. While Dartmouth has also developed a measure to

reflect the market for primary care services, there are over 6,000 primary care service areas in the United States. Given our analytic approach, which relies on including market-level fixed effects, our analysis sample was not large enough to estimate such models using the primary care service area as our market of interest.

Health Center Data from the Uniform Data System

We generate our key measure of the health center funding expansion using data from the Bureau of Primary Health Care's UDS. The UDS data provide comprehensive information on the staff and services provided, revenue collected, and patients served by all types of health center grantees. Our analysis uses the funding to CHCs only because they represent the majority of federally funded health centers and many individuals served by other federally funded health centers (e.g., migrant and homeless health centers) are not represented in the NHIS data.[2]

The UDS is collected at the grantee level, but grantees often provide services at several individual sites. The data allow for identification of the number and location of the individual sites, but they do not provide information on how the services, staff, or revenues are distributed across sites. This structure creates the potential for measurement error in generating a market-level measure of health center funding because when grantees have sites in multiple markets we need to allocate the grantee's funding across those markets. Since approximately 75 percent of grantees have sites in only one HRR, however, our market definition limits this potential measurement error by allowing us to allocate all of the grantee-level funding to one HRR in the majority of cases.

For grantees with sites in multiple HRRs, we use information on the distribution of patients served to allocate the grant funding to the appropriate HRRs. For example, for a grantee with sites in two HRRs and 75 percent of patients residing in ZIP codes in one HRR and 25 percent in the other HRR, we would allocate 75 percent of the funding to the HRR with more patients and 25 percent to the other. While this method does introduce measurement error, the problem would be exacerbated further if we used a finer level of geographic detail for our market of interest.

Table 1 describes the variation in funding per poor person, both across areas and within areas over time, used to identify the effects of the health center expansion on access to care. The first panel describes the variation across markets in each year from 2000 to 2007.[3] The statistics show that there is strong variation across markets in each year with the 5th percentile equal to

Table 1: Variation in Federal Funding to Community Health Centers, 2000–2007

	Percentile						
	5	*10*	*25*	*50*	*75*	*90*	*95*
Distribution of federal funding to CHCs ($ per person in poverty)							
2000	0.00	0.00	7.70	18.12	32.69	45.01	52.24
2001	0.00	0.00	8.35	19.68	34.55	49.69	57.98
2002	0.00	0.00	8.91	22.69	39.83	56.46	63.63
2003	0.00	1.79	11.73	25.79	44.06	63.30	73.04
2004	0.00	2.35	12.51	26.49	44.42	65.31	77.74
2005	0.00	2.57	13.67	27.05	46.22	65.63	75.95
2006	0.00	4.27	13.45	28.29	48.84	73.89	82.04
2007	1.56	6.49	16.22	32.23	49.22	75.38	94.09
Distribution of growth in federal funding to CHCs ($ per person in poverty)							
2000–2007	−1.33	0.00	3.28	9.70	21.29	31.08	44.50

Source: Uniform Data System 2000–2007. Estimates reflect the distribution of federal funding levels or growth across 243 HRRs with NHIS observations in each year. The growth in federal funding reflects the change in funding from 2000 to 2007 within a market.

zero in all years except 2007, and the 95th percentile growing from $52.24 to $94.09. Funding growth over time is also evident from the growth in the median from $18.12 in 2000 to $32.23 in 2007. The second panel describes the variation in funding growth within markets between 2000 and 2007. The median change in funding per poor person from 2000 to 2007 was $9.70, while the 5th percentile was a loss of $1.33 and the 95th percentile a gain of $44.50. Together, these statistics indicate that there is substantial identifying variation, both across markets and over time, for use in our multivariate models of access and utilization.

Access and Utilization on the National Health Interview Survey

Using data from the sample adult component of the NHIS, we generate eight measures of access and utilization for low-income adults. These measures include (1) having a usual source of care other than the emergency department; (2) having had any office visit in the past year; (3) having had any visit to a general doctor in the past year; (4) having had more than three Emergency Department (ED) visits in the past year; (5) reporting unmet needs for medical care due to costs in the past year; (6) reporting delayed medical care due to costs in the past year; (7) reporting unmet dental needs due to cost in the past year; and (8) reporting unmet mental health needs due to costs in the past year.

We expect the health center funding expansion to increase the probability of having a usual source of care and any office or general doctor visit, while reducing the probability of frequent ED use and the various measures of unmet needs or delayed care due to cost.[4]

Table 2 shows that from 2001 to 2008, access to health care declined for low-income adults on virtually every measure. The share with a usual source of care fell, as did the likelihood of having an office visit and a general doctor

Table 2: Characteristics of Low-Income Adults, 2001 and 2008

	Low-Income Adults	
	2001	*2008*
Access and use		
Usual source of care	0.723	0.690**
Any office visit	0.760	0.737**
Any general doctor visit	0.599	0.563**
More than three ED visits	0.036	0.040
Unmet medical needs due to cost	0.138	0.177**
Delayed medical care due to cost	0.167	0.202**
Unmet dental needs due to cost	0.198	0.276**
Unmet mental health needs due to cost	0.041	0.065**
Age, race and gender		
19–24	0.277	0.278
25–39	0.354	0.345
40–49	0.179	0.172
50–64	0.190	0.205
Female	0.572	0.542**
White, not Hispanic	0.554	0.533
Black, not Hispanic	0.179	0.173
Hispanic	0.220	0.237
Other, not Hispanic	0.047	0.058*
Noncitizen	0.164	0.168
Family status		
Married	0.394	0.338**
Wid/sep/divorce	0.210	0.169**
Never married	0.395	0.493**
Any dependent child in HIU	0.450	0.395**
Education and work status		
Less than high school	0.296	0.259**
High school grad	0.322	0.316
Some college	0.293	0.317*
College grad	0.089	0.108**
Worker	0.614	0.585**

continued

Table 2. *Continued*

	Low-Income Adults	
	2001	*2008*
Income relative to poverty		
Less than 100% FPL	0.452	0.469
100–199% FPL	0.548	0.531
Insurance coverage		
Private – full year	0.398	0.331**
Public – full year	0.178	0.227**
Part year insured/uninsured	0.152	0.148
Uninsured – full year	0.272	0.294*
Health status and activity limitation		
Excellent/very good health	0.566	0.522**
Good health	0.265	0.281
Fair/poor health	0.168	0.197**
Limited activity	0.191	0.205
Market characteristics		
CHC funding per poor person	22.27	35.09**
% in poverty	0.120	0.131**
% unemployed	0.043	0.048**
% minority	0.317	0.333**
Primary care docs per 1,000 people	0.588	0.634**

Source: National Health Interview Survey 2001–2008. Limited to sample adults ages 19–64 with HIU incomes less than 200 percent of the federal poverty level. Market characteristics are from the Area Resource File. ** (*) indicates that the difference between 2001 and 2008 is statistically significant at the 5 (10) percent level.

visit. The proportion of low-income adults with more than three ED visits increased slightly, but the change was not statistically significant. A significant increase in unmet needs for medical care and delayed care due to costs also occurred over this period. At the same time, unmet dental and mental health needs were rising. This overall trend in declining access is important because it indicates that we are not likely to see large improvements in access to care over time in response to the increases in health center funding. Rather, any effects are likely to emerge as more modest declines than would have occurred in the absence of the policy change.

Table 2 also shows descriptive statistics on the individual and market-level control variables used in our models. The changes reflect some of the economic realities over this period. The proportion of low-income adults who were working fell from 61.4 percent in 2001 to 58.5 percent in 2008. Differences in insurance coverage were particularly pronounced. The proportion of low-income adults covered by private insurance fell almost 7 percentage points from 2001 to 2008. However, public coverage increased for

low-income adults, resulting in an increase in the uninsurance rate of only 2.2 percentage points. The market-level characteristics measured using data from the Area Resource File indicate that the proportion of the population in poverty and the unemployment rate both increased over this period, as did the percent of the population in minority groups. In addition to the increase in CHC funding per poor person, the average number of primary care physicians per capita also increased.

Limitations

There are several limitations to our analysis. First, the NHIS is not designed to be representative at the local level, so there are some concerns about using market-level changes over time to identify the effects on access. However, unless the HRR-level samples are biased in a way that is systematically related to health center funding (or changes in funding) and access to care, this should not create substantial bias in our estimates. Concerns also exist, however, that because the population using health centers is a relatively small proportion of the total population, this will yield a small sample of health center users on the NHIS. We cannot actually identify health center users on the NHIS, so we limit our sample to low-income adults (income less than 200% of the FPL) to concentrate on those most likely to be affected by the expansion. As a result of this narrow sample, not all of whom actually use health centers, we may have limited statistical power to detect the effects of funding increases on access to care. These power concerns are exacerbated by additional adjustments necessary in our estimation to account for multiple imputation of income and clustering of individuals within markets, both of which further reduce the precision of our estimates. Thus, in some cases, we may find evidence of access improvements that are meaningful in size, but for which we cannot detect a statistically significant effect.

As has been noted, another limitation of this analysis is measurement error in our estimates of market-level health center funding because of the need to allocate grantee-level funding across markets using patient ZIP code of residence. Moreover, because the UDS data before 2005 do not contain the patient ZIP code distribution, we apply the 2005 information to the earlier years. Since health centers were expanding over this time period, we may attribute too much funding to certain HRRs prior to 2005, thus reducing the estimated change in funding over time. This could cause us to underestimate the impact of increases in funding over time. However, because most grantees did not have sites in multiple HRRs, we do not believe the bias to be severe.

RESULTS

Table 3 summarizes the results of our multivariate models of access and use without market-level fixed effects. We present the marginal effect of an additional 10 dollars of funding per poor person on each access indicator for all low-income adults and for those with public, private, or no insurance. The results for all low-income adults show a positive and significant association between health center funding and the probability of having a usual source of care, but no significant association with the other measures of access. Among uninsured adults, health center funding is associated with a higher probability of having a usual source of care and having at least one office visit. Those with public coverage are more likely to have a usual source of care and less likely to use the ED frequently and delay care due to cost in markets with higher levels of CHC funding. We found no significant relationship between CHC funding and access for privately insured individuals.

These results are relatively consistent with prior research finding positive associations between the availability and capacity of health centers and access to care. These analyses, however, are subject to potential bias because health centers are more likely to locate in areas with poor access to care, thus making it more difficult to identify positive associations between funding and access in a simple cross-section. Therefore, we also examine evidence on the effects of changes in health center funding within markets over time.

Figure 1 explores the relationship between health center funding growth and access to care by describing the change in access for low-income adults from 2001 to 2008 in markets with the smallest and largest funding growth from 2000 to 2007. We categorized markets into quartiles based on funding growth per poor person, with those in the first quartile experiencing the smallest increases in funding over the expansion period. As was true for the overall trend for low-income adults, the results in both quartiles suggest that access was declining over the expansion period. However, in the markets with the largest increases in federal funding to health centers (quartile 4), the declines are generally smaller. This suggests that health center funding had a role in tempering the declines in access over this period, but none of the differences between quartile 1 and quartile 4 were statistically significant.

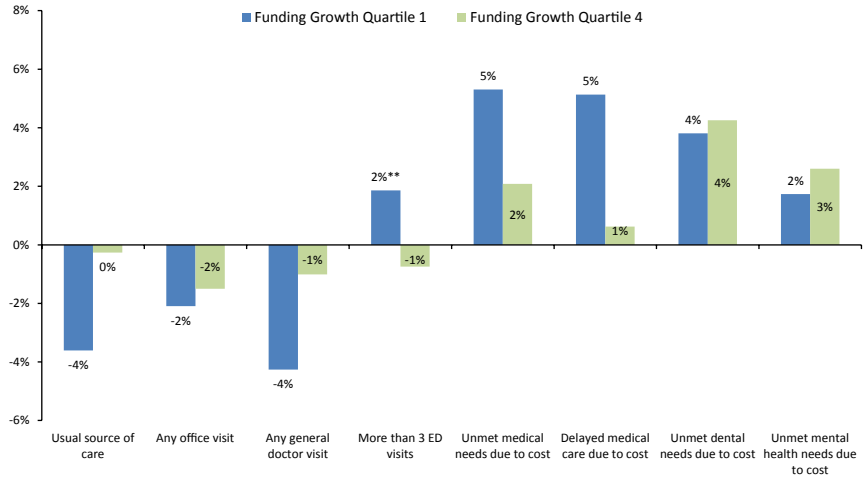
Table 4 summarizes the results of multivariate models that identify the effects of changes in health center funding over time using market-level fixed effects. Again, we present the marginal effect of an additional 10 dollars of funding per poor person on the access indicator of interest for all low-income adults and for those with public, private, or no insurance. We find that CHC

Table 3: Estimates from Models without Market Fixed Effects

	All Low-Income Adults		*Uninsured*		*Public Coverage*		*Private Coverage*	
	Marginal Effect	*p-value*	*Marginal Effect*	*p-value*	*Marginal Effect*	*p-value*	*Marginal Effect*	*p-value*
Marginal effect of $10 increase in CHC funding per poor person on access to care for low-income adults								
Usual source of care	0.004	.050*	0.007	.032**	0.004	.079*	0.000	.863
Any office visit in past year	0.003	.111	0.005	.044**	0.002	.268	−0.001	.700
Any general doctor visit in past year	0.003	.248	0.004	.238	0.003	.470	0.002	.634
More than three ED visits in past year	0.000	.443	0.000	.701	−0.002	.097*	0.000	.668
Unmet medical needs due to cost	−0.001	.621	−0.001	.614	−0.001	.697	0.000	.854
Delayed medical care due to cost	0.001	.599	0.002	.418	−0.003	.057*	0.001	.425
Unmet dental needs due to cost	0.000	.927	0.001	.648	0.000	.883	−0.002	.297
Unmet mental health needs due to cost	0.001	.431	0.002	.170	−0.001	.343	0.000	.947

Note. All models are estimated using OLS on NHIS data from 2001–2008. Sample is limited to adults (19–64 years) with incomes below 200 percent of the FPL. Market-level measures are lagged 1 year. Controls include age, gender, race, citizenship, marital status, education, family income relative to poverty, insurance type (full-year public and private, part-year uninsured), self-reported health status, and activity limitation. Market-level controls include the number of primary care physicians per capita, unemployment rate, proportion of the population in poverty and proportion of the population that is nonwhite. Models also include controls for region and year fixed effects. All standard errors are clustered at the HRR-level and adjusted for multiple imputation of income variables. Uninsured refers to those uninsured at some point during the year. Public (private) coverage refers to those with public (private) coverage at the time of the survey and no uninsurance in the past year. ** (*) denotes statistical significance at the .05 (.10) level.

Figure 1: Change in Access to Care for Low-Income Adults, by Quartile of CHC Funding Growth, 2001–2008



Notes: Markets were divided into quartiles based on the growth in funding from 2000 to 2007. Quartile 1 had the smallest growth and quartile 4 had the largest growth. The change in each access measure from 2001 to 2008 is calculated for low-income adults in both quartiles. ** indicates that the difference between quartile 1 and quartile 4 is statistically significant at the .05 level.

funding growth has a positive and significant impact on the probability of having an office visit for all low-income adults and for uninsured and publicly insured adults. A similar pattern emerges for the probability of a general doctor visit, but the results are not quite significant at the 10 percent level for all low-income adults or the uninsured. For both outcomes, however, the estimated effects are larger in magnitude and more highly significant than those in the models without fixed effects. This provides support for concerns regarding potential bias of the cross-sectional models.

Beyond the effects on the likelihood of an office visit and general doctor visit, there are few other significant effects in the fixed effects models. The effect of CHC funding on delayed care due to cost is positive for all low-income adults, the uninsured and the privately insured. This is in contrast with expectations that increased funding should decrease delays in care. Finally, stronger funding growth is associated with a reduction in unmet dental needs for privately insured adults.

Sensitivity Analysis on Income Definition

Our main analysis is based on a sample of adults with incomes below 200 percent of the FPL because this is the population we expect to benefit most from

the health center funding expansions. However, this limits the sample size and creates some concerns that the analysis does not have the statistical power to detect the effects of health center funding expansions. To address these power concerns, we expand the definition of low-income adults to include those with

Table 4: Estimates from Models with Market Fixed Effects

	< 200% FPL		*< 300% FPL*	
	Marginal Effect	*p-value*	*Marginal Effect*	*p-value*
Marginal effect of $10 increase in CHC funding per poor person on access to care for low-income adults				
Usual source of care				
All low-income adults	0.002	.619	0.001	.893
Uninsured	0.006	.306	0.004	.440
Public coverage	0.002	.645	0.001	.773
Private coverage	−0.001	.802	−0.002	.601
Any office visit in past year				
All low-income adults	0.010	.015**	0.008	.029**
Uninsured	0.013	.005**	0.011	.011**
Public coverage	0.010	.028**	0.007	.084*
Private coverage	0.007	.134	0.006	.091*
Any general doctor visit in past year				
All low-income adults	0.010	.101	0.011	.079*
Uninsured	0.011	.100	0.011	.073*
Public coverage	0.011	.099*	0.011	.095*
Private coverage	0.009	.186	0.010	.111
More than three ED visits in past year				
All low-income adults	−0.001	.415	−0.001	.410
Uninsured	−0.001	.732	0.000	.778
Public coverage	−0.003	.145	−0.003	.079*
Private coverage	−0.001	.489	−0.001	.524
Unmet medical needs due to cost				
All low-income adults	0.002	.523	0.002	.514
Uninsured	0.002	.644	0.002	.480
Public coverage	0.001	.701	0.002	.573
Private coverage	0.003	.360	0.001	.619
Delayed medical care due to cost				
All low-income adults	0.007	.076*	0.007	.040**
Uninsured	0.009	.048**	0.009	.013**
Public coverage	0.003	.504	0.003	.356
Private coverage	0.007	.054*	0.006	.061*
Unmet dental needs due to cost				
All low-income adults	−0.006	.183	−0.005	.155
Uninsured	−0.004	.411	−0.003	.529
Public coverage	−0.007	.175	−0.005	.217
Private coverage	−0.008	.090*	−0.007	.049**

continued

Table 4. *Continued*

	< 200% FPL		< 300% FPL	
	Marginal Effect	*p-value*	*Marginal Effect*	*p-value*
Unmet mental health needs due to cost				
All low-income adults	0.001	.615	0.002	.412
Uninsured	0.003	.295	0.003	.143
Public coverage	−0.001	.780	0.000	.999
Private coverage	0.001	.795	0.001	.615

Note. All models are estimated using OLS on NHIS data from 2001–2008. Sample is limited to adults (19–64 years) with incomes below 200 percent of the FPL or 300 percent of the FPL. Market-level measures are lagged 1 year. Controls include age, gender, race, citizenship, marital status, education, family income relative to poverty, insurance type (full-year public and private, part-year uninsured), self-reported health status, and activity limitation. Market-level controls include the number of primary care physicians per capita, unemployment rate, proportion of the population in poverty, and proportion of the population that is nonwhite. Models also include HRR and year fixed effects. All standard errors are clustered at the HRR-level and adjusted for multiple imputation of income variables. Uninsured refers to those uninsured at some point during the year. Public (private) coverage refers to those with public (private) coverage at the time of the survey and no uninsurance in the past year. ** (*) denotes statistical significance at the .05 (.10) level.

incomes up to 300 percent of the FPL. However, if these higher income adults are not likely to benefit from health centers, adding them to the sample may dilute the impacts of funding on the lower income group.

Table 4 includes the results of the analysis on adults with incomes below 300 percent of the FPL. While the results are generally consistent with our main findings, there is some evidence that our main analysis, in fact, may be underpowered. For example, the estimated effects of CHC funding on the probability of a general doctor visit for all low-income, uninsured, and publicly insured adults remain almost identical in magnitude, but are estimated more precisely and thus achieve more conventional levels of statistical significance in the expanded sample. Similar patterns emerge on measures of delayed care due to cost, unmet dental needs, and frequent ED use. The tradeoff in expanding the sample is evident, however, in the estimates on the probability of an office visit. Compared with the results for the population under 200 percent of the FPL, the estimated effects of CHC funding on the probability of an office visit are smaller in magnitude and less significant when using the expanded sample. These results suggest that the effects of funding growth seem to be concentrated among the lower income population, as we would expect. Altogether, this sensitivity analysis demonstrates the importance

of weighing power concerns against a well-defined treatment group when choosing the analysis sample.[5]

DISCUSSION

This analysis suggests that increases in federal funding to CHCs had some positive effects on access to care for low-income adults. Depending on the specification, we found significant positive effects on the likelihood of having an office visit, a general doctor visit, and a usual source of care. The increased funding also led to a reduction in unmet dental needs due to cost for the privately insured and a reduction in frequent ED use for the publicly insured. So, while we did not find significant effects for all outcomes or in all specifications, the evidence suggests that increases in CHC funding improved access to care for low-income adults. The magnitudes of the funding effects we found were small, but this is not surprising given the relatively small population of health center users. In 2008, there were ~53 million low-income nonelderly adults in the United States and only about 10 million nonelderly adult health center users. Our results measure the effects of health center funding across the broader low-income population, but we would expect stronger effects if our data allowed us to measure the impacts on access within the narrower population of health center users.

The results were stronger for the uninsured and publicly insured—consistent with the fact that health center users are more likely to be uninsured or covered by Medicaid. However, the effect of health center funding on reducing unmet dental needs for the privately insured is particularly noteworthy. The health center expansions over the past decade included a strong focus on improving access to dental care, and private health insurance often excludes dental benefits. This result indicates that the most recent expansion had benefits for individuals not often considered to be the target population for health centers. A few results, however, did not support the hypothesis that CHC funding improves access to care. Stronger CHC funding growth resulted in increases in delaying care due to cost for low-income uninsured and privately insured adults. This may indicate that funding increases were targeted to those areas experiencing increasing access problems.

Overall, our results indicate that increased federal funding for health centers modestly mitigated the access declines that were generally occurring over the last decade. However, our estimates are relatively conservative and may reflect an underestimate of the true effects of this funding expansion. As

already noted, our analysis may not have the power to detect all of the meaningful effects of increased funding on access to care and our market definition may result in more limited impacts than if we had used a smaller geographic area more consistent with the true market for primary care.

This study focused on the effects of federal funding increases on access to care. We did not consider the other mechanisms used to support health centers, including private, state, and local grant funding as well as payments from third-party payers. The increase in the proportion of adults with public coverage over this time period provided additional support for health centers and is likely to become more important as the ACA further expands Medicaid coverage. We also did not consider other improvements in quality of care or patient satisfaction that may have resulted from the funding expansion. Recent work has found that health centers provide high-quality care on several established measures (Kaiser Family Foundation 2013). Thus, extending this study to account for other forms of health center support as well as outcomes beyond access to care could identify additional positive impacts of expanding overall funding for health centers.

The ACA includes $11 billion in funding for health centers, which was intended to further expand the capacity of the health center system. In fiscal years 2011–2013, however, Congress reduced the discretionary allocation of federal funding to health centers from its 2010 level of $2.2 billion to $1.6 billion. Therefore, some of the ACA funding has been used to maintain existing staffing and service levels, limiting the potential for expansion. Our results indicate that this funding retrenchment could limit anticipated access improvements for low-income adults. Furthermore, our findings on dental care suggest that the health center system could prove to be an important source of oral health care in the future. Neither the Medicaid program nor the essential benefits package in the exchanges require coverage of dental care for adults, so continued expansion of dental capacity in the health center system is likely to be critical.

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NOTES

1. The term *health centers* describes the various public and nonprofit organizations that receive federal funding under section 330 of the Public Health Service Act (42 U.S.C. 254b), as amended. These Health Resources and Services Administration (HRSA)-supported health centers are also designated by Medicaid and Medicare as Federally Qualified Health Centers.
2. While users of public housing health centers may be represented on the NHIS, we excluded funding to these centers because our analytic file did not allow us to distinguish it from funding to migrant and homeless health centers.
3. We limit our sample of markets to those with NHIS observations in every year of data (2001–2008).
4. We might also expect effects on the number of visits to various providers, but the direction of such effects is less clear. While the presence of at least one doctor visit is commonly used as an indicator of access, the presence of multiple visits may indicate better access or worse health. Thus, we limit our outcomes to the extensive margin for this analysis.
5. We also considered pooling Medicaid and uninsured individuals in the models by coverage type to increase the power to detect differences for the targeted population. No significant differences emerged that were not significant for one or the other in the main models.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.