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The Impact of the Federally Qualified Health Center Advanced Primary Care Practice Demonstration on the Poor and Elderly

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By

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Abstract

This study implements a difference-in-differences and multinomial logistic regression to quantify the effects of the Federally Qualified Health Centers (FQHC) Advanced Primary Care Practice (APCP) demonstration on the self-reported general health of 367 U.S. counties across 47 states. Using the Annual Social and Economic (ASEC) supplement of the Current Population Survey (CPS), no statistically significant results were obtained when estimating the models for the general population. However, stratifying the data into three subsamples – the elderly, people living in high poverty areas, and the elderly living in high poverty areas – reveals statistically significant effects, indicating the importance of FQHCs as a source of medical care for the elderly and those living in communities of high poverty.

Tables

1. Introduction

Federally Qualified Health Centers (FQHCs), also known as Community Health Centers (CHCs), are primary care facilities that receive grants under Section 330 of the Public Health Service Act (PHS). The objective of these facilities is to serve those in need of care at an affordable price. Although everyone is welcome, the target population is made up of individuals with limited access to health care, typically the poor, uninsured, underinsured, immigrants, and homeless (hrsa.gov). The medical care provided by FQHCs forms an essential part of the health care safety net (Udow-Phillips, 2016), which comprises of providers that deliver a significant level of health to vulnerable populations, making their study imperative for future health care investments and reforms.

Section 3021 of the Affordable Care Act (ACA), directs the Department of Health and Human Services to implement a three-year project for the enhancement of FQHC facilities, using an estimated $42 million of ACA funding over three years. The project expected the facilities to achieve level 3 status as a Patient Centered Medical Home (PCMH) by the National Committee of Quality Assurance (NCQA). A level 3 facility is the highest recognition possible and is established by meeting specific standards in safety, effectiveness, care coordination, care management, patient-centered access to care, and continuous quality improvement. In turn, the program expected improvements in health outcomes and a reduction in future medical expenditures (Kahn, 2015).

The project, named The FQHC Advanced Primary Care Practice, was spearheaded by The Center for Medicaid and Medicare Services (CMS). To participate in the project, the FQHCs had to satisfy three main requirements. First, the facility must have provided care to at least 200 Medicare beneficiaries within the past 12 months. Second, the FQHC had to enroll in the

Provider Enrollment Chain and Ownership System (PECOS) file, which allows registered users to submit and manage Medicare enrollment information. Finally, the facility must be able to receive Electronic Fund Transfers (EFTs). The project resulted in the addition of 434 FQHCs across the United States (see Figure 1).

To facilitate the transition to level 3 status, the 434 FQHCS in the program were supplied with quarterly payments, technical assistance, and training over the three years of the program (Kahn, 2015). In this paper I attempt to identify the impact of this demonstration on the health of the community. In other words, did the enhancement of FQHC facilities have any spillover effect on the health of individuals living near these facilities? After applying multiple econometric models and stratifying the data into the elderly, people living in high poverty, and the elderly living in high poverty areas, I find that the FQHC APCP demonstration has a positive 1-percentage point impact on the health of the elderly and residents of poor communities. The effect is five times greater (5-percentage points) for the intersection of elderly living in poor communities.

This study contributes to the literature by assessing in particular the impact of upgrading FQHC facilities to level 3 status on community health levels. Other research has studied the impact of CHCs on infant mortality rates (Goldman & Grossman, 1988) and on age-adjusted mortality rates (Bailey & Goodman-Bacon, 2015), which examine population health levels. Additionally, the cost-effectiveness, quality of care provided, ambulatory care measures, and hospital utilization of FQHC patients versus non-FQHCs has been studied (Mukamel et al, 2016, Hoff et al, 2012, Goldman et al, 2012, Rothkopf et al, 2011) and is explained further in the literature review section.

The remainder of the paper is formatted as follows: section 2 is the literature review, section 3 presents the data used in the study, section 4 details the empirical strategies employed, section 5 explains the results, and section 6 offers a conclusion for the paper.

2. Literature Review

The RAND Corporation conducted preliminary evaluation reports on the effectiveness of the FQHC APCP program. They matched participating FQHCs (FQHCs in the demonstration) with non-participating FQHCs (FQHCs similar in characteristics to those that participated) via propensity score matching, which is a type of synthetic matching methodology that matches by characteristics to study the impact of the demonstration. The result showed that 69% of participating FQHCs achieved level 3 recognition versus the 11% achieved by non-participating FQHCs. However, they anticipate that the remainder of participating FQHCs are on track to achieving level 3 status. Furthermore, participating FQHCs experienced an increase in utilization and costs, which RAND's pending third evaluation report will fully assess by exploiting longitudinal data and employing a difference-in-differences (henceforth DID) framework (Kahn, 2015)

One of the first studies regarding FQHCs deals with their impact on lagged infant mortality rates (Goldman & Grossman, 1988). In the literature, infant mortality rate is generally accepted as an indicator of health levels of the population in which infant mortality and health levels have an inverse relationship. Their study uses large counties (n=678) from 1970 to 1978 and multivariate regression techniques to estimate the effect of FQHCs on White and Black infant mortality rates. Their results show that counties with FQHCs have had lower overall infant mortality rates, the magnitude of the effect greater among Black infants.

Bailey & Goodman-Bacon (2015) exploit the establishment of the first FQHCs to study the long-term impact of primary medical care provided by FQHCs on the health of the community. They focused on the FQHCs built between 1965 and 1974 and examine their impact by employing a county level fixed effects regression. When implementing a proxy for health status through mortality rates, an overall decrease in age-adjusted mortality rates was observed within the first 10 years as well as a 7 to 13 percent decline in mortality rates of poor individuals above the age of 50. Overall, the regression had no significant impact on the infant mortality rates, children mortality rates, or accident-related mortality rates.

Lovenheim et al. (2016) similarly study the impact of increasing access to health care, but by the expansion of School-Based Health Centers (SBHCs). SBHCs are located in or around schools and provide the same type of care as FQHCs, but with a focus on STI and teen pregnancy prevention. SBHCs differ from FQHCs in whom they treat – SBHCs are available only to adolescents in school, while FQHCs are open to everyone. Employing a DID regression, their results indicate that SBHCs caused a 5 percent decline in rates of teenage fertility for 15-18 year olds, the study having a larger impact among Black and Hispanic teens.

Rothkopf et al. (2011) turned their attention to patients of FQHCs versus patients of Private Practices on the likelihood of utilizing hospital services. Conditional on where individuals obtained their primary care (FQHC or Private), the likelihood of emergency room visits, inpatient hospitalizations, hospital readmissions, and preventable hospital admissions were estimated with logistic regression methodology. Controlling for sex, age, geographical location, and disabilities, their results demonstrate FQHC patients have lower odds of utilizing all hospital services measured for as compared to Private Practice patients. FQHCs are reducing hospital utilization, producing a positive externality for everybody else. The study omitted relevant variables like education, income, and employment, leaving further analysis to be conducted for causal results. Although, viewing the study as a base for future research, the results point to pro-FQHC outcomes.

Mukamel et al. (2016) compare the costs of caring for Medicare beneficiaries treated in FQHCs versus physician offices and outpatient clinics. Using Medicare claims data from 14 geographically diverse states; they measure total cost variables through a fixed effects regression and control for patient characteristics. They find FQHCs have 10% lower total median annual cost as compared to the other care settings. Nonetheless, they were not able to determine whether this decrease in costs reflects better management by FQHCs or limited access to specialty care by them.

Goldman et al. (2012) compare FQHCs physician's performance against Private Practice physicians in ambulatory care measures. Using the National Ambulatory Medical Care Survey from 2006 to 2008 and cross-sectional analysis techniques, they find that FQHCs performed better on six measures, including proper use of ACE inhibitors, aspirin use, beta-blockers, benzodiazepines, BP screening, and EKG screening. Interestingly enough, FQHCs were only found to perform worse on one measure - diet counseling. This supports the notion that FQHCs provide efficient quality care, similar to the private care physicians.

Empirical literature on transforming practices into Patient-Centered Medical Homes (level 3 facilities) has showed mixed results. Hoff et al. (2012) conducted a review of 21 studies of PCMH transformations from 2007 to 2010. The studies measured outcomes of interest such as quality of care, emergency department (ED) utilization, expenditure, and others. The 7 studies with quality of care as the variable of interest showed that PCMH facilities provide a greater degree of care than non-PCMH facilities. However, the results of the studies regarding other outcomes of interest yielded inconclusive results.

3. Data

The CMS website is the source of the participating FQHCs and Provider of Service (POS) files. The FQHC dataset contains the names and addresses of the 434 FQHCs in the demonstration and the POS file contains data on all types of health care facilities (e.g. hospitals, nurse facilities, hospices, and FQHCs). I merged the two datasets by facility name and address, and then I excluded all non-FQHC facilities, leaving 6,112 FQHCs across the U.S. as the remainder of observations in the dataset. Out of upwards of 3,100 counties in the U.S. at least one FQHC appears in over half of the counties. The 434 participating FQHCs, the focus of this paper, were located in 292 counties, which were predominantly metropolitan, and were located in areas that are medically underserved, according to the Secretary of Health and Human Services.

The source of individual level data comes from The Annual Social and Economic (ASEC) supplement of the Current Population Survey (CPS). The ASEC dataset contains repeated cross-sectional data and is widely used for its measures of income and per person socio-economic data from more than 75,000 households annually. Since treatment of the program started at the beginning of 2012, I analyzed four years of ASEC data pre (2008-2011) and post treatment (2012-2015).

Due to confidentiality restrictions, FIPS County codes are provided for a select number of counties, allowing me to merge data for 702,192 individuals in 367 counties only. A county with at least one participating FQHC is a “treated” county (98 treated counties) and a county with no participating FQHC is a “control” county (269 control counties). From a state-level perspective, 47 states contain at least one participating FQHC and 6 states do not (DC, Guam, and Puerto Rico were counted as states).

The ASEC contains a question asking individuals to report their current state of health as either “poor,” “fair,” "good,” “very good,” or “excellent.” From the responses the binary variable “*Poor Health*”, the outcome of interest for the DIDs, is created to equal 1 if an individual responds “poor” health and 0 if otherwise. Similarly, the outcome of interest for the multinomial logistic regression uses the response to that same health status question by giving a numerical value to each of the five responses. This variable, “*Health*” is equal to 1 if individual responds “poor” health, equal to 2 if individual responds “fair” health, 3 if individual responds “good” health and so on and so forth. Figure 2 shows the distribution of health status by subsample.

Subsampling the data allows for the analysis of the demonstration on different groups of people, they are: the full sample, individuals >=65 only, individuals living in high poverty areas, and the intersection of individuals >=65 that live in high poverty areas (intersection consists of roughly 10% of people from elderly group and high poverty group).

The Area Health Resources Files (AHRF) high poverty typology code for the county level is used to determine whether an area is of high poverty. The variable is equal to 1 if the county is high in poverty according to the AHRF (~10% of counties) and 0 if otherwise. And the U.S. Census is the source for the county level population estimates and region/division census codes.

The explanatory variables controlled for in the models include the standard socio-economic variables, demographic characteristics, state dummies, year dummies, metropolitan indicators, number of active MDs per county, and county level population estimates. The data consists of an approximately even number of males and females. Half of the population is married, 60% of individuals are employed, and 95% of counties (349 counties) are metropolitan in the study. The full set of summary statistics for all variables by subsample can be found in Table 1.

4. Identification Strategy

4.1 Difference-in-Differences Specification

Let the indicator variable G_i equal 1 if the individual lives in county containing at least 1 participating FQHC (treatment group), and 0 if otherwise (control group). The binary T_i equals 1 if in post-treatment (2012-2015), and 0 if in pre-treatment (2008-2011). Let X_i stand for the set of covariates controlled for. The treatment effect in the difference-in-differences model can then be written as

$$DID=\{E[Y_i |G_i = 1, T_i =1] - E[Y_i |G_i = 1, T_i =0]\} - \{E[Y_i |G_i = 0, T_i =1] - E[Y_i |G_i = 0, T_i = 0] \quad (1)$$

where (1) can be re-written using the potential outcomes framework (Athey & Imbens, 2006) using y_i^1 and y_i^0 to denote the outcomes with and without treatment respectively –

$$DID = E[y_i^1| T_i =1 , G_i = 1, X_i] - E[y_i^0| T_i =1 , G_i = 1, X_i] \quad (2)$$

If **1** denotes the indicator function, then the observed outcome in the potential outcomes framework can be expressed as:

$$Y_i = \mathbf{1}[T_i =1 , G_i = 1] \times y_i^1 + (1-\mathbf{1}[T_i =1 , G_i = 1]) \times y_i^0 \quad (3)$$

$$= T_i \times G_i \times y_i^1 + (1 - T_i \times G_i) \times y_i^0 \quad (4)$$

Alternatively, the above in the context of a linear regression is:

$$Y_i = \beta_1 T_i + \beta_2 G_i + \beta_3 T_i G_i + X_i\theta + \varepsilon_i \quad (5)$$

where the coefficient of the interaction term, β_3, is where the treatment group and time indicator are jointly equal to 1, thereby reflecting the treatment group and thus the effect of the demonstration.

A value of 1 is a response of poor health for the outcome variable. Thus a negative interaction term is interpreted as a decline in poor health responses, which translates inversely to an overall increase in health levels. This effect is attributed to the FQHC APCP demonstration.

A key assumption of the DID framework is the “parallel trend”. This assumption states that prior to treatment, the trend in the outcome variable is the same between the treatment groups and control groups. I tested for this by comparing the trends before the treatment year (2008-2011) using year dummies and the outcome variable in an OLS regression. I did this for both treated and control counties, and then combined the two regressions into one using interaction terms. The interaction terms between the years prior to treatment and the treated counties were statistically indistinguishable from zero, demonstrating the trends were the same in both groups. To the extent of my knowledge, there were no other programs, or events happening at the same time in FQHC counties that would lead to a change in trends.

It is important to note that all regressions in this study were clustered by county, thus the standard errors reflect the variance in the models between counties and not within them, as is customary in county level regressions.

4.2 Multinomial Logit Specification

A multinomial logistic regression is a type of nonlinear probability model used when the dependent variable is categorical and contains more than 2 possible outcomes. In my specification, I estimate the set of coefficients for each outcome of "*Health*" - $\beta^{1(poor)}$, $\beta^{2(fair)}$, $\beta^{3(good)}$, $\beta^{4(very\ good)}$, and $\beta^{5(excellent)}$ - Thus, the probability of responding, say, "excellent health" to the questionnaire is:

$$Pr(y=5) = e^{X\beta 5} / (e^{X\beta 1}+ e^{X\beta 2}+ e^{X\beta 3}+ e^{X\beta 4}+ e^{X\beta 5}) \qquad (6)$$

In multinomial logits the results are relative to a base group, in this case the poor health response group. To make the coefficient measures relative to the poor health category, the coefficients of the poor health group is set equal to zero. Thus, to find the probability of responding "fair health" relative to "poor health" is:

$$Pr(y=2) / Pr(y=1) = e^{X\beta 2(fair)} \qquad (7)$$

For ease of interpretation, the exponentiated values of the coefficients are interpreted using the relative risk ratio (RRR). The RRR is the probability of choosing one outcome category over the probability of choosing the base outcome category. If the RRR is below 1, the outcome is more likely to be in the base group and vice versa for a RRR greater than 1.

In the multinomial logistic regressions, the outcome variable, "*Health*", is treated as nominal, meaning the categories have no intrinsic ordering. This creates a slight tradeoff in model effectiveness due to the disregard of the ordering of health responses but is less prone to specification error.[1]

5. Results

Estimating the DID models and multinomial logistic regressions with the general population does not produce significant results. The inclusion of young and well-off individuals diminishes the effect of the upgraded FQHC facilities. It is when the sample is stratified into the elderly, those living in counties of high poverty, and both the elderly that live in counties of high poverty that there is an observable and significant effect of the demonstration on health levels.

Table 2 shows estimates of the DID before inclusion of explanatory variables. In theory, the treatment group indicator of the model captures all different possible group effects between the treatment and control groups. The year indicator captures all time variant factors in the model. Column 2 shows the treatment effect of the demonstration on the elderly is a 1-percentage point decrease in poor health responses statistically significant at the 10% level. A similar treatment effect is seen for high poverty residents, column 3, but significant at the 5% level. Column 4 shows the effect of the treatment on the intersection (elderly living in high poverty) group. The magnitude of the treatment effect increases to 5 percentage points. These results are expected and plausible.

Table 3 shows the DID regressions with inclusion of explanatory variables. Adding explanatory variables to the DID model aids in reducing the error variance and increasing power to detect significance of the treatment. Therefore the magnitude of the coefficients are the same with or without inclusion of covariates, the main difference is the increase in significance to the 1% level for the high poverty sample.

[1] Ordered Logit Specificaiton conducted – Significant results with intersection sample (elderly living in poverty) only. Results not shown.

All covariates demonstrate the expected associations. For example, if female, married, or if employed, one was less likely to report poor health. Likewise, the more educated individual is, the lower it is for the likelihood of him or her reporting poor health. There was a similar effect for income; the more that the individual makes, the less likely it is for them to report poor health. Blacks, Hispanics, Native Americans, and other ethnicities were more likely to report worse health relative to Whites, except for Asians.

Tables 4 through 7 show the multinomial logistic regression results by subsample. The results are relative risk ratios comparable to the base group of poor health. The interaction term, or the main coefficient of interest, represents the impact of the treatment facilities on reporting a health status. An interaction term with a RRR greater than 1 simply states that for an individual living in a county with treated FQHCs, the likelihood of reporting health of the comparison group (not poor health) is more likely. Table 4 shows estimates using the general population, and the treatment effect is insignificant. The RRR for the interaction term in the subsampled data, ages>=65, residents of high poverty areas, and the intersection of elderly living in high poverty areas (Table 5, 6 and 7 respectively) shows they are greater than 1 and statistically significant for the comparison group outcomes. This means that if the individual lives in a county with a treated facility, then he or she is more likely to report “fair,” “good,” or “very good” health statuses as opposed to “poor”. The exception is the age>=65 sample, where the result is only statistically significant for the “fair” category. The likelihood of reporting “excellent” health relative to “poor health” is insignificant in all cases. This result is expected, since a change to excellent health from poor health involves many factors, and an upgraded FQHC may not be sufficient. As for the covariates, their results are consistent with the DID regressions, all of the expected association.

6. Conclusion

In this paper, I examined the effect of the FQHC APCP demonstration on the self-reported general health of the community. Using the responses to the health status question from the ASEC supplement as the outcome of interest, the multiple analyses conducted capture an improvement in the general health of the elderly and individuals living in communities of high poverty. The results from this study align with the literature in that individuals with low socio-economic backgrounds are the ones who most benefit from FQHCs. The magnitude of the impact may be understated in this study because the FQHC APCP project started in October of 2011 and came to completion in October of 2014, thus there may be a delay period in observing the full effect of the facility enhancements on health levels. Also, as with many dependent variables, classical measurement error is a concerning factor. Indeed, the individuals being surveyed are prone to error and possibly not caring to report correct estimates. Another caveat involves the homeless population not being included in this study since the CPS collects data in person or over the phone. Future research should use individual panel data (data that follows individuals through time) for a more precise analysis on the impact. This study has many implications for policy reform, especially for Medicare and reduction of health care costs for the elderly and poor.

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Table 1 - Full Set of Descriptive Statistics (mean only) by Subsample

	(1) Full Sample	(2) Age>=65	(3) HighPov	(4) Age>=65 & HighPov
health	3.865	3.022	3.708	2.784
poor health	0.028	0.097	0.036	0.129
fair health	0.074	0.215	0.096	0.276
good health	0.243	0.358	0.276	0.353
very good health	0.312	0.226	0.303	0.167
excellent health	0.342	0.103	0.288	0.075
year	2011	2011	2011	2011
post	0.493	0.528	0.490	0.533
treated county	0.398	0.394	0.552	0.573
post*treated county	0.199	0.208	0.275	0.310
state	19.08	18.84	24.15	25.09
metropolitan	0.967	0.957	0.986	0.985
northeast	0.168	0.182	0.287	0.332
midwest	0.147	0.134	0.126	0.137
south	0.314	0.331	0.296	0.273
west	0.370	0.353	0.291	0.258
pop/10000	15.73	14.87	10.18	10.80
high poverty	0.098	0.093	1	1
MDs	4715	4595.7	2870.6	3241.7
age	35.26	73.80	33.91	73.63
female	0.516	0.568	0.528	0.586
married	0.510	0.549	0.455	0.499
employed	0.607	0.181	0.540	0.143
family size	3.492	2.186	3.623	2.186
white	0.506	0.595	0.302	0.384
black	0.132	0.142	0.207	0.246
hispanic	0.249	0.148	0.414	0.299
asian	0.076	0.091	0.049	0.046
native	0.012	0.010	0.018	0.016
other ethnicities	0.023	0.013	0.009	0.007
less than high school	0.192	0.196	0.273	0.338
high school	0.264	0.341	0.280	0.324
some college	0.263	0.214	0.255	0.174

bachelor’s	0.182	0.141	0.127	0.088
master’s+	0.100	0.108	0.064	0.076
income<$15,000	0.403	0.409	0.499	0.536
$15,000-25,000	0.143	0.216	0.148	0.187
$25,000-50,000	0.228	0.217	0.205	0.178
$50,000-75,000	0.106	0.078	0.079	0.053
$75,000+	0.120	0.079	0.068	0.044
N	702,192	77,697	69,425	7,290

Table 2 - Difference In Differences: Effect of Demonstration on Poor Health by Subsample (No Covariates)

	(1) Full Sample	(2) Age>=65	(3) HighPov	(4) Age>=65 & HighPov
treated county	0.0026*	0.0151**	0.0034	0.0199
	(0.001)	(0.007)	(0.004)	(0.019)
post	-0.0000	-0.0104***	0.0065*	0.0062
	(0.001)	(0.004)	(0.004)	(0.019)
post*treated county	-0.0009	-0.0108*	-0.0117**	-0.0515**
	(0.001)	(0.006)	(0.004)	(0.022)
N	702,192	77,697	69,425	7,290
adj. R^2	0.000	0.001	0.000	0.002

Standard errors in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$

Table 3 - Difference In Differences: Effect of Demonstration on Poor Health by Subsample (With Covariates)

	(1) Full Sample	(2) Age>=65	(3) HighPov	(4) Age>=65 & HighPov
treated county	0.0019	0.0015	-0.0062	0.0343*
	(0.002)	(0.006)	(0.005)	(0.019)
post	-0.0021	-0.0055	0.0097	0.0316
	(0.001)	(0.006)	(0.007)	(0.025)
post*treated county	-0.0002	-0.0112*	-0.0165***	-0.0531**
	(0.002)	(0.007)	(0.006)	(0.021)
metropolitan	-0.0006	0.0040	0	0
	(0.003)	(0.009)	(.)	(.)
pop/10000	-0.0000	-0.0000	-0.0011	0.0041
	(0.000)	(0.000)	(0.001)	(0.010)
MDs	7.39e-08	0.0000	0.0000	-0.0000
	(0.000)	(0.000)	(0.000)	(0.000)
age	0.0042***	-0.0366***	0.0050***	-0.0498***
	(0.000)	(0.005)	(0.001)	(0.017)
female	-0.0064***	-0.0177***	-0.0088***	-0.0085
	(0.001)	(0.003)	(0.002)	(0.009)
married	-0.0155***	-0.0198***	-0.0176***	-0.0213
	(0.001)	(0.003)	(0.003)	(0.014)
family size	-0.0025***	0.0002	-0.0035***	-0.0009
	(0.000)	(0.002)	(0.001)	(0.005)
black	0.0064***	0.0220***	0.0070	0.0191
	(0.002)	(0.005)	(0.008)	(0.014)
hispanic	0.0005	0.0077	0.0029	-0.0086
	(0.001)	(0.006)	(0.004)	(0.025)
asian	-0.0022	-0.0032	0.0046	0.0186
	(0.002)	(0.007)	(0.006)	(0.028)
native	0.0169***	0.0471***	0.0028	-0.0182
	(0.004)	(0.016)	(0.007)	(0.020)
other ethnicity	0.0109***	0.0343*	0.0116	0.0090
	(0.002)	(0.018)	(0.012)	(0.045)
high school	-0.0110***	-0.0384***	-0.0125***	-0.0373***

	(0.002)	(0.006)	(0.004)	(0.013)
some college	-0.0148***	-0.0454***	-0.0159***	-0.0484**
	(0.002)	(0.005)	(0.002)	(0.018)
bachelor’s	-0.0227***	-0.0572***	-0.0194***	-0.0468**
	(0.002)	(0.006)	(0.004)	(0.021)
master’s+	-0.0251***	-0.0587***	-0.0281***	-0.0655***
	(0.002)	(0.006)	(0.005)	(0.020)
employed	-0.0414***	-0.0581***	-0.0547***	-0.0788***
	(0.002)	(0.003)	(0.004)	(0.012)
$15,000-25,000	-0.0094***	-0.0249***	-0.0016	-0.0192
	(0.001)	(0.004)	(0.003)	(0.013)
$25,000-50,000	-0.0240***	-0.0418***	-0.0239***	-0.0413***
	(0.001)	(0.004)	(0.004)	(0.014)
$50,000-75,000	-0.0292***	-0.0498***	-0.0307***	-0.0528**
	(0.001)	(0.005)	(0.004)	(0.020)
$75,000+	-0.0314***	-0.0450***	-0.0341***	-0.0647***
	(0.001)	(0.006)	(0.004)	(0.019)
_cons	-0.0083	1.495***	-0.0129	2.011***
	(0.007)	(0.203)	(0.021)	(0.625)
N	406,100	57,236	38,765	5,284
adj. R^2	0.059	0.035	0.072	0.032

Standard errors in parentheses
Models also include variables for state and year
* $p < .1$, ** $p < .05$, *** $p < .01$

Table 4 - Multinomial Logit Model of Health Outcomes for Full Sample

VARIABLES	Fair Full Sample	Good Full Sample	Very Good Full Sample	Excellent Full Sample
treated county	0.990	0.905**	0.969	0.929
	(0.041)	(0.041)	(0.059)	(0.062)
post	1.062	1.061	1.049	0.994
	(0.057)	(0.057)	(0.059)	(0.055)
post*treated county	0.986	1.056	0.997	1.037
	(0.055)	(0.060)	(0.060)	(0.062)
metropolitan	0.977	0.968	1.029	1.175*
	(0.080)	(0.071)	(0.082)	(0.113)
pop/10000	1.004	1.003	1.000	0.997
	(0.003)	(0.003)	(0.004)	(0.004)
MDs	1.000	1.000	1.000	1.000
	(0.000)	(0.000)	(0.000)	(0.000)
age	0.937***	0.854***	0.822***	0.787***
	(0.004)	(0.004)	(0.004)	(0.004)
female	1.162***	1.276***	1.356***	1.281***
	(0.025)	(0.028)	(0.030)	(0.026)
married	1.148***	1.481***	1.776***	1.896***
	(0.026)	(0.033)	(0.042)	(0.047)
family size	1.026***	1.058***	1.039***	1.044***
	(0.009)	(0.010)	(0.011)	(0.011)
black	1.147***	0.949	0.708***	0.579***
	(0.042)	(0.041)	(0.035)	(0.031)
hispanic	1.128***	1.178***	0.932	0.727***
	(0.045)	(0.058)	(0.042)	(0.038)
asian	1.225***	1.287***	1.005	0.864**
	(0.066)	(0.069)	(0.063)	(0.061)
native	0.905	0.750***	0.541***	0.468***
	(0.085)	(0.070)	(0.049)	(0.048)
other ethnicity	0.924	0.757***	0.670***	0.600***
	(0.071)	(0.049)	(0.051)	(0.041)
high school	1.142***	1.358***	1.519***	1.422***
	(0.039)	(0.059)	(0.049)	(0.052)
some college	1.131***	1.394***	1.814***	1.977***
	(0.043)	(0.059)	(0.057)	(0.081)
bachelor’s	1.252***	1.824***	2.950***	3.881***
	(0.059)	(0.095)	(0.130)	(0.197)
master’s+	1.168***	1.829***	3.089***	4.588***
	(0.062)	(0.111)	(0.169)	(0.287)
employed	2.300***	4.397***	4.922***	4.751***
	(0.090)	(0.180)	(0.232)	(0.207)

$15,000-25,000	1.082***	1.244***	1.367***	1.279***
	(0.030)	(0.035)	(0.040)	(0.041)
$25,000-50,000	1.281***	1.772***	2.276***	2.205***
	(0.041)	(0.062)	(0.081)	(0.090)
$50,000-75,000	1.397***	2.207***	3.339***	3.428***
	(0.072)	(0.112)	(0.183)	(0.180)
$75,000+	1.471***	2.501***	4.110***	4.910***
	(0.105)	(0.165)	(0.282)	(0.328)
_cons	7.438***	101.4***	291.7***	871.7***
	(1.201)	(16.022)	(75.799)	(222.009)

Exponentiated coefficients; Standard errors in parentheses
Models also include variables for state and year
RRR relative to Poor Health
* $p < .1$, ** $p < .05$, *** $p < .01$

Table 5 - Multinomial Logit Model of Health Outcomes for Individuals Ages>=65

VARIABLES	Fair Age>=65	Good Age>=65	Very Good Age>=65	Excellent Age>=65
treated county	0.996	0.971	0.982	1.044
	(0.064)	(0.064)	(0.084)	(0.102)
post	1.039	1.073	1.172*	0.943
	(0.078)	(0.091)	(0.098)	(0.096)
post*treated county	1.189**	1.133	1.084	1.089
	(0.101)	(0.094)	(0.106)	(0.130)
metropolitan	0.968	0.956	0.905	1.018
	(0.106)	(0.116)	(0.133)	(0.152)
pop/10000	1.005	1.000	0.996	0.999
	(0.003)	(0.004)	(0.004)	(0.005)
MDs	1.000	1.000	1.000	1.000
	(0.000)	(0.000)	(0.000)	(0.000)
age	1.330***	1.476***	1.435***	1.556***
	(0.088)	(0.102)	(0.100)	(0.164)
female	1.095***	1.227***	1.411***	1.414***
	(0.038)	(0.048)	(0.055)	(0.061)
married	1.074*	1.305***	1.387***	1.368***
	(0.040)	(0.048)	(0.055)	(0.071)
family size	1.002	1.003	0.966	1.019
	(0.016)	(0.019)	(0.021)	(0.024)
black	1.037	0.814***	0.614***	0.405***
	(0.059)	(0.045)	(0.042)	(0.038)

hispanic	1.120*	0.939	0.727***	0.711***
	(0.065)	(0.071)	(0.053)	(0.072)
asian	1.248***	1.120	0.809**	0.751***
	(0.097)	(0.111)	(0.084)	(0.079)
native	0.740	0.666**	0.436***	0.494***
	(0.140)	(0.122)	(0.064)	(0.111)
other ethnicity	0.835	0.664**	0.595***	0.495***
	(0.152)	(0.128)	(0.111)	(0.075)
high school	1.109*	1.444***	1.828***	1.720***
	(0.060)	(0.081)	(0.106)	(0.122)
some college	1.071	1.531***	2.274***	2.161***
	(0.053)	(0.088)	(0.132)	(0.158)
bachelor’s	1.151*	1.748***	2.924***	3.348***
	(0.089)	(0.137)	(0.221)	(0.310)
master’s+	1.032	1.837***	3.250***	4.094***
	(0.089)	(0.159)	(0.306)	(0.411)
employed	2.223***	3.819***	4.912***	5.300***
	(0.195)	(0.312)	(0.411)	(0.445)
$15,000-25,000	1.131***	1.268***	1.382***	1.469***
	(0.047)	(0.053)	(0.071)	(0.084)
$25,000-50,000	1.265***	1.527***	1.970***	2.137***
	(0.063)	(0.073)	(0.109)	(0.146)
$50,000-75,000	1.382***	1.843***	2.623***	3.061***
	(0.118)	(0.156)	(0.246)	(0.306)
$75,000+	1.266*	1.819***	2.655***	3.754***
	(0.159)	(0.211)	(0.324)	(0.471)
_cons	0.000***	0.000***	0.000***	6.20e-08***
	(0.000)	(0.000)	(0.000)	(0.000)

Exponentiated coefficients; Standard errors in parentheses
Models also include variables for state and year
RRR relative to Poor Health
* $p < .1$, ** $p < .05$, *** $p < .01$

Table 6 - Multinomial Logit Model of Health Outcomes for Individuals Residing in High Poverty Areas

VARIABLES	Fair High Poverty	Good High Poverty	Very Good High Poverty	Excellent High Poverty
treated county	1.024	1.231	1.073	1.201
	(0.151)	(0.157)	(0.174)	(0.236)
post	0.731^{*}	0.805	0.671^{*}	0.917
	(0.117)	(0.137)	(0.137)	(0.172)
post*treated county	1.545^{***}	1.592^{***}	1.623^{***}	1.198
	(0.248)	(0.235)	(0.277)	(0.196)
metropolitan	1	1	1	1
	(.)	(.)	(.)	(.)
pop/10000	1.017	1.054	1.025	1.019
	(0.031)	(0.049)	(0.043)	(0.057)
MDs	1.000	1.000	1.000	1.000
	(0.000)	(0.000)	(0.000)	(0.000)
age	0.936^{***}	0.847^{***}	0.817^{***}	0.786^{***}
	(0.013)	(0.011)	(0.013)	(0.011)
female	1.192^{***}	1.296^{***}	1.272^{***}	1.195^{***}
	(0.056)	(0.069)	(0.079)	(0.080)
married	1.084	1.508^{***}	1.750^{***}	1.895^{***}
	(0.082)	(0.110)	(0.143)	(0.143)
family size	1.042	1.075^{**}	1.064^{**}	1.044
	(0.027)	(0.034)	(0.032)	(0.029)
black	1.132	0.936	0.696^{*}	0.582^{***}
	(0.129)	(0.150)	(0.135)	(0.117)
hispanic	1.105	1.033	0.823	0.692^{**}
	(0.130)	(0.124)	(0.117)	(0.100)
asian	0.789^{*}	1.035	0.808	0.764
	(0.099)	(0.149)	(0.199)	(0.177)
native	0.926	1.108	0.666	0.910
	(0.179)	(0.218)	(0.175)	(0.195)
other ethnicities	0.809	0.917	0.572^{*}	0.544^{**}
	(0.217)	(0.272)	(0.178)	(0.153)
high school	1.161^{**}	1.321^{***}	1.475^{***}	1.400^{***}
	(0.082)	(0.100)	(0.091)	(0.116)
some college	1.159^{**}	1.396^{***}	1.788^{***}	2.010^{***}
	(0.080)	(0.077)	(0.123)	(0.128)
bachelor’s	1.112	1.615^{***}	2.380^{***}	2.961^{***}
	(0.155)	(0.180)	(0.337)	(0.449)
master’s+	1.334	1.898^{***}	3.165^{***}	4.127^{***}
	(0.237)	(0.324)	(0.604)	(0.756)
employed	2.655^{***}	5.615^{***}	6.474^{***}	5.948^{***}

	(0.411)	(0.810)	(0.965)	(0.795)
$15,000-25,000	0.865**	1.013	1.115	1.084
	(0.060)	(0.076)	(0.090)	(0.080)
$25,000-50,000	1.131	1.702***	2.269***	2.329***
	(0.129)	(0.215)	(0.275)	(0.305)
$50,000-75,000	1.563**	2.394***	3.833***	3.998***
	(0.314)	(0.454)	(0.763)	(0.758)
$75,000+	1.870**	3.046***	5.312***	5.682***
	(0.494)	(0.615)	(1.118)	(1.190)
_cons	6.379***	104.1***	316.7***	819.0***
	(2.765)	(43.136)	(204.862)	(561.884)

Exponentiated coefficients; Standard errors in parentheses
Models also include variables for state and year
RRR relative to Poor Health
* $p < .1$, ** $p < .05$, *** $p < .01$

Table 7 - Multinomial Logit Model of Health Outcomes for Elderly Residing in High Poverty Areas

VARIABLES	Fair High Poverty & Age>=65	Good High Poverty & Age>=65	Very Good High Poverty & Age>=65	Excellent High Poverty & Age>=65
treated county	0.609***	0.808	0.819	0.757
	(0.113)	(0.147)	(0.175)	(0.221)
post	0.794	0.699	0.601*	0.898
	(0.205)	(0.169)	(0.176)	(0.304)
post*treated county	1.755**	1.733***	1.835**	1.014
	(0.411)	(0.368)	(0.524)	(0.369)
metropolitan	1	1	1	1
	(.)	(.)	(.)	(.)
pop/10000	0.977	0.975	0.951	0.873
	(0.072)	(0.094)	(0.094)	(0.091)
MDs	1.000	1.000	1.000	1.000
	(0.000)	(0.000)	(0.000)	(0.000)
age	1.437**	1.614***	1.795**	1.345
	(0.233)	(0.274)	(0.415)	(0.432)
female	1.038	1.113	1.203	1.100
	(0.090)	(0.101)	(0.140)	(0.165)
married	1.012	1.324**	1.422**	1.510**
	(0.144)	(0.177)	(0.204)	(0.283)

family size	1.003	1.011	1.002	1.066
	(0.040)	(0.058)	(0.061)	(0.067)
black	0.986	0.810	0.798	0.399***
	(0.125)	(0.113)	(0.138)	(0.100)
hispanic	1.156	1.152	0.851	0.911
	(0.260)	(0.336)	(0.233)	(0.223)
asian	0.781	0.805	0.911	0.978
	(0.161)	(0.135)	(0.509)	(0.473)
native	0.992	1.915***	0.636	0.927
	(0.479)	(0.354)	(0.316)	(0.446)
other ethnicities	0.689	1.427	0.358	0.523
	(0.446)	(0.590)	(0.249)	(0.482)
high school	1.100	1.391**	2.029***	2.127***
	(0.145)	(0.180)	(0.311)	(0.438)
some college	1.072	1.654**	2.513***	2.521***
	(0.162)	(0.334)	(0.600)	(0.641)
bachelor’s	0.921	1.516**	2.446***	4.009***
	(0.268)	(0.318)	(0.598)	(1.195)
master’s+	1.161	2.152**	4.144***	6.712***
	(0.421)	(0.726)	(1.612)	(1.998)
employed	2.706***	5.088***	8.458***	7.349***
	(0.965)	(1.820)	(3.068)	(2.937)
$15,000-25,000	0.954	1.340**	1.314*	0.998
	(0.129)	(0.167)	(0.188)	(0.144)
$25,000-50,000	1.043	1.627***	1.992***	1.761**
	(0.191)	(0.230)	(0.329)	(0.454)
$50,000-75,000	1.210	2.334**	3.561***	2.216**
	(0.467)	(0.820)	(1.409)	(0.704)
$75,000+	3.420**	3.705**	5.100**	5.174***
	(1.910)	(1.914)	(3.403)	(2.722)
_cons	0.000**	2.78e-08***	3.25e-10**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)

Exponentiated coefficients; Standard errors in parentheses
Models also include variables for state and year
RRR relative to Poor Health
* $p < .1$, ** $p < .05$, *** $p < .01$

Figure 1. The 434 Participating FQHCs

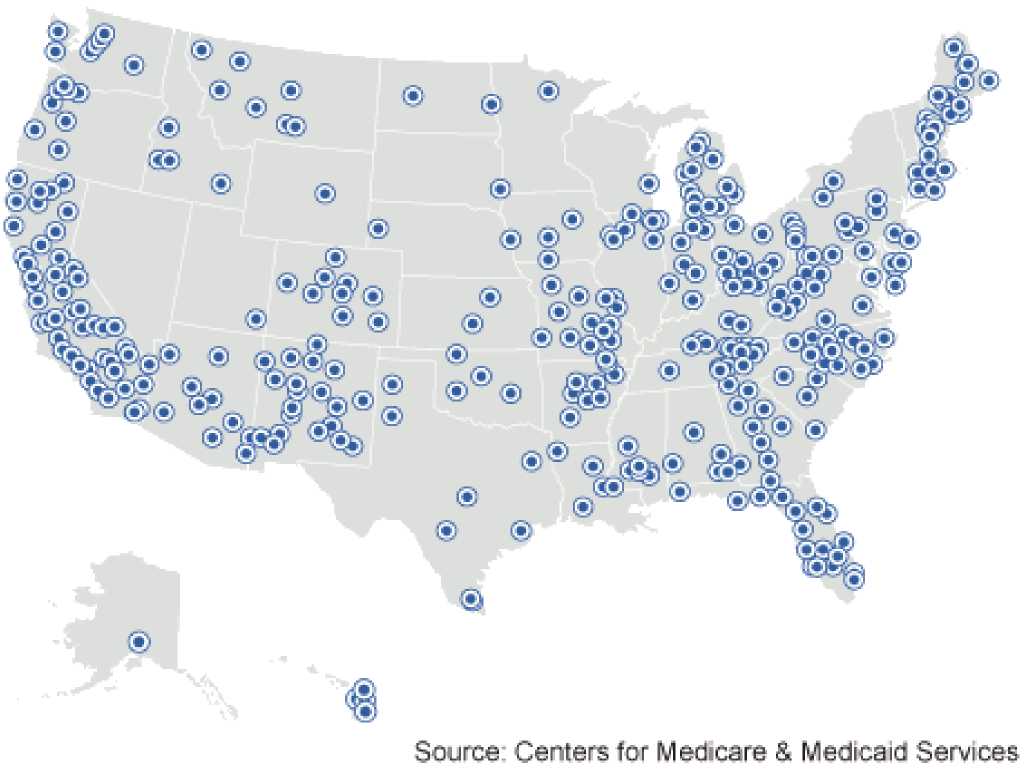

Figure 2. Health Distribution by Subsample