

PUBLIC HEALTH INSURANCE, PROGRAM TAKE-UP, AND CHILD HEALTH

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Abstract—Of the ten million uninsured children in 1996, nearly half were eligible for public health insurance (Medicaid) but not enrolled. In response, policy efforts to reduce the uninsured have shifted from expanding Medicaid eligibility to increasing take-up among those eligible. However, little is known about the reasons poor families fail to enroll or the consequences. Using a unique data set I find that information and administrative costs are important barriers to enrollment, especially for Hispanics and Asians. In addition, enrolling children in Medicaid before they get sick promotes the use of preventative care, reduces the need for hospitalization, and improves health.

I. Introduction

IN 1996, ten million U.S. children were without health insurance and nearly half a million children were hospitalized for conditions that could have been avoided had they had access to timely preventative care (Fronstin, 1998; Graves & Kozak, 1998). Such facts have often been used to support efforts to expand eligibility for public health insurance. However, nearly half of the ten million children without insurance were already eligible for Medicaid, the public health insurance program for poor families, but not enrolled (Selden, Banthin, & Cohen, 1998). And evidence presented by Card and Shore-Sheppard (2002) suggests that recent Medicaid eligibility expansions have had a very limited impact on health insurance coverage precisely because of low take-up, not crowd-out. As a result, recent debate over improving health insurance coverage has shifted away from eligibility expansions to increasing enrollment or take-up among those already eligible but not enrolled.

However, little is known about the reasons nearly half of poor families fail to use public programs that involve no out-of-pocket costs. In a review of the existing literature on program take-up, Remler, Rachlin, and Glied (2001) conclude that of the factors determining program (including Medicaid) participation, “what little evidence about their effects that exists is primarily qualitative and self-reported, based on focus groups and reports of officials. Their quantitative magnitude is entirely unknown.”

Yet the policy debate over Medicaid take-up also raises the question of whether early enrollment in Medicaid leads to gains in efficiency or health. Unlike the food stamp or

cash welfare programs for which lack of program participation results in lack of any benefit, poor children who are eligible for Medicaid but who fail to enroll will be cared for (by law) should they become ill and require hospitalization. Not only will they be cared for, but their care will be covered by Medicaid since eligible uninsured children are nearly always enrolled in Medicaid when they present at the hospital.¹ Thus, the potential benefit of early enrollment lies in its promotion of the efficient use of healthcare resources by increasing financial access to ambulatory preventative care prior to hospitalization, resulting in fewer hospitalizations, better health, and lower costs. However, estimation of the impact of Medicaid enrollment on healthcare utilization and child health is hindered by the endogeneity of the enrollment decision: children who are less healthy and thus in greater need of medical care and hospitalization are more likely to enroll.

Thus the purpose of this research is twofold: (i) to better understand the causes of low take-up in public programs by studying the case of Medicaid, and (ii) to determine whether greater Medicaid take-up improves access to primary preventative care and reduces the need for hospitalization. To answer these questions, I create a unique data set for the state of California that combines information on the timing and placement of outreach efforts to increase Medicaid take-up with administrative data on Medicaid enrollment and hospitalization for the period 1996–2000 at a very fine level of detail (the ZIP code and month). The California outreach campaign was launched in mid-1998 and consists of advertising a toll-free hotline number and providing community-based application assistance that is often bilingual. Identification follows from the exogenous variation in both the placement and the timing of the outreach, using geographic fixed effects to account for any potential selection in the placement of outreach.

I find the largest effects of outreach on those with the highest costs of enrolling: Hispanic and Asian children who have greater language and immigration concerns than other families. Proximity to an additional bilingual application assistant increases new monthly Medicaid enrollment among Hispanics by 7% to 9% and among Asian children by 27% to 36%. Advertising has a smaller impact on new enrollment than application assistance and its impact is slightly delayed. English-language advertisements increase new Medicaid enrollment among all children in the follow-

¹ In California very few children are discharged from the hospital with no source of insurance listed. This is likely due to the fact that most hospitals in California (and elsewhere) have workers on-site to aid with Medicaid enrollment.

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ing month by 4.7% and Spanish-language advertisements increase new enrollment among Hispanic children the following month by an additional 2.5%. These results have important implications not only for improving Medicaid coverage among poor children, but also for increasing take-up in other programs such as food stamps and the Earned Income Tax Credit (EITC).

In the second part of the paper, I use instrumental variable techniques to estimate the impact of early Medicaid take-up on access to primary care and avoidable hospitalizations. In the first stage I estimate the impact of outreach on Medicaid enrollment. In the second stage I estimate the impact of (predicted) Medicaid enrollment on avoidable hospitalizations. I define hospitalizations as avoidable if they are for “diagnoses for which timely and effective ambulatory care can help to reduce the risks of hospitalization by either preventing the onset of an illness or condition, or controlling an acute episodic disease or condition” (Billings & Teicholz, 1990). If families respond to local outreach efforts and enroll their children in Medicaid before they become sick, this should improve their access to regular ambulatory care and the number of avoidable hospitalizations should decline. I find that increased take-up leads to lower hospitalization rates for avoidable conditions but not others. IV results suggest that increasing the number of children with Medicaid by 10% results in a 2% to 3% decline in avoidable hospitalizations among children.

The rest of the paper proceeds as follows: section II surveys the existing literature on outreach and Medicaid take-up and avoidable hospitalizations; section III provides background on California’s outreach program; section IV describes the data, empirical strategy, and results of the analysis of the effect of outreach on enrollment; section V presents the results of the analysis of the impact of increases in enrollment on avoidable hospitalizations; and section VI concludes.

II. Existing Literature

A. Medicaid Take-Up

Though Medicaid has no out-of-pocket costs, many poor families still fail to enroll: nearly half of all uninsured children in California in 1998 were eligible for Medicaid but not enrolled. The three main reasons for low take-up, as hypothesized in the literature, are (i) lack of information (information costs); (ii) administrative hassle associated with an application that requires considerable paperwork, verification of income, and visits with caseworkers (process costs); and (iii) stigma associated with public programs (outcome costs) (Craig, 1991).

What empirical work on Medicaid take-up exists consists largely of focus groups and case studies, the results of which may not be generalizable to the population of uninsured

children.² Three qualitative studies of Medicaid take-up in California suggest that process and information costs are the main concerns for this population, particularly for immigrant populations who face language barriers and may have documentation concerns.³

B. Avoidable Child Hospitalizations

Of all child hospitalizations, 18% to 28% are avoidable or ambulatory care sensitive (McConnochie, Roghmann, & Liptak, 1997). There is strong evidence that a high rate of avoidable hospitalizations do reflect inadequate ambulatory care (Parchman & Culler, 1994; Shi et al., 1999; Gill & Mainous, 1998; Gadmoski, Jenkins, & Nichols, 1998; Epstein, 2001).⁴

Linking avoidable hospitalizations to insurance coverage, however, has proven more difficult because of unobserved characteristics correlated with both the insurance decision and the medical care utilization. If underlying factors, such as initial health status, care-seeking behavior, or poverty, are associated with Medicaid enrollment and with avoidable hospitalizations, then Medicaid enrollment is endogenous, complicating estimation of its impact on hospitalizations. Work by Kaestner, Joyce, and Racine (1999) and Dafny and Gruber (2005) represent the two best efforts to control for these factors in estimates of the impact of Medicaid eligibility expansions on child hospitalization. The authors identify the effect of expanding Medicaid eligibility to previously ineligible children by using variation across states over time (as the Medicaid expansions were implemented at different times in different states).⁵ Kaestner et al. (1999) find mixed evidence regarding the impact of Medicaid eligibility expansions on avoidable hospitalizations, concluding that there is “at best weak support for the hypothesis that Medicaid improves the health of low-income children.” Dafny and Gruber (2005) find that expanding Medicaid eligibility increases the total number of hospitalizations, but

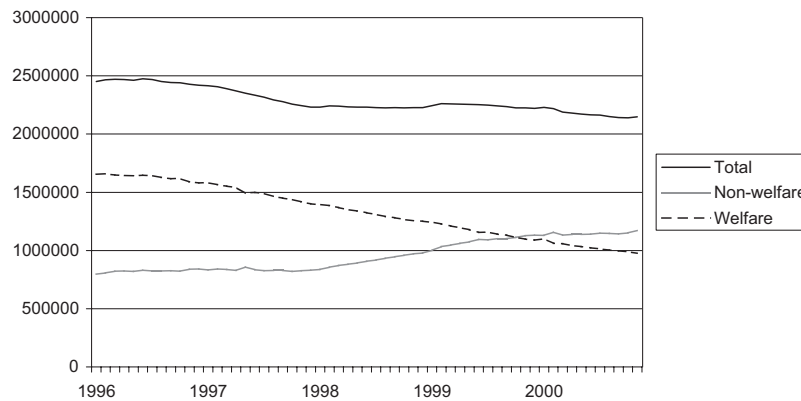
² Focus groups on Medicaid enrollment in California revealed that confusion over eligibility, language barriers, fears about immigration, and an onerous enrollment process were considered important barriers by eligibles (Perry, Stark, & Valdez, 1998; Perry, 2001). Other research concludes that the enrollment process (long applications and waiting periods) represents a greater barrier to enrollment than concerns related to eligibility, coverage, benefits, costs, physician availability, and documentation requirements (Medi-Cal Policy Institute, 2002).

³ Immigration concerns consist of fears of deportation among those in the United States without proper documentation, and for those with documentation, fears of being considered a “public charge” which could lead to deportation.

⁴ For example, Parchman and Culler (1994) find that areas with more general practice physicians have lower rates of avoidable hospitalizations, controlling for other environmental characteristics that might affect hospitalization rates. Shi et al. (1999) find that those children without a primary care provider were nearly ten times more likely to be hospitalized for an ambulatory care sensitive (ACS) condition than those with a primary care provider.

⁵ Their method relies on the inclusion of state and time fixed effects to control for unobservables correlated with Medicaid coverage and hospitalization rates. They also exploit some within state \times year variation, as the Medicaid expansions included children of some ages, and not others.

FIGURE 1.—TOTAL MEDICAID ENROLLMENT OVER TIME



that the increase was mitigated by a much smaller (and statistically insignificant) increase in avoidable hospitalizations.

The question raised and answered in this paper, however, differs from both these two papers, which can explain the different results. In this paper I estimate the impact not of expanding eligibility to additional children, *but of increasing program take-up among children already eligible*. Those made eligible for Medicaid through program expansions gain access to both inpatient and ambulatory care, which may have opposing effects on avoidable hospitalizations: the former may raise all hospitalizations (including avoidable ones), while the latter may reduce them. A priori, it is not clear which dominates, though the evidence on eligibility expansions presented by Kaestner et al. (1999) and Dafny and Gruber (2005) suggests that the increase in access to inpatient care is at least as great as the increase in access to ambulatory preventative care. In contrast, the impact on hospitalization of an outreach campaign that targets those who already have access to inpatient care but stand to gain access to ambulatory care is unambiguously negative. This can explain why, unlike previous work on eligibility expansions, I find that increasing take-up reduces avoidable hospitalizations.⁶ A second difference between this work and that of previous work is that I use considerably more detailed data (outreach, enrollment, and hospitalization at the ZIP code level versus state level), enabling me to control for many factors, observed and unobserved, that vary at a local level and may affect both Medicaid enrollment and child health. In addition, I use a novel instrument to identify the impact of Medicaid enrollment on child hospitalizations.

III. Background on Medicaid and Outreach in California

A. Medicaid Eligibility

Children in California qualify for Medicaid through multiple channels. The most common channel (67% of all

Medicaid-covered children in 1996) is through the cash welfare program—AFDC/TANF. All children on welfare are automatically eligible for Medicaid and thus face zero costs of enrollment in Medicaid. The next most common means of Medicaid enrollment among children are through the Medicaid poverty expansion and medically needy programs, and, more recently, the federal section 1931(b) program. The outreach programs developed by the state target families eligible through all non-welfare mechanisms.⁷

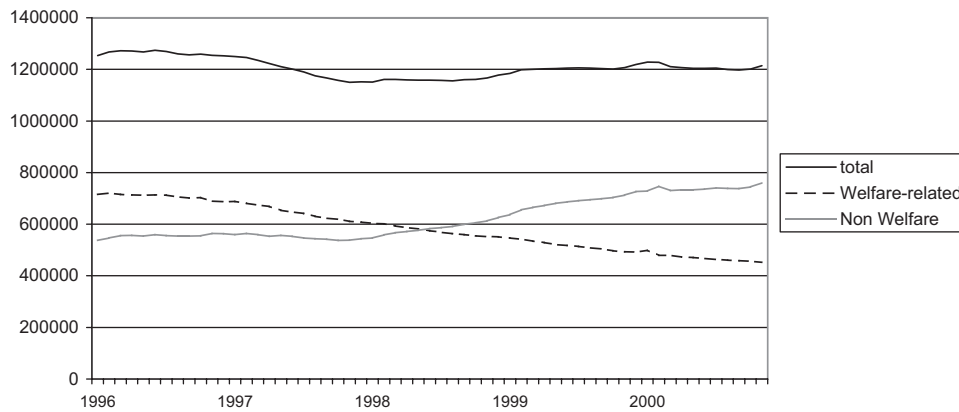
B. Trends in Child Medicaid Enrollment

Child Medicaid enrollment in California has been declining since 1995 (California Medical Assistance Program, Annual Statistical Report, 2000). The driving force behind the decline in Medicaid enrollment has been drastically falling welfare rolls in California that have been partially offset by a rise in children enrolled through other non-welfare-related channels beginning in mid-1998, coincident with the implementation of the state's outreach program in June of that year (figure 1). This suggests that the rise in non-welfare-related Medicaid enrollment does not simply reflect a transfer of enrollment from welfare-related enrollment as welfare caseloads decline, but is likely linked to outreach launched in mid-1998. For Hispanic children, the increase in enrollment beginning in 1998 was particularly

⁶ One could argue that if eligible children do not know they are eligible, then an outreach campaign would have the same effect as an eligibility expansion in terms of increasing access to inpatient care as well. If that were the case, then an outreach campaign might increase hospitalizations, contrary to these findings.

⁷ In California, the poverty expansions extend Medicaid eligibility to infants up to 200% of the federal poverty level (FPL), children under age 6 up to 133%, children ages 6–15 up to 100%, and children ages 15 and older up to 82% of the FPL. California's medically needy program is a relatively generous program, providing coverage to families with income roughly one-third higher than current AFDC/TANF levels. The 1931(b) program (implemented in January 1998) stipulates that all families with income below 100% FPL are eligible for Medicaid. For most children (except those age 15 and older), 1931(b) did not represent an eligibility expansion.

FIGURE 2.—TOTAL HISPANIC MEDICAID ENROLLMENT OVER TIME



large, resulting in a net increase in total Hispanic Medicaid enrollment between 1998 and 2000 (figure 2).

C. California's Uninsured and the Medicaid Outreach Campaign

A 1999 study of the uninsured in California estimated that of the 1.8 million uninsured children in the state, nearly 800,000 were eligible for Medicaid and among those eligible, 60% were Hispanic.⁸ Low rates of take-up among the Hispanic population are consistent with their facing greater costs of enrolling due to language barriers and/or immigration concerns.

California's outreach campaign was launched in June 1998 coincident with the launching of the state's SCHIP program, entitled Healthy Families, which expanded coverage to children in families with income above Medicaid eligibility thresholds but below 250% of the federal poverty level through a separate, non-Medicaid program. The outreach campaign targets both the 800,000 uninsured children eligible for Medicaid but not enrolled and an additional 325,000 newly eligible for Healthy Families. The outreach campaign comprises two main components discussed in turn below.

Community-Based Application Assistants (CBOs). Community-based application assistants (CBOs) are non-profit community organizations that are trained by the state in the completion of Medicaid applications. This component of the outreach campaign is designed to lower the process or application costs of enrollment, and the state budgeted \$6.7 million for CBOs in the first year.⁹ CBOs do not represent new organizations placed in the community for the purpose of conducting outreach and enrollment, but are preexisting organizations that are trained and authorized by the state to

assist their clients in the completion of Medicaid applications.¹⁰ For all applications received and approved by the state, a \$50 fee is granted to the application assistant, providing a financial incentive to enroll children.¹¹ Nearly half of the 1,100 CBOs providing assistance in the first year of the program were healthcare providers and clinics (hospitals are not eligible), 20% were community service organizations, and 9% were schools. Half of the CBOs have bilingual staff. According to information provided by a subset of the CBOs, CBOs primarily serve one ethnic/racial group.

Over time, access to CBOs has increased. In 1998, 28% of all ZIP codes had a participating CBO (appendix table A1). CBOs in the most disadvantaged areas (lower per capita income, fewer high school graduates, and fewer white families) appear to have been the first to participate (appendix table A2). Over time, as CBO participation increased, the percentage of ZIP codes with a CBO increased to 39 by 1999 and 46 by 2000, with the newest CBOs located in less disadvantaged areas. By March of 1999, ten months after the campaign was launched, half of all Medicaid applications received by the state were completed with the assistance of a community-based organization and over \$1 million in application assistance fees had been paid to CBOs.

Figure 3 presents trends in non-welfare-related Medicaid enrollment among Hispanics that gain access to one, two to four, and five or more CBOs over this period. Differences in initial levels between these groups exist, but the time trends in enrollment prior to the launching of the campaign appear the same across all areas. However, beginning in June 1998, the differences in non-welfare-related Medicaid enrollment among these groups increased proportionately with the

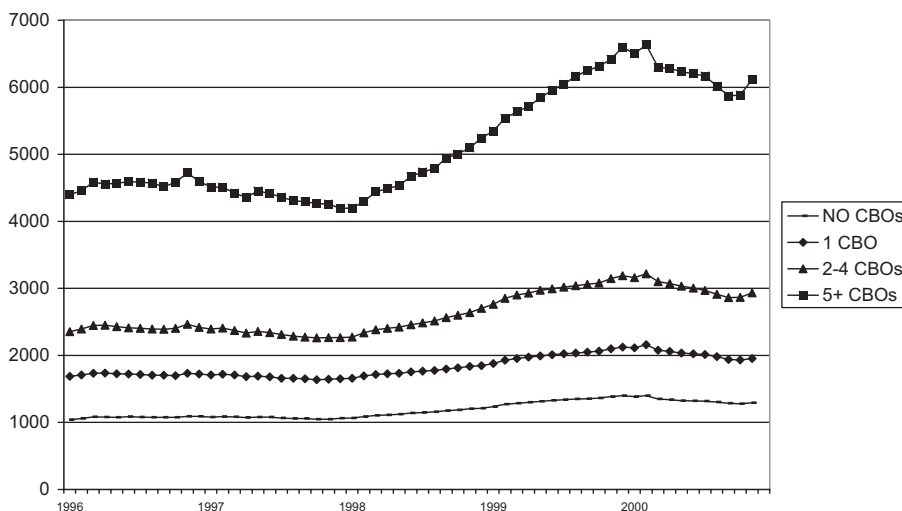
⁸ This study was conducted by the UCLA Center for Health Policy and based on the March 1998 Current Population Survey.

⁹ In the first year, \$2.1 million was allocated for the payment of the \$50 fee, \$1.9 million for training, and \$2.7 million for support.

¹⁰ CBOs become certified as application assistants by the state prior to their submitting any applications, thereby mitigating the possibility that the estimated impact of CBOs on enrollment is demand driven.

¹¹ Kopczuk and Pop-Eleches (2005) find evidence that providing financial incentives to tax preparers increases participation in the EITC program.

FIGURE 3.—MONTHLY HISPANIC NON-WELFARE MEDICAID ENROLLMENT BY BILINGUAL CBO AVAILABILITY



number of CBOs located in those areas. Hispanics living in areas that gain access to greater numbers of CBOs exhibited a greater increase in enrollment relative to Hispanics that gained access to fewer numbers of CBOs. The nonrandom placement of CBOs suggests possible selection on location, which I address in section V.

The State Advertising Campaign. The state advertising campaign consists of English and Spanish television advertisements that run in 48 of the state's 58 counties. The advertising campaign was launched in June 1998 and in the first thirty months of the program, television advertisements were aired in at least one county in all but seven months. All campaign materials consistently promote the toll-free number, which is staffed Monday through Friday from 8 a.m. to 8 p.m. by a team of operators proficient in ten languages, who respond to requests for applications, assist with questions about the application, and provide referrals to CBOs.

The campaign cost \$7 million in the first year. The state largely considers the statewide media campaign a success, based on the fact that calls to the toll-free hotline doubled in the weeks during which commercials have aired (from roughly 800 calls per day to 1,900 calls per day), and that 30% of callers identified advertising as their primary source of information about Medicaid. However, the state does not know what proportion of calls result in application and enrollment.

IV. The Effect of Outreach on Medicaid Enrollment

A. Medicaid Enrollment and Selection

There are two main implications of a simple economic model of enrollment in Medicaid that lowers the cost of purchasing medical care but includes fixed costs of participation. First, if the fixed costs of participation decrease

(through, for example, an outreach campaign), families will be more likely to participate. For those for whom the cost decrease is greater as a result of outreach (Hispanic and Asian families with language barriers and immigration concerns), the probability of enrollment will likewise be greater. Second, given the likelihood of negative correlation between underlying (and unobserved) health and enrollment (those sickest are most likely to enroll), OLS regression of hospitalization on Medicaid coverage will result in upward biased estimates of the impact of Medicaid coverage on hospitalization. However, as the costs of enrollment decrease with outreach, the average health of those enrolling will increase. Thus instrumenting for Medicaid coverage using outreach should reduce or eliminate this selection bias.

B. CBOs

Data and Empirical Strategy. To assess the impact of lowering process costs on new Medicaid enrollment, I link data on CBO placement with data on new Medicaid enrollment by ZIP code, race, and month for February 1996 to December 2000 among all children age 0 to 15. Administrative data on Medicaid enrollment for all children in California includes information on the child's age, race/ethnicity, ZIP code of residence, type or mechanism of Medicaid eligibility (welfare-related, SSI, 1931(b), and so forth) and month of enrollment. I define enrollment as new if the individual had not been enrolled in Medicaid in the past month, thereby excluding those children who have transitioned off welfare onto other Medicaid coverage. I also exclude all children eligible through foster care and supplemental security income (SSI) because Medicaid coverage is automatic for these populations. The data are collapsed to ZIP code-year-month-race cells. If there were

no zero cells, this would yield a sample size of 480,000.¹² However, due to some zero cells (ZIP codes with no low-income children of a given race), the final data set consists of 390,379 cells. Weights are generated by calculating the number of children in each ZIP code in families with income below 200% FPL from the 2000 Census. Sample means (calculated for each ZIP code and month, and weighted) are provided in appendix table A3. In a (low-income population weighted) average ZIP code-race-month cell, there are 67 new monthly Medicaid enrollees, most of whom enroll through non-welfare-related programs.¹³ Among Hispanic children, there are on average 140 new Medicaid enrollees per ZIP code per month.

CBO availability or access is defined as the number of CBOs in one's ZIP code as of the first month of enrollment. Because Medicaid coverage begins on the date of application, this is equivalent to access to CBOs as of the date of application. To isolate the effect of outreach on take-up among those already eligible but not enrolled separate from eligibility expansions, I include only those children whose eligibility did not expand over this period. Thus children made newly eligible through the SCHIP program Healthy Families and children ages 15–19 who witnessed a small increase in eligibility over this period through the 1931(b) program (from 82% to 100% of the FPL) were excluded.

To identify the impact of CBOs on Medicaid enrollment, I employ multiple strategies to account for possible selection in their placement or timing that may be based on demand for these services. First, ZIP code, year, and month fixed effects are included to control for the fact that areas with more intense outreach efforts may have higher numbers of low-income children, and general trends in enrollment over this time period, respectively. Also included are other covariates that control for changes in the business cycle and in the underlying demographic composition of the state that may affect the demand for health insurance. The basic equation has the following form:

$$\begin{aligned}
 M_{r_{zmy}} = & \beta_0 + \beta_1 ENG CBO_{zmy} + \beta_2 SPCBO_{zmy} \\
 & + \beta_3 ASNCBO_{zmy} + \beta_4 HISP \times SPCBO_{r_{zmy}} \\
 & + \beta_5 ASIAN \times ASNCBO_{r_{zmy}} + \beta_6 RACE_r \\
 & + \beta_7 BIRTHS_{r_{zmy}} + \beta_8 UNEMP_{cy} + \beta_9 INC_{cy} \\
 & + \beta_{10} MONTH_m + \beta_{11} Year_y \\
 & + \beta_{12} ZIPCODE_z + v_{r_{zmy}}.
 \end{aligned} \tag{1a}$$

$M_{r_{zmy}}$ is new Medicaid enrollment for race r in ZIP code z in month m and year y . $ENG CBO_{zmy}$ is the number of community-based application assistants without bilingual staff in the ZIP code in the month of enrollment, and

$SPCBO_{zmy}$ is the number of CBOs with Spanish-speaking staff. Spanish-speaking CBOs are interacted with a dummy for Hispanic ($HISP_r \times SPCBO_{zmy}$ in the above equation), while Asian-speaking CBOs ($ASNCBO_{zmy}$) are interacted with a dummy for Asian ($ASIAN_r \times ASNCBO_{zmy}$). There are numerous Asian groups with different languages in California (Chinese, Japanese, Korean, Vietnamese, and so forth). Grouping them together is justified because Asians from different countries tend to be highly geographically segregated in California and as such, the CBOs with Asian bilingual staff tend to serve one group primarily (this is also confirmed by self-reports of populations served provided by a subset of the CBOs). In addition, I include race (black, Hispanic, Asian, and other race) indicators, controls for county unemployment rates ($UNEMP_{cy}$), and per capita personal income (INC_{cy}) as well as counts of the number of births to women with less than a college degree to control for changes in the population of low-income families ($BIRTHS_{r_{zmy}}$). All analyses are weighted by the size (population) of the cell as defined previously, and the standard errors are adjusted for serial correlation within ZIP code (clustered at the ZIP code).

In additional specifications, I include further controls (ZIP code \times year fixed effects) to account for the possibility of selective timing and placement of CBOs that may bias the results. This limits the identifying variation to changes in access to CBOs that occur within a relatively short period, thereby minimizing potential unobserved underlying differences between those areas that quickly gained access to a CBO and those with delayed access. The model is still identified since ZIP codes gained access to CBOs throughout each year. To control for the possibility that Hispanic and Asian families residing in areas that gain access to bilingual CBOs may differ from those who do not, I interact Hispanic and Asian children with an indicator for whether they ever gained access to a CBO: $Hisp \times EverSPCBO$ and $Asian \times EverASNCBO$. Finally, I include ZIP code \times year \times month fixed effects to control for ZIP code-specific changes over time in enrollment patterns. These fixed effects subsume the English-only CBOs and the main effects of the bilingual CBOs.

Results: The Impact of CBOs on New Medicaid Enrollment. In table 1 are estimates of the impact of CBOs on new non-welfare Medicaid enrollment (columns 1–4). The first column contains ZIP code, month, and year fixed effects (equation 1a). As is evident from the table, the greatest effects are those found for bilingual CBOs on Hispanic and Asian enrollment (Spanish-language CBO \times Hispanic and Asian-language CBO \times Asian). The estimates suggest that an additional Spanish-language CBO increases total new monthly Medicaid enrollment for Hispanic children by 9%, while an additional Asian-language CBO in-

¹² 1,600 ZIP codes \times 5 races \times 5 years \times 12 months.

¹³ The unweighted means of monthly new enrollment are 9.4, 6.5, and 2.9 for total, non-welfare, and welfare-related enrollment.

TABLE 1.—IMPACT OF CBOs ON NEW MONTHLY MEDICAID ENROLLMENT

		Non-Welfare-Related		Welfare-Related	
Bilingual (Spanish) CBO × Hispanic	12.763 [1.379]	12.72 [1.388]	12.7 [1.558]	7.517 [1.379]	1.24 [0.308]
Bilingual (Asian) CBO × Asian	1.882 [0.372]	1.895 [0.375]	1.858 [0.419]	1.931 [0.387]	0.556 [0.128]
Bilingual (Spanish) CBO	-2.815 [0.291]	-2.821 [0.292]			
Bilingual (Asian) CBO	-0.352 [0.079]	-0.394 [0.086]			
English-only CBO	0.027 [0.059]	-0.074 [0.067]			
Black	-4.705 [0.177]	-4.761 [0.181]	-4.774 [0.204]	-4.214 [0.199]	-1.601 [0.231]
Hispanic	12.34 [0.831]	12.467 [0.846]	12.517 [0.955]	2.79 [0.659]	-1.414 [0.185]
Asian	-5.895 [0.198]	-5.979 [0.202]	-5.985 [0.228]	-4.967 [0.283]	-4.039 [0.186]
Other race	-4.442 [0.156]	-4.493 [0.158]	-4.504 [0.179]	-4.199 [0.176]	-3.903 [0.161]
Asian × ever gain access to CBO				-1.103 [1.078]	-1.127 [0.489]
Hispanic × ever gain access to CBO				28.708 [2.286]	6.965 [0.624]
Observations	390,379	390,549	390,549	390,549	390,549
R-squared	0.4	0.41	0.42	0.47	0.45
ZIP code fixed effects	yes				
Year fixed effects	yes				
Month fixed effects	yes				
ZIP code × year and month fixed effects		yes			
ZIP code × year × month fixed effects			yes	yes	yes

Robust standard errors (clustered on ZIP code) in brackets.

creases enrollment by 27% among Asian children.¹⁴ Interestingly, the main effects of bilingual CBOs are negative and significant, though small, for Spanish- and Asian-language CBOs (-2.815 and -0.352). This suggests the possibility of selection effects in the timing and/or location of outreach efforts, with outreach placed in those areas with declining enrollment. Columns 2 through 4 of table 1 contain estimates from regressions that include increasingly restrictive controls. Column 2 includes ZIP code × year and month fixed effects and column 3 includes ZIP code × month × year fixed effects. Finally, the last column contains, in addition to ZIP code × month × year fixed effects, the additional variables—ever gain access to a Spanish CBO × Hispanic and ever gain access to an Asian CBO × Asian. These fixed effects control for the possibility that Hispanics and Asians in ZIP codes that gain access to a CBO differ significantly from those who do not. When these additional controls are included, the coefficient on the interaction term for Hispanics declines, while the interaction term for Asians increases slightly. Estimates based on the most restrictive regressions suggest that proximity to a bilingual CBO increases new enrollment by 7% among Hispanics and 36% among Asians. In column 5, I present estimates of the impact of CBOs on welfare-related enrollment including the same set of controls as in column 4. As

¹⁴ Calculated as follows for Hispanic children: $(12.76 - 2.82)/109 = 0.09$.

expected, the impact is significantly smaller in size, but there is still a small positive effect. It is possible that CBOs, as social service providers trained in the completion of Medicaid applications, may also assist their clients in the completion of welfare applications. This could explain the small positive impact on Medicaid enrollment through welfare.

In table 2 are estimates of the impact of CBOs on the natural log of new non-welfare-related enrollment. In a natural log specification, the fixed effects will have the same proportional impact on each cell. For these regressions, I limit the sample to large cell sizes (more than 250 low-income children) that have no zero observations in the first three columns, and in the last column I simply add 1 to every outcome to avoid dropping any cells (and thus any bias that might arise from selection on certain cells). For Asian and Hispanic children, gaining access to a bilingual CBO increases enrollment by roughly 14% and 12%, respectively, based on the most restrictive regression estimates.

I also explore whether the impact of CBOs varies by the type of CBO and by age of the child. CBOs that are healthcare providers have a greater incentive to enroll children—in addition to the \$50 fee, the medical care they provide these children will now be reimbursed by the state. In table 3, I present estimates of the impact of CBOs that are healthcare providers on enrollment. As expected, providers appear to have considerably larger effects on enrollment

than the average CBO—with new enrollment roughly double that of the average CBO. In table 4, I present estimates of the impact of CBOs by age of the child: infant, preschool age, and 6–15. The effects appear smallest for infants, perhaps because many infants are typically enrolled in Medicaid by the hospital at time of birth and the regressions include controls for the number of births to women with less than a college degree. The largest effects appear for the oldest children, those ages 6–15, perhaps because younger children are required to visit the doctor periodically for immunizations, providing an incentive for enrollment that is absent for older children.

Finally, in order to explore the possibility that the effect of CBOs is nonlinear and whether there may be diminishing returns, I present estimates of the impact of the first CBO, second CBO, and so forth on new non-welfare-related enrollment in table 5. In the first column, I present estimates for new (non-welfare) monthly enrollment and in the second column, the dependent variable is the log of new monthly enrollment. These regressions include the most restrictive sets of controls. The results suggest that the impact is roughly linear for Spanish CBOs, but slightly concave for Asian CBOs.

In regressions not presented here, I aggregate the data to a broader level (a minor civil division that is a city or town)

TABLE 2.—IMPACT OF CBOs ON LN(NEW NON-WELFARE MEDICAID ENROLLMENT)

	(1)	(2)	(3)	(4)
Bilingual (Spanish) CBO × Hispanic	0.19 [0.017]	0.116 [0.020]	0.116 [0.015]	0.152 [0.022]
Bilingual (Asian) CBO × Asian	0.18 [0.027]	0.137 [0.030]	0.138 [0.023]	0.173 [0.027]
Bilingual (Spanish) CBO	−0.05 [0.009]	0.022 [0.024]		0.066 [0.015]
Bilingual (Asian) CBO	−0.04 [0.008]	−0.092 [0.021]	−0.067 [0.017]	0.04 [0.042]
English-only CBO	−0.018 [0.013]	0.049 [0.067]		0.04 [0.042]
Black	−0.712 [0.053]	−0.697 [0.069]	−0.696 [0.053]	−0.873 [0.026]
Hispanic	1.103 [0.052]	0.642 [0.101]	0.61 [0.076]	0.038 [0.036]
Asian	−0.958 [0.055]	−1.135 [0.083]	−1.125 [0.063]	−1.058 [0.026]
Other race	−1.442 [0.043]	−1.415 [0.058]	−1.413 [0.043]	−0.863 [0.022]
Asian × ever gain access to CBO		0.417 [0.126]	0.409 [0.096]	0.284 [0.067]
Hispanic × ever gain access to CBO		0.749 [0.118]	0.784 [0.089]	1.254 [0.068]
Observations	128,317	128,317	128,317	390,549
R-squared	0.67	0.75	0.68	0.67
ZIP code × year and month fixed effects	yes	yes		yes
ZIP code × year × month fixed effects			yes	

Robust standard errors (clustered on ZIP code) in brackets.

TABLE 3.—IMPACT OF HEALTH PROVIDER CBOs ON NEW MONTHLY MEDICAID ENROLLMENT

	(1)	(2)	(3)	(4)
Bilingual (Spanish) CBO × Hispanic	23.656 [2.462]	23.598 [2.480]	23.57 [2.783]	11.517 [2.125]
Bilingual (Asian) CBO × Asian	3.375 [0.918]	3.403 [0.926]	3.324 [1.021]	4.06 [1.006]
Bilingual (Spanish) CBO	−5.12 [0.539]	−5.213 [0.577]		
Bilingual (Asian) CBO	−0.508 [0.230]	−0.634 [0.169]		
English-only CBO	−0.546 [0.607]	−0.023 [0.285]		
Black	−4.779 [0.177]	−4.836 [0.180]	−4.848 [0.204]	−4.487 [0.203]
Hispanic	13.651 [0.868]	13.782 [0.883]	13.834 [0.997]	7.713 [0.781]
Asian	−5.925 [0.202]	−6.014 [0.207]	−6.019 [0.233]	−5.366 [0.253]
Other race	−4.486 [0.156]	−4.539 [0.159]	−4.551 [0.179]	−4.359 [0.179]
Asian × ever gain access to CBO				−1.77 [1.711]
Hispanic × ever gain access to CBO				39.113 [3.955]
Observations	390,379	390,549	390,549	390,549
R-squared	0.41	0.41	0.42	0.49
ZIP code fixed effects	yes			
Year fixed effects	yes			
Month fixed effects	yes			
ZIP code × year and month fixed effects		yes		
ZIP code × year × month fixed effects			yes	yes

Robust standard errors (clustered on ZIP code) in brackets.

to account for the fact that individuals located near (but not in) ZIP codes with a CBO also have access to application assistance.¹⁵ The results of this extension suggest that having access to a CBO within one's city or town increases enrollment one-tenth as much as having a CBO in one's ZIP code.

Between 1997 and 2000, enrollment in non-welfare-related Medicaid increased 23% for Hispanics and 110% for Asians. Calculations based on results presented here suggest that outreach was responsible for 80% and 69%, respectively, of these increases in enrollment.

Spillover from Eligibility Expansions. Some spillover from SCHIP to Medicaid may have occurred from families who applied to SCHIP only to learn that they were eligible for Medicaid. However, the identification strategy employed is based on within-state variation only. Any SCHIP spillover effects that affect the entire state equally will be subsumed in the time fixed effects (year and month). If, however, outreach was greater in areas that witnessed bigger increases in eligibility and thus increased demand for Medi-

¹⁵ There are 58 counties in California, 1,600 ZIP codes, and 422 minor civil divisions.

TABLE 4.—IMPACT OF CBOs ON NEW NON-WELFARE MEDICAID ENROLLMENT BY AGE

	Infant	Age 1–5	Age 6–15	Infant	Age 1–5	Age 6–15
Bilingual (Spanish) CBO × Hispanic	-0.682 [0.381]	3.761 [0.696]	4.796 [0.824]	-0.658 [0.434]	3.769 [0.788]	4.801 [0.929]
Bilingual (Asian) CBO × Asian	0.775 [0.186]	1.538 [0.287]	1.813 [0.377]	0.765 [0.208]	1.505 [0.334]	1.761 [0.430]
Bilingual (Spanish) CBO	-0.061 [0.371]	-2.383 [0.606]	-2.591 [0.531]			
Bilingual (Asian) CBO	0.219 [0.333]	0.039 [0.296]	-0.385 [0.207]			
English-only CBO	-0.243 [0.242]	0.334 [0.246]	0.231 [0.224]			
Black	-6.473 [1.013]	-6.617 [1.092]	-6.728 [1.087]	-6.463 [1.162]	-6.598 [1.236]	-6.71 [1.226]
Hispanic	5.8 [2.005]	7.564 [2.398]	8.382 [2.776]	5.872 [2.314]	7.632 [2.706]	8.43 [3.121]
Asian	-4.147 [0.476]	-5.028 [0.592]	-6.878 [0.755]	-4.162 [0.548]	-5.022 [0.669]	-6.881 [0.849]
Other race	-12.244 [1.226]	-13.445 [1.324]	-14.879 [1.247]	-12.303 [1.414]	-13.421 [1.501]	-14.846 [1.408]
Asian × ever gain access to CBO	-2.211 [1.283]	-1.58 [1.351]	-0.531 [1.548]	-2.198 [1.472]	-1.562 [1.521]	-0.488 [1.738]
Hispanic × ever gain access to CBO	15.921 [2.905]	14.01 [3.176]	13.845 [3.469]	15.856 [3.343]	13.948 [3.581]	13.818 [3.898]
Observations	279,706	318,235	329,025	279,706	318,235	329,025
R-squared	0.7	0.73	0.71	0.73	0.77	0.76

Robust standard errors (clustered on ZIP code) in brackets.
ZIP code × year and month fixed effects included.

caid coverage, this would confound the effect of outreach. Measuring changes in eligibility at the ZIP code level over a short period time is difficult because of data limitations. However, I can examine whether CBOs are located in areas with greater declines in welfare-related Medicaid coverage that may affect the underlying demand for non-welfare-related Medicaid coverage. I find that bilingual CBOs are placed in poor areas that are characterized by higher initial levels of welfare use (among all groups, not just Hispanics), but the rates of decline appear similar for those in areas without CBOs. In addition, I also examine trends in the number of births to women with a high school degree or less (a significant predictor of poverty and a proxy for the number of low-income families in an area) by race, ZIP code, and month. I find no evidence that CBOs locate in areas with increased growth in the number of poor families (see figure 4).

C. Advertisements

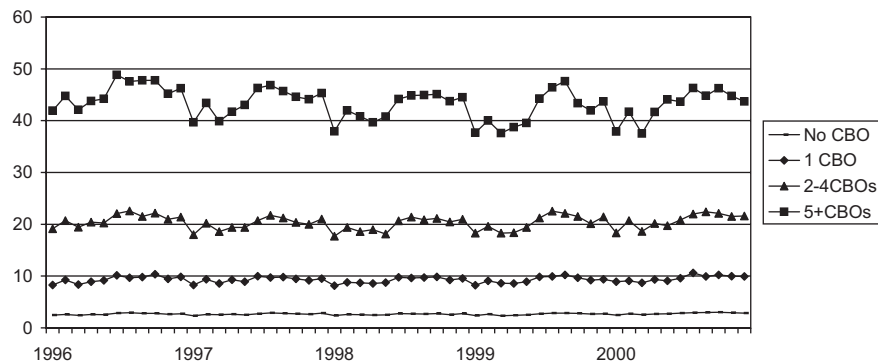
Data and Empirical Strategy. To assess the influence of advertisements on new Medicaid enrollment, data on the timing of advertisements were linked to monthly Medicaid enrollment. The following equation was estimated:

$$\begin{aligned}
 M_{rzymy} = & \gamma_0 + \gamma_1 ENGADVT_{zymy} + \gamma_2 SPADVT_{zymy} \\
 & + \gamma_3 HISP \times SPADVT_{zymy} + \gamma_4 RACE \\
 & + \gamma_5 MONTH_m + \gamma_6 YEAR \times ZIPCODE_{zy} \\
 & + \gamma_7 BIRTHS_{zymy} + \epsilon_{zymy}.
 \end{aligned}
 \tag{1b}$$

TABLE 5.—NONLINEAR IMPACT OF CBOs ON NEW NON-WELFARE ENROLLMENT: LEVELS AND LOGS

	New Enrollment	Ln(New Enrollment)
1 Spanish CBO × Hispanic	11.422 [2.017]	0.343 [0.072]
2 Spanish CBO × Hispanic	30.4 [3.599]	0.794 [0.083]
3 Spanish CBO × Hispanic	39.488 [5.514]	0.891 [0.126]
4 Spanish CBO × Hispanic	62.627 [9.179]	1.052 [0.136]
5 Spanish CBO × Hispanic	86.259 [14.207]	1.444 [0.155]
1 Asian-language CBO × Asian	2.227 [1.118]	0.271 [0.114]
2 Asian-language CBO × Asian	5.656 [1.886]	0.61 [0.136]
3 Asian-language CBO × Asian	5.114 [3.115]	0.686 [0.168]
4 Asian-language CBO × Asian	5.851 [5.580]	0.973 [0.269]
5 Asian-language CBO × Asian	16.47 [4.821]	1.525 [0.207]
Black	-4.746 [0.201]	-0.496 [0.060]
Hispanic	12.277 [0.902]	0.574 [0.054]
Asian	-5.999 [0.235]	-1.194 [0.059]
Other race	-4.497 [0.178]	-1.611 [0.045]
Asian × ever gain access to CBO	-1 [0.099]	0.441 [0.102]
Hispanic × ever gain access to CBO	33.434 [2.477]	1.129 [0.093]
Observations	390,549	172,406
R-squared	0.42	0.78

Robust standard errors (clustered on ZIP code) in brackets.
ZIP code × year and month fixed effects included.

FIGURE 4.—MONTHLY BIRTHS TO HISPANIC WOMEN \leq HS BY BILINGUAL CBO AVAILABILITY

M_{rzm} is new non-welfare-related Medicaid enrollment of race r in ZIP code z in month m and year y . $ENGADVT_{zmy}$ is a dummy variable equal to 1 if there is any English-language television advertising in the month of enrollment, $SPADVT_{zmy}$ is a dummy equal to 1 if there is any bilingual (English- and Spanish-language) television advertising in the month of enrollment. The analysis is conducted at the level of the ZIP code to allow more detailed controls, and the standard errors are adjusted to account for the fact that advertising is determined at the level of the media market, which is larger than a ZIP code (for example, clustered by media market).¹⁶ Observations from ten mostly rural counties in which advertisements were never aired are excluded from the data set because they are so different. The final data set consists of 336,334 observations. To ascertain whether advertising has an immediate effect on enrollment, or whether the effect is lagged, I also estimate the impact of television advertisements in the month before enrollment. Finally, as a check, I also estimate the impact of advertising in the month after enrollment—for which we expect no significant effect.

Results: The Impact of Advertising on New Medicaid Enrollment. The first column of table 6 contains estimates of the impact of advertising (in English and Spanish) in the current month on new non-welfare Medicaid enrollment. There does not appear to be any significant effect of advertising in the month of enrollment. In column 2 are estimates of the impact of advertising in the month before enrollment. Advertising in the month before enrollment does appear to have a small but significant impact on enrollment. In the month after English advertisements have aired, new monthly enrollment in Medicaid increases by nearly 4%. The main effect of Spanish-language advertisements is negative (-0.883) but imprecisely estimated. The effect of Spanish-language advertisements on Hispanics, however, is

positive and significant (1.828) but small, leading to just an additional 1% increase in non-welfare-related Medicaid enrollment among Hispanic children. In column 4 are estimates of past, current, and future advertising on Medicaid enrollment. Neither current nor future advertisements appear to have any significant effect on Medicaid enrollment. The only significant effects are those for past English advertisements and the interaction of past Spanish-language advertisements with Hispanic. English advertising in the previous month increases new monthly Medicaid enrollment by 4.7%, and Spanish-language advertisements increase enrollment among Hispanic children by an additional 2.5%. Thus, advertising appears to have a delayed impact on Medicaid enrollment.

V. The Effect of Outreach and Enrollment on Avoidable Hospitalizations

In this section, I examine whether early enrollment in Medicaid improves access to primary preventative care. To do so, I estimate the impact of Medicaid enrollment on avoidable or ambulatory care sensitive hospitalizations instrumenting for Medicaid with outreach efforts. Recall that hospital admissions are defined as avoidable or ambulatory care sensitive (ACS) if they are for “diagnoses for which timely and effective ambulatory care can help to reduce the risks of hospitalization by either preventing the onset of an illness or condition, [or by] controlling an acute episodic disease or condition” (Billings & Tiecholz, 1990).¹⁷ Thus, if early enrollment in Medicaid increases access to primary preventative care, we should see a decline in avoidable or ACS hospitalizations in the following months.

A. Data and Empirical Strategy

Data on all child hospitalizations in the state of California for the period 1996–2000 were combined with data on

¹⁶ There are twelve media markets (DMAs) in California: Bakersfield, Chico, El Centro, Eureka, Fresno, Los Angeles, Monterey, Palm Springs, Sacramento, San Francisco, Santa Barbara, and San Diego.

¹⁷ ACS conditions include asthma, bronchitis, bacterial pneumonia, dehydration, cellulitis, and ear infections.

TABLE 6.—IMPACT OF ADVERTISING ON NEW MONTHLY MEDICAID ENROLLMENT

	(1)	(2)	(3)	(4)
English-language advertisements	1.764 [1.303]			0.808 [0.901]
Spanish-language advertisements	-0.677 [0.572]			-0.609 [0.600]
Spanish-language advertisements × Hispanic	-2.689 [2.909]			-3.786 [3.418]
Lag English-language advertisements		2.609 [1.182]		3.175 [1.183]
Lag Spanish-language advertisements		-0.833 [0.981]		-1.508 [1.414]
Lag Spanish-language advertisements × Hispanic		1.828 [0.661]		3.475 [1.512]
Lead English-language advertisements			0.518 [0.334]	0.104 [0.249]
Lead Spanish-language advertisements			-0.332 [1.268]	-0.765 [0.823]
Lead Spanish-language advertisements × Hispanic			-1.065 [1.701]	-0.568 [0.551]
Black	42.068 [6.856]	42.074 [6.853]	42.072 [6.855]	42.07 [6.855]
White	33.872 [7.820]	33.86 [7.812]	33.871 [7.821]	33.868 [7.818]
Hispanic	57.247 [9.018]	56.039 [8.313]	56.82 [8.768]	56.776 [8.876]
Asian	40.455 [8.299]	40.462 [8.296]	40.461 [8.301]	40.458 [8.298]
Observations	336,334	336,334	336,334	336,334
R-squared	0.87	0.87	0.87	0.87

Robust standard errors in brackets (clustered at the DMA level).

ZIP code × year and month fixed effects included.

Column (1) presents estimates of the impact of advertising in the current month on enrollment.

Column (2) presents estimates of the impact of advertising in the previous month on enrollment.

Column (3) presents estimates of the impact of advertising in the next month on enrollment.

Column (4) presents estimates of the impact of advertising in the current, previous, and future month on enrollment.

Medicaid enrollment and outreach. The hospitalization data include age, race, ZIP code of residence, year, and quarter of admission. Data on Medicaid enrollment for a given race in a given ZIP code at the beginning of each quarter (January, April, July, and October) are linked to admissions for that race and ZIP code occurring in that quarter (for example, Medicaid enrollments as of the first of January are linked to all admissions in January, February, and March of that year). The equation estimated has the following form:

$$\begin{aligned}
 H_{rzqy} = & \gamma_1 \text{Medicaid}_{rzqy} + \gamma_2 \text{Race}_r + \gamma_3 \text{Quarter}_q \\
 & + \gamma_4 \text{AdultAdm}_{rzqy} + \gamma_5 \text{AFDC/TANF}_{rzqy} \\
 & + \gamma_6 \text{Zipcode} \times \text{year}_{zy} + \gamma_7 \text{Hisp} \times \text{EverSPCBO}_{rz} \\
 & + \gamma_8 \text{Asian} \times \text{EverASNCBO}_{rz} + \varepsilon_{rzqy}.
 \end{aligned} \quad (2)$$

H_{rzqy} is the number of avoidable (ACS) child hospitalizations in a given race, ZIP code, quarter, and year defined two ways: (i) over children with Medicaid as the listed source of payment, and (ii) over all children, to avoid any sample selection. Medicaid in the above equation represents the stock of Medicaid enrollment for a given race and ZIP code as of the first day of the quarter. Other controls include adult admissions for ACS hospitalizations (AdultAdm) to control for underlying trends in diseases or propensity to hospitalize

that may vary over time or across groups. Ideally, I would include changes in income by race and ZIP code over this period as the relationship between income and health is well established, but such data are not available. Instead, I include welfare caseloads (AFDC/TANF), a proxy for changing income which also enables one to isolate the impact of outreach on Medicaid enrollment through non-welfare-related channels (however, the inclusion of welfare caseloads does not alter the results). To control for the fact that Hispanic and Asian children residing in ZIP codes that gain access to a CBO may differ in ways unobserved to the researcher that might affect both enrollment and propensity to hospitalize, the interaction terms $\text{Hisp} \times \text{EverSPCBO}$ and $\text{Asian} \times \text{EverASNCBO}$ are also included, as they were in previous regressions of the impact of CBOs on new enrollment. Finally, ZIP code × year fixed effects are also included subsuming all annual county-level employment and income measures. ZIP code × year × quarter fixed effects are included in the last set of regressions, representing the most restrictive controls for all variables, observed and unobserved, that vary from year to year within ZIP code.

As noted previously, because children in need of hospitalization are more likely to enroll in Medicaid, we would

expect OLS estimates to be biased upward. To overcome this bias, I use outreach efforts as instruments for the stock of Medicaid enrollment in the first stage. Specifically, outreach is defined as the number of CBOs available in one's ZIP code as of the start of the quarter.¹⁸ Outreach is likely to affect the stock of Medicaid enrollment by increasing both the number of new enrollees and the probability of reenrollment, given the high rates of turnover in Medicaid.

In the first stage I estimate the impact of provider CBOs, nonprovider CBOs, and all CBOs on the stock of Medicaid enrollment and present the results in columns 1, 2, and 3, respectively, of appendix table A4. The decision to stratify by CBO type is based on the fact that previous results suggest that provider CBOs have a greater impact on enrollment as well as the fact that IV results with respect to avoidable hospitalizations may vary with CBO type. How they vary, however, is unclear. On the one hand, we might expect access to primary care to improve more if enrollment is through a provider—resulting in a bigger decline in avoidable hospitalizations. On the other hand, it might be the case that those who enroll through a provider are more likely to be in worse health and thus more likely to be hospitalized—resulting in a smaller decline in avoidable hospitalizations.

Consistent with previous findings with respect to new enrollment, provider CBOs have a greater impact on the stock of Medicaid enrollment (appendix table A4). The results from the first stage suggest that access to one Spanish-speaking CBO clinic increases Medicaid enrollment among Hispanic children by 11%, while access to any Spanish-speaking CBO (not necessarily a clinic) increases enrollment by 7%.¹⁹ The impact of access to one Asian-language CBO increases Medicaid enrollment by 20% among Asians. The main effect of Spanish-language CBOs is negative and significant, suggesting possible omitted variable bias/endogeneity regarding the placement and/or timing of CBO placement. In columns 4, 5, and 6, I present estimates of the first-stage regression in which ZIP code \times year \times quarter fixed effects are included (these fixed effects will control for omitted variables that vary within ZIP code over time and subsume the main effects of English-only, Spanish, and Asian-language CBOs). When the most restrictive controls are included, the estimated coefficients on the interaction terms remain unchanged.

¹⁸ Advertisements are not used because of the relatively small impact on enrollment. In addition, using advertisements at the start of the quarter as an instrument is problematic given that the stock of Medicaid enrollment is affected by advertisements in both current and past months. Presence of CBOs in current and past months is correlated, but advertisements are not.

¹⁹ Average (non-welfare) Medicaid enrollment among Hispanic children is 2,094. Increasing access to one Spanish-speaking CBO will increase enrollment by 222 (339 – 117), roughly 11%.

B. Results

OLS and IV regression estimates of the impact of Medicaid enrollment on ACS hospitalizations are presented in table 7. The first three columns display results from a regression of the impact of Medicaid enrollment on all child ACS hospitalizations. The first contains OLS results, the second results from an IV regression in which only clinic/provider CBOs (IV-Clinic) are used as instruments in the first stage, and the third column contains results from an IV regression in which all CBOs are used as instruments in the first stage (IV-All). The OLS results suggest that a 10% increase in Medicaid enrollment leads to a 1.6% decline in ACS hospitalizations. The instrumented results suggest that such an increase leads to a 2.9% reduction in hospitalizations if only clinics are used as instruments and a 1.8% reduction when all CBOs are used as instruments. This suggests that access to a provider CBO is more effective in increasing access to ambulatory care. The results for Medicaid ACS hospitalizations (columns 4–6) are very similar. Though the point estimates are smaller, the effects (in percentage terms) are slightly larger: a 10% increase in Medicaid enrollment leads to between a 2.3% and 3.4% decrease in Medicaid ACS hospitalizations, with larger effects for clinic CBOs. In columns 7–9 are OLS and IV estimates of the impact of Medicaid enrollment on marker conditions—hospitalizations which should not be affected by access to primary care such as congenital heart defect, appendicitis, and some forms of cancer. Medicaid enrollment has no significant impact on hospitalization for markers in either OLS or IV regressions. Finally, in columns 10–12 are estimates of regressions in which ZIP code \times year \times quarter fixed effects are included (the first-stage results are in columns 4–6 of appendix table A4). The estimated coefficients are very similar: a 10% increase in Medicaid enrollment leads to between a 1.8% and 2.8% decline in ACS hospitalizations.

It is possible that in addition to affecting the probability of admission, early enrollment might also affect one's treatment once hospitalized. To explore this possibility, I estimate the impact of early enrollment on the length of hospitalization and present the results in the second panel of table 7. Columns 1 through 3 show the OLS and IV results for the impact of early enrollment on average length of stay for all child hospitalizations; columns 4 through 6 show similar results for Medicaid hospitalizations. There seems to be only weak evidence that early enrollment in Medicaid reduces length of stay in the hospital. OLS estimates suggest that a 10% increase in Medicaid enrollment reduces average length of stay by 0.5% while the IV-Clinic results are more than twice as large, but imprecisely estimated. These small effects may be due to the fact that increases in Medicaid take-up are likely to reduce hospitalizations among the least sick, and thus those who continue to be hospitalized after increased Medicaid take-up will be, on average, sicker and

TABLE 7.—IMPACT OF MEDICAID ENROLLMENT ON CHILD HOSPITALIZATIONS AND LENGTH OF STAY (LOS)

	All ACS Admissions			Medicaid ACS Admissions			All Marker Admissions			All ACS Admissions		
	OLS	IV-Clinic	IV-All	OLS	IV-Clinic	IV-All	OLS	IV-Clinic	IV-All	OLS	IV-Clinic	IV-All
Medicaid Enrollment	-0.0017 [0.0008]	-0.0031 [0.0014]	-0.0019 [0.0011]	-0.0014 [0.0006]	-0.0024 [0.0010]	-0.0016 [0.0008]	-0.0001 [0.0001]	-0.0003 [0.0002]	0 [0.0002]	-0.0014 [0.0009]	-0.0029 [0.0015]	-0.0019 [0.0001]
Hispanic	-0.0896 [0.7191]	0.6899 [1.0811]	-0.0124 [0.9318]	-0.2738 [0.5609]	0.3129 [0.8534]	-0.1177 [0.7319]	0.0941 [0.0440]	0.2084 [0.1038]	0.0545 [0.0981]	-0.1775 [0.8278]	0.7002 [1.1885]	0.08 [0.1376]
White	-0.7564 [0.7069]	-0.2558 [0.8714]	-0.7068 [0.7838]	-1.4979 [0.5599]	-1.1211 [0.6910]	-1.3977 [0.6257]	0.0468 [0.0328]	0.1145 [0.0481]	0.0199 [0.0473]	-0.8092 [0.8572]	-0.234 [1.0169]	-0.6405 [0.1046]
Asian	0.2669 [0.6505]	0.8309 [0.8736]	0.3228 [0.7515]	0.0822 [0.5578]	0.5067 [0.7239]	0.1951 [0.6321]	0.0076 [0.0304]	0.0913 [0.0609]	-0.0214 [0.0516]	0.2603 [0.7263]	0.8921 [0.9543]	0.4456 [0.1457]
Black	1.5717 [0.8977]	1.892 [1.0093]	1.6034 [0.9701]	0.8638 [0.7617]	1.1048 [0.8565]	0.9279 [0.8300]	0.0149 [0.0484]	0.0588 [0.0427]	-0.0016 [0.0360]	1.6785 [1.0186]	2.0398 [1.1254]	1.7845 [0.1256]
Adult hospitalizations for same conditions	0.0908 [0.0101]	0.0884 [0.0100]	0.0906 [0.0098]	0.0515 [0.0083]	0.0497 [0.0083]	0.051 [0.0082]	0.0062 [0.0013]	0.006 [0.0011]	0.0065 [0.0013]	0.0929 [0.0123]	0.0898 [0.0121]	0.092 [0.0013]
Welfare caseload	0.0023 [0.0005]	0.0028 [0.0006]	0.0023 [0.0005]	0.0016 [0.0005]	0.0019 [0.0006]	0.0017 [0.0005]	-0.0001 [0.0000]	0 [0.0001]	-0.0001 [0.0001]	0.0021 [0.0005]	0.0026 [0.0006]	0.0022 [0.0001]
Ever gain access to Spanish CBO × Hispanic	-1.6461 [0.5642]	-1.8306 [0.5319]	-1.6644 [0.5477]	-1.4873 [0.4990]	-1.6261 [0.4720]	-1.5242 [0.4886]	-0.0035 [0.0281]	-0.0294 [0.0403]	0.0048 [0.0416]	-1.5649 [0.6155]	-1.7747 [0.5889]	-1.6264 [0.1783]
Ever gain access to Asian CBO × Asian	0.7882 [0.6001]	0.8995 [0.6441]	0.7992 [0.6263]	0.7508 [0.5099]	0.8346 [0.5551]	0.7731 [0.5404]	0.0674 [0.0467]	0.0854 [0.0444]	0.0615 [0.0424]	0.7932 [0.6670]	0.9153 [0.7104]	0.829 [0.1163]
Observations	121,806	121,806	121,806	121,806	121,806	121,806	121,806	121,806	121,806	121,806	121,806	121,806
R-squared	0.71	0.71	0.71	0.68	0.68	0.68	0.63	0.64	0.63	0.81	0.81	0.81
ZIP code × year and quarter fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes			
ZIP code × year × quarter fixed effects										yes	yes	yes

	Average LOS-All			Average LOS-Medicaid			Average LOS-All			Average LOS-Medicaid		
	OLS	IV-Clinic	IV-All	OLS	IV-Clinic	IV-All	OLS	IV-Clinic	IV-All	OLS	IV-Clinic	IV-All
Medicaid Enrollment	-0.0002 [0.0001]	-0.0005 [0.0004]	-0.0001 [0.0004]	-0.0002 [0.0001]	-0.0005 [0.0003]	-0.0001 [0.0004]	-0.0002 [0.0001]	-0.0002 [0.0004]	0.0001 [0.0002]	-0.0002 [0.0001]	-0.0003 [0.0004]	0 [0.0004]
Observations	78,844	78,844	78,844	60,480	60,480	60,480	78,844	78,844	78,844	60,480	60,480	60,480
R-squared	0.28	0.28	0.28	0.14	0.14	0.14	0.73	0.73	0.73	0.4	0.4	0.4
ZIP code × year and quarter	yes	yes	yes	yes	yes	yes						
ZIP code × year × quarter							yes	yes	yes	yes	yes	yes

Robust standard errors in brackets.

Robust standard errors (clustered on ZIP code) in brackets.

IV-Clinic refers to IV regressions in which CBOs that are health providers/clinics are used as instruments in the first stage.

IV-All refers to IV regressions in which all CBOs are used as instruments in the first stage.

more likely to need more hospital care, thus resulting in longer hospital stays.

VI. Conclusions

The empirical results presented here represent some of the first to shed light on the causes and consequences of low take-up rates in public programs. Using a unique data set with local area detail, I am able to exploit exogenous variation in factors influencing take-up in the Medicaid program to identify the reasons why families may fail to take up benefits that involve no out-of-pocket costs. Costs of finding information about programs as well as costs associated with completing applications appear significant, and language barriers and immigration concerns increase these

costs for Hispanic and Asian children. Furthermore, my findings suggest that increased enrollment as a result of outreach improves access to primary care, as evidenced by a reduction in ACS hospitalizations.

An outreach program that increases Medicaid program take-up and limits avoidable hospitalizations has the potential to reduce state expenditures substantially. Between 1997 and 2000, enrollment in non-welfare-related Medicaid increased roughly 27%, and 55% of the increase was due to outreach (in other words, outreach was responsible for a 15% increase in Medicaid enrollment, concentrated in the Hispanic and Asian communities). Considering only the charges associated with ACS hospitalizations (\$284 million in California in 1996), a 15%

increase in Medicaid enrollment would lead to a 2.7% decline in ACS hospitalizations, for a savings of \$8 million annually. This is \$6 million less than the costs of the campaign in the first year and excludes the (relatively small) additional costs associated with an increase in primary preventative care. This calculation, however, does not incorporate any of the potential savings associated with reduced emergency room visits, the increased labor supply of parents, or the benefits to children in terms of improved health and less pain and suffering as a result of avoiding days in the hospital. Considering these savings, the benefits of the outreach program may exceed its costs.

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APPENDIX

TABLE A1.—CHANGES OVER TIME IN ACCESS TO CBOs

	1998		1999		2000	
	Number	Percent	Number	Percent	Number	Percent
ZIP codes with any CBO	471	28	662	39	776	46
ZIP codes with 1 CBO	283	17	317	19	311	19
ZIP codes with 2–4 CBOs	171	10	282	17	342	20
ZIP codes with 5+ CBOs	17	1	63	4	123	7
ZIP codes with any CBO w/Spanish-speaking staff	402	24	537	32	620	37
ZIP codes with any CBO w/Asian-speaking staff	126	8	175	10	219	13

TABLE A2.—CHANGING CHARACTERISTICS OF ZIP CODES WITH ACCESS TO AT LEAST ONE CBO

	1998	1999	2000
Median household income	33,190	33,467	34,448
Share urban	0.711	0.734	0.734
Share with less than a HS degree	0.294	0.279	0.268
Share Asian	0.077	0.08	0.082
Share black	0.053	0.054	0.053
Share Hispanic	0.345	0.33	0.319
Share white	0.331	0.352	0.371

TABLE A3.—SAMPLE MEANS

	All	Hispanic	Asian
New Monthly Medicaid Enrollment			
New Medicaid enrollment	67 [100]	140 [117]	9 [10]
New non-welfare-related Medicaid enrollment	50 [79]	109 [93]	6 [6]
New welfare-related Medicaid enrollment	17 [25]	31 [29]	3 [6]
Stock of Medicaid Enrollment			
Total Medicaid enrollment	2,182 [3,014]	4,222 [3,566]	749 [1,000]
Medicaid enrollment per 1,000 poor children	619 [634]	767 [596]	684 [541]
Non-welfare Medicaid enrollment	977 [1,541]	2,094 [1,870]	125 [156]
Non-welfare Medicaid enrollment per 1,000 poor children	236 [269]	387 [322]	137 [104]
Hospitalizations			
ACS hospitalizations	10.1 [14.2]	14.8 [18.4]	2.9 [3.6]
Medicaid ACS hospitalizations	6.8 [11.1]	10.5 [14.5]	1.5 [2.6]
Medicaid ACS hospitalizations per 1,000 poor children	1.91 [3.8]	1.7 [3.5]	1.5 [3.9]
Medicaid ACS hospitalizations per 1,000 Medicaid	10 [27]	2.3 [2.9]	4.3 [30]
Marker hospitalizations	0.86 [1.45]	1.04 [1.41]	0.197 [0.542]
CBOs (post-June 1998)			
Bilingual (Spanish-language) CBOs	2.1 [2.4]	2.5 [2.6]	1.6 [2.2]
English-only CBOs	0.18 [0.53]	0.16 [0.46]	0.22 [0.54]
Bilingual (Asian-language) CBOs	0.55 [1.5]	0.58 [1.52]	1.3 [2.7]
Controls			
Unemployment rate	0.06 [0.04]	0.07 [0.04]	0.05 [0.04]
Per capita income	28,912 [7,944]	28,618 [7,296]	32,835 [10,798]
Number of births to mothers \leq HS	21 [31]	44 [36]	4 [5]

Standard deviations are in brackets.

TABLE A4.—FIRST-STAGE RESULTS IMPACT OF CBOs ON STOCK OF MEDICAID ENROLLMENT

	Clinic	Non-Clinic	All CBOs	Clinic	Non-Clinic	All CBOs
Spanish CBO × Hispanic	338.7216 [63.4910]	218.0621 [46.2778]	227.887 [41.7251]	339.3906 [70.5585]	218.2878 [51.2507]	228.3508 [46.3912]
Asian-language CBO × Asian	119.3813 [36.1899]	36.2796 [21.4317]	72.6484 [21.8236]	120.5376 [40.5100]	37.9184 [23.9937]	74.134 [24.4975]
Spanish CBO	-116.5638 [30.1472]	-58.4979 [13.5270]	-72.3654 [16.0239]			
Asian-language CBO	-18.45 [14.4564]	-7.1678 [21.6785]	-8.6444 [10.9130]			
English-only CBO	-2.03 [15.0806]	-9.9475 [8.6849]	-6.3122 [7.2724]			
Observations	121,806	121,806	121,806	121,806	121,806	121,806
R-squared	0.94	0.93	0.94	0.94	0.93	0.94
F-test instruments	$F(5, 1429) = 8.5$	$F(5, 1429) = 2.2$	$F(5, 1429) = 4.5$	$F(2, 1429) = 11.64$	$F(2, 1429) = 9.71$	$F(2, 1429) = 12.13$
p-value	0.0000	0.0495	0.0002	0.0000	0.0001	0.0000
ZIP code × year and quarter	yes	yes	yes			
ZIP code × year × quarter				yes	yes	yes

Robust standard errors (clustered on ZIP code) in brackets.

All regressions include race indicators, controls for adult admissions, welfare caseloads, and Ever Spanish × Hispanic and Ever Asian × Asian.