Medicaid HMO Penetration and Its Mix: Did Increased Penetration Affect Physician Participation in Urban Markets?

E. Kathleen Adams and Bradley Herring

Objective. To use changes in Medicaid health maintenance organization (HMO) penetration across markets over time to test for effects on the extent of Medicaid participation among physicians and to test for differences in the effects of increased use of commercial versus Medicaid-dominant plans within the market.

Data Sources/Study Setting. The nationally representative Community Tracking Study's Physician Survey for three periods (1996–1997, 1998–1999, and 2000–2001) on 29,866 physicians combined with Centers for Medicare and Medicaid Services (CMS) and InterStudy data.

Study Design. Market-level estimates of Medicaid HMO penetration are used to test for (1) any participation in Medicaid and (2) the degree to which physicians have an “open” (i.e., nonlimited) practice accepting new Medicaid patients. Models account for physician, firm, and local characteristics, Medicaid relative payment levels adjusted for geographic variation in practice costs, and market-level fixed effects.

Principal Findings. There is a positive effect of increases in commercial Medicaid HMO penetration on the odds of accepting new Medicaid patients among all physicians, and in particular, among office-based physicians. In contrast, there is no effect, positive or negative, from expanding the penetration of Medicaid-dominant HMO plans within the market. Increases in cost-adjusted Medicaid fees, relative to Medicare levels, were associated with increases in the odds of participation and of physicians having an “open” Medicaid practice. Provider characteristics that consistently lower participation among all physicians include being older, board certified, a U.S. graduate and a solo practitioner.

Conclusions. The effects of Medicaid HMO penetration on physician participation vary by the type of plan. If states are able to attract and retain commercial plans, participation by office-based physicians is likely to increase in a way that opens existing practices to more new Medicaid patients. Other policy variables that affect participation include the presence of a federally qualified health center (FQHC) in the county and cost-adjusted Medicaid fees relative to Medicare.

Key Words. Medicaid, physician participation, HMOs

States have recently increased their use of Medicaid managed care in order to assure predictable cost increases by shifting financial risk onto plans and to potentially improve patient access and quality of care. Enrollment in Medicaid managed care increased from 32.1 percent in 1995 to 60.7 percent in 2004, while enrollment specifically in Medicaid health maintenance organizations (HMOs) increased even more rapidly from 14.1 percent in 1995 to 39.5 percent in 2004 (CMS 2005).

Early research on Medicaid managed care found that shifts in the type and site of care (e.g., lower specialty care and emergency room [ER] use) occurred but found little evidence of increased physician visits, preventive care or changes in hospitalizations; cost savings appeared minimal but enrollees reported no worse satisfaction or quality (Hurley et al. 1993; Kaiser Commission 1995). More recent research continues to find mixed results for utilization and access. Duggan (2004) found increased state spending and no corresponding improvement in infant health outcomes when welfare-related enrollees were mandated to enroll in Medicaid HMOs.

One goal of Medicaid managed care was to “mainstream” Medicaid enrollees into private physician practices. While Medicaid managed care did appear to improve some aspects of access in some geographic areas, less is known about how it changed the participation of office-based physicians or how local market characteristics affect these and related outcomes. Most evaluations have focused on enrollee service use or expenditures, and few have examined changes in the provider system through which it might work. Moreover, studying physician participation under Medicaid managed care is hampered by the lack of reliable and timely encounter data from HMOs (Howell 1996); claims or survey data are needed.

In this paper, we use 3 years of data from the Community Tracking Study’s Physician Survey (CTS-PS) in 51 urban markets to examine the following questions: Were increases in the penetration of Medicaid managed care in the 1990s associated with increases in physician participation? Did this association vary for commercial versus Medicaid-dominant plan penetration? Did certain physicians respond to expansions in Medicaid managed care differently? Were Medicaid reimbursement rates among the other factors that

Address correspondence to Bradley Herring, Ph.D., Department of Health Policy & Management, Bloomberg School of Public Health, Johns Hopkins University, 624 N Broadway, Baltimore, MD 21205-1901. E. Kathleen Adams, Ph.D., is with the Department of Health Policy & Management, Rollins School of Public Health, Emory University, Atlanta, GA.

affected physician participation across urban markets? Now is an opportune time to examine these questions as states face rising budget pressure from Medicaid spending and threats of federal cuts. It is important for states to know the impact of capitated managed care within the context of their provider reimbursement policies and the role that other factors play.

BACKGROUND

Researchers examining physician participation in Medicaid generally follow the “physician as firm” model (Sloan, Mitchell, and Cromwell 1978; Held and Holahan 1985). In this model, a physician’s decision to participate is a function of private and Medicaid demand, and relative fees. A physician enters into the Medicaid market when the marginal revenue curve from private demand drops below the state’s Medicaid reimbursement level. Studies have confirmed the positive effect of relative Medicaid fees (Sloan, Mitchell, and Cromwell 1978; Adams 1995; Cohen and Cunningham 1995; Hassan, Bronstein, and Johnson 1997) although the estimated price elasticity is often small. Mainstreaming Medicaid enrollees into private office-based practices has been hard to achieve in many communities (Lewis-Idema 1992; Davidson 1993) given generally low reimbursement levels and geographic separation of office-based practices from poorer residential areas (Fossett and Peterson 1989).

In an effort to improve access to office-based physicians and contain costs, many states began to move portions of their Medicaid population into a combination of full-risk capitated managed care programs (i.e., HMOs) and more loosely organized primary care case management (PCCM) programs during the 1990s. Researchers have stressed the importance of both physician recruitment/retention and inclusion of traditional safety net providers to facilitate managed care (Felt-Lisk et al. 1999; Norton and Zuckerman 2000; Smith et al. 2000). Others note that the success of HMOs appears related to the level/adequacy of rates, risk adjustment, and excess provider capacity while rates are largely driven, and often constrained, by past provider payment policies (Holahan et al. 1999). States interested in improving access are less likely to discount historical payment levels when setting capitation rates (Holahan et al. 1999).

A descriptive report by Cunningham (2002) based on the CTS-PS showed slight declines in physicians participating in Medicaid from 1997 to 2001 but it is unclear what role reduced Medicaid enrollment, payment levels,

and managed care policies played. Changes in the Medicaid market, such as exits of commercial plans since 1998 (Coughlin, Long, and Holahan 2001), likely played a role. These withdrawals are of concern since one of the goals of managed care was to provide access to mainstream providers and as commercial plans exit, states are increasingly reliant on Medicaid-dominant HMOs (Felt-Lisk 2000). Medicaid-dominant plans tend to be smaller, based in urban underserved areas, and form their provider networks around physicians and health centers who historically served low-income populations (Felt-Lisk and Yang 1997).

Two recent studies have looked specifically at Medicaid managed care and provider participation. Adams, Bronstein, and Florence (2003) found that implementation of PCCM in two southern states, in the absence of increases in physician reimbursement, was associated with declines in participation rates, the number of very small practice sites, and visit volume. Green, Blustein, and Remler (2005) used the CTS-PS data to examine physician participation. They found that while commercial plan penetration was associated with a small, positive effect on primary care physician participation, this was not sufficient to offset the significantly large negative effects of increased penetration of Medicaid-dominant plans on participation among these primary care physicians. One weakness of this study is their use of a county-level measure of HMO plan penetration to examine physician behavior. County boundaries can be arbitrary, geographically uneven, and regionally biased (Porell and Adams 1995). While metropolitan statistical areas (MSAs) are also geopolitically based, markets based on patient-origin data have been found to be at least as large as the MSA and typically larger (Morrisey, Sloan, and Valvona 1988). Other weaknesses are their reliance on cross-sectional variation in HMO penetration and a limited set of controls.

We add to this literature by: (1) using the market to measure commercial and Medicaid-dominant plan penetration; (2) focusing on changes in HMO penetration within markets over time incorporating market-level fixed effects; (3) examining not only changes in the number of physicians participating but also the extent to which physicians have "open" practices accepting new patients; (4) examining participation among both office-based and nonoffice-based physicians; (5) examining participation among specialists in addition to primary care physicians; and (6) using a broader set of control variables, such as changes in the cost-adjusted Medicaid fee index, use of PCCM, provider competition, and the presence of safety net providers.

DATA AND METHODS

Data

We use data from the three available rounds of the nationally representative CTS-PS for our analysis. The 1996–1997, 1998–1999, and 2000–2001 CTS-PS contains detailed data on training, specialty, practice characteristics, and patient interactions for a sample of physicians in 60 U.S. markets. Given the rapid change of the Medicaid managed care market in recent years, a limitation of our analysis is the lack of more timely data. We use data only for the 51 MSA as rural Medicaid HMO penetration is so low. The CTS-PS markets were chosen so the resulting pooled sample is nationally representative (Kemper et al. 1996), so our sample is representative of the urban United States.

Physician Participation in Medicaid

The CTS-PS has two questions regarding physician participation in Medicaid. One asks, “Approximately what percentage of the practice revenue from patient care would you say comes from payments from Medicaid or any other public insurance, including Medicaid managed care?” and the other asks, “Is the practice accepting all, most, some, or no new patients who are insured through Medicaid, including Medicaid managed care patients?” We used question responses to examine the number of participating physicians and the extent to which they have an “open” network. For the first, we estimate a simple logit equation for the likelihood that the physician receives any Medicaid revenue. For the latter, we estimate both a cumulative logit equation for accepting none, some, most, or all new Medicaid patients, and a simple logit equation for accepting most/all new Medicaid patients. A potential limitation to our analysis is that it is possible that some physicians who see Medicaid patients in commercial HMOs do not actually realize that these patients are covered by Medicaid.

The advantage of the cumulative logit model is that it uses all information available on the extent of physician participation. If the probability of seeing either no new, some new, most new, or all new Medicaid patients is given by P_{NO} , P_{SOME} , P_{MOST} , and P_{ALL} , respectively, the cumulative logit model with four discrete choices estimates a system of three linear equations:

$$\log((P_{ALL} + P_{MOST} + P_{SOME})/P_{NO}) = A_{ALL,MOST,SOME} + BX_i \quad (1)$$

$$\log((P_{ALL} + P_{MOST})/(P_{SOME} + P_{NO})) = A_{ALL,MOST} + BX_i \quad (2)$$

$$\log(P_{ALL}/(P_{MOST} + P_{SOME} + P_{NO})) = A_{ALL} + BX_i \quad (3)$$

where X_i is a vector of policy, local area, physician, and practice characteristics and B is the vector of coefficients. The intercepts in this system differ but the regression parameters for each logit are constrained to be identical. As a result, we are not able to distinguish the effect of HMO penetration on token versus heavy participation. The simple logit model we estimate is for equation (2) alone. We estimate models both for all physicians and for those physicians with some level of prior Medicaid participation (indicated by having received any Medicaid revenue during the past year).

Market-Level Medicaid HMO Penetration

Our measures of HMO penetration by commercial and Medicaid-dominant HMOs are constructed using data from CMS and from InterStudy. We start with plan-level data from CMS for HMOs that serve the Medicaid population in years 1996, 1998, and 2000; these data list the “point in time” number of enrollees and the counties served for each individual Medicaid managed care plan in the United States. Since the CMS plan data only list the number of Medicaid enrollees, we link it to plan-level InterStudy data to obtain information on the sources of payment for other enrollees (if applicable). We then classify each HMO serving Medicaid enrollees as either being a “commercial HMO” with less than 75 percent Medicaid enrollment or a “Medicaid-dominant HMO” with between 75 and 100 percent Medicaid enrollment. While our classification of Medicaid-dominant HMOs groups together private HMOs (that may either be for-profit or nonprofit) which specialize in contracting with state Medicaid programs and county-level provider-based entities, our primary interest in examining differences across HMOs is whether Medicaid patients are integrated with privately insured patients in the plan.

Because the list of counties served by each HMO frequently include more than one MSA, we derive a market-based measure for HMO penetration by apportioning each plan’s Medicaid enrollment to the MSA by determining the percent of the population in all counties (in the state) served by the HMO that actually reside in the counties that comprise the MSA. The penetration rate for each market is then the percentage of all Medicaid enrollees in the market that are in an HMO. That is, the commercial penetration rate is the percentage of all Medicaid enrollees in the market in a commercial HMO, and the Medicaid-dominant penetration rate is the percentage in a Medicaid-dominant HMO.

Control Variables

We limit our sample to physicians providing direct patient care for at least 20 hours/week, and we use data on practice type and employment arrangement to separate office-based versus nonoffice-based physicians, following the American Medical Association (AMA) definition; those in a practice (solo, two-person, or group) or part of an HMO (group or staff) are office-based. Nonoffice-based includes those in a medical school/university, hospital (private or government), clinic (government or free-standing), community health center, or one of several other small categories. We further split practices into either solo practice; owner, 2–3 MDs; owner, 4–10 MDs; owner, 11+ MDs; nonowner, 2–3 MDs; nonowner, 4–10 MDs; and nonowner, 11+ MDs.

Using the CTS-PS data on reported specialty, we define primary care physicians as internal medicine, general practice, pediatrics, or obstetrics/gynecology. We include the latter in primary care since pregnant women constitute a significant portion of the nonelderly Medicaid population. Specialists include medical specialists, surgical specialists, or psychiatrists. The CTS-PS data also include information on the gender of the physician, years spent in practice, and whether one is a Foreign Medical Graduate, an osteopathic MD, or a board certified MD. Each of these characteristics is included as a control variable in our models.

We include other Medicaid policy variables. We include a state-level measure of the percent of the Medicaid population enrolled in PCCM, a measure of Medicaid fee generosity, the percent of the total population enrolled in State Children's Health Insurance Program (SCHIP), and whether a federally qualified health center (FQHC) exists in the county. We adjust previously published indices of relative fees (i.e., the ratio of Medicaid fees to Medicare fees) to develop a cost-adjusted relative Medicaid fee index since earlier work indicates practice costs affect participation decisions (Adams 1995).¹

We add data from the Area Resource File (ARF), InterStudy, Community Tracking Study's Household Survey, and CMS to further reflect the characteristics of the geographic areas in which these physicians practice that could affect both the supply and demand for Medicaid or charity care. In particular, we include measures of the market-level number of office-based physicians per capita, market-level private HMO penetration, market-level insurance rates, the overall poverty rate in the county, the racial/ethnic distribution of the county, and the interaction of the poverty rate and race/ethnicity. We estimate market-level fixed effects models to account

for unmeasured, time-invariant factors and adjust the standard errors for clustering of observations within markets.

RESULTS

Descriptive Results

We use a total sample of 29,866 physicians from the three rounds of CTS-PS data in our analyses. Descriptive data on participation, market plan penetration and characteristics are shown in Table 1. These data indicate that fully 85 percent of physicians in urban markets serve some Medicaid patients during the year. While this indicates wide participation, the remaining measures show a more complex pattern. Less than half (49.2 percent) of urban MDs report accepting *all new* Medicaid patients that present themselves to their practice and somewhat more than one-half (59.4 percent) report accepting *most or all new* Medicaid patients. These measures are more indicative of Medicaid access issues as studies indicate physicians tend to limit their Medicaid practices resulting in many small Medicaid practices and a skewed distribution of patients across participating practices (Sloan, Mitchell, and Cromwell 1978; Perloff, Kletke, and Fossett 1995).

The descriptive data indicate key changes in the pattern of HMO plan Medicaid participation and penetration over our study period. The mean Medicaid penetration of commercial plans across the 51 urban markets (weighted by Medicaid enrollees and not shown in Table 1) grew from 8.5 percent in 1996 to 14.5 percent by 1998. By 2000, however, with the exit of some commercial plans, the penetration of commercial plans in the Medicaid market had dropped to 12.5 percent. In contrast, and likely in response to these exits, the penetration of Medicaid-dominant plans in the urban CTS-PS markets grew from 15.4 percent in 1996 to 22.8 percent by 2000. The measures of HMO penetration presented in Table 1 are weighted by physician observations within the CTS-PS, and are therefore slightly different in magnitude. Across all physicians in the pooled sample between 1996–1997 and 2000–2001, the mean commercial HMO penetration rate was 12.3 percent and the Medicaid-dominant HMO penetration rate was 19.6 percent. The patterns of growth (and decline of commercial plans) seen for the enrollee weighted data also hold.²

Multivariate Results for HMO Penetration

Table 2 shows regression results for the full sample. The first column shows the results from the logit model for whether physicians have any Medicaid

Table 1: Means and Standard Deviations for All Urban Physicians, Pooled 1996–1997, 1998–1999, and 2000–2001 CTS-PS Data

	<i>Mean</i>	<i>SD</i>
Dependent variables		
Any Medicaid revenue	0.852	0.355
Accepting all new Medicaid patients	0.492	0.500
Accepting all or most new Medicaid patients	0.594	0.491
Accepting all, most, or some new Medicaid patients	0.785	0.411
Independent variables		
Policies		
Commercial Medicaid HMO penetration	0.123	0.138
Medicaid-dominant HMO penetration	0.196	0.220
Percent in PCCM	0.166	0.210
Relative Medicaid fee index	0.687	0.204
FQHC in county	0.740	0.439
Percent in SCHIP ($\times 100$)	1.320	0.684
Local area characteristics		
MDs/capita ($\times 1,000$)	1.099	0.193
Private HMO penetration	0.434	0.211
Percent Medicaid insured	0.056	0.029
Percent private insured	0.654	0.076
Percent uninsured	0.117	0.049
Percent Medicare insured	0.136	0.031
Percent in poverty	0.056	0.029
Percent white	0.742	0.143
Percent black	0.153	0.126
Percent Hispanic	0.122	0.147
Percent Asian	0.043	0.048
Physician characteristics		
Years of practice	16.99	10.02
Female	0.212	0.409
Foreign medical graduate	0.213	0.410
Osteopathic MD	0.063	0.244
Board-certified MD	0.829	0.377
Physician Specialty		
General practitioner	0.145	0.352
Internal medicine	0.134	0.341
Pediatric specialty	0.086	0.280
Obstetric/gynecology	0.067	0.249
Medical	0.284	0.451
Surgical	0.213	0.410
Psychiatry	0.071	0.257
Practice characteristics		
Owner, solo practice	0.304	0.460
Owner, small practice (2–3 MDs)	0.073	0.260
Owner, medium practice (4–10 MDs)	0.095	0.293
Owner, large practice (11+ MDs)	0.125	0.331

Continued

Table 1: *Continued*

	<i>Mean</i>	<i>SD</i>
Nonowner, small practice (2–3 MDs)	0.009	0.096
Nonowner, medium practice (4–10 MDs)	0.032	0.177
Nonowner, large practice (11+ MDs)	0.082	0.275
Employed at university	0.086	0.281
Employed at hospital	0.106	0.308
Employed at clinic	0.039	0.194
Employed elsewhere	0.048	0.213
Year, 1996–1997	0.333	0.471
Year, 1998–1999	0.328	0.470
Year, 2000–2001	0.339	0.473

Note. $N = 29,866$.

CTS-PS, Community Tracking Study's Physician Survey; PCCM, primary care case management; SCHIP, State Children's Health Insurance Program; FQHC, federally qualified health center.

revenue. The second column shows the results from the cumulative logit model for the extent to which physicians accept *new* Medicaid patients. This table includes the full set of results for the effects of other policy variables (e.g., the level of Medicaid fees relative to Medicare), local characteristics, individual physician characteristics, and practice characteristics.

Table 3 shows selected results of the cumulative logit model for seeing new Medicaid patients and for the simple logit model for seeing some or most/all new patients—for subsamples of physicians based on prior participation, practice setting (i.e., office-based versus nonoffice-based), and specialty (i.e., primary care versus specialty care). Specifically, the first column of Table 3 shows selected results for the full sample of physicians, the second column shows results for office-based physicians, the third column shows results for nonoffice-based physicians, the fourth column shows results for office-based primary care physicians, and the fifth column shows results for office-based specialists. The top two panels of Table 3 are for the cumulative ordered logit model for all physicians, while the bottom two panels are for the simple logit model. For both of these models, we also show results for only those physicians who were already participating in Medicaid, as indicated by having nonzero Medicaid revenue.

As shown in the first column of Table 2, we find no significant effects of HMO market penetration, whether commercial or Medicaid dominant, on whether physicians see *any* Medicaid patients, based upon the measure of Medicaid revenue in the CTS-PS.³

Table 2: The Odds of Seeing Any Medicaid Patients and the Odds of Accepting New Medicaid Patients, All MDs

<i>Variables</i>	<i>Seeing Any Patients^a</i>	<i>Accepting New Patients^b</i>
Policies		
Commercial Medicaid HMO penetration	1.061	1.360*
Medicaid-dominant HMO penetration	1.371	1.007
Percent in PCCM	0.786	0.819
Relative Medicaid fee index	0.780	1.917*
FQHC in county	0.660***	0.766**
Percent in SCHIP ($\times 100$)	1.686*	1.216
Local area characteristics		
MDs/capita ($\times 1,000$)	1.798**	1.576**
Private HMO penetration	0.943	1.012
Percent Medicaid insured	—	—
Percent private insured	0.115	1.825
Percent uninsured	0.142	6.202
Percent Medicare insured	0.329	0.640
Percent in poverty	56.46	6.637
Percent white	—	—
Percent black	0.427	0.963
Percent Hispanic	0.256	0.955
Percent Asian	0.000****	0.023
Percent black $\times$ percent in poverty	0.981	0.990
Percent Hispanic $\times$ percent in poverty	1.058	1.045
Percent Asian $\times$ percent in poverty	2.083***	1.196
Physician characteristics		
Years of practice	0.983****	0.994****
Female	0.734***	0.923
Foreign medical graduate	1.721****	1.793****
Osteopathic MD	0.902	1.147
Board-certified MD	1.082	0.767****
Physician Specialty		
General practitioner	—	—
Internal medicine	1.243**	1.153*
Pediatric specialty	1.753****	2.086****
Obstetric/gynecology	1.134	1.350**
Medical	1.760****	3.543****
Surgical	1.811****	3.130****
Psychiatry	0.461****	0.670**
Practice characteristics		
Owner, solo practice	—	—
Owner, small practice (2–3 MDs)	1.103	1.218**
Owner, medium practice (4–10 MDs)	2.246****	1.825****
Owner, large practice (11+ MDs)	2.431****	1.871****
Nonowner, small practice (2–3 MDs)	1.472	1.266
Nonowner, medium practice (4–10 MDs)	1.505***	1.968****

Continued

Table 2: *Continued*

<i>Variables</i>	<i>Seeing Any Patients^a</i>	<i>Accepting New Patients^b</i>
Nonowner, large practice (11+ MDs)	1.730***	2.193***
Employed at university	3.452***	5.625***
Employed at hospital	3.226***	4.138***
Employed at clinic	2.117***	4.553***
Employed elsewhere	1.520***	2.940***
Year, 1996–1997	—	—
Year, 1998–1999	1.013	1.059
Year, 2000–2001	0.936	0.952

Note:^aThis is a logit model for the odds of having any revenue from Medicaid during the year.^bThis is a cumulative logit model for seeing no new, some new, most new, or all new patients.

Significance:

*** $p < .0001$,** $p < .0010$,* $p < .0500$,* $p < .1000$.

PCCM, primary care case management; SCHIP, state children's health care insurance program; FQHC, federally qualified health center; HMO, health maintenance organization.

As shown in the second column of Table 2, we do observe a positive effect of increases in commercial penetration on the odds of seeing *new* Medicaid patients. While the effect is marginally significant for the full sample of physicians (odds ratio [OR] = 1.360, $p = .055$), the effect is stronger (and significant) for physicians already participating in Medicaid and for office-based primary care physicians, as shown in Table 3. However, we observe no significant effect of commercial Medicaid HMO penetration for nonoffice-based physicians. The results from the simple logit model on accepting new patients are consistent with the results from the cumulative logit model. These effects on the “openness” of one's practice are important since it appears (from the results presented in the first column of Table 2) that Medicaid HMO penetration does not increase the number of physicians seeing *any* Medicaid patients.

As noted above, the ORs in the cumulative logit model combine the odds of seeing all, most, or some new Medicaid patients relative to seeing no new Medicaid patients; the odds of seeing all or most new Medicaid patients relative to seeing some or no new Medicaid patients; and the odds of seeing all new Medicaid patients relative to seeing most, some, or no new Medicaid patients. These results indicate that, for the full sample of physicians and in

Table 3: The Odds of Accepting New Medicaid Patients: Physician Subsamples and Alternative Specifications

<i>Variables</i>	<i>All MDs</i>	<i>Office- Based MDs</i>	<i>Nonoffice- Based MDs</i>	<i>Office- Based Primary</i>	<i>Office- Based Specialists</i>
Cumulative logit, all MDs					
Commercial HMO penetration	1.360*	1.395*	0.988	1.395	1.394
Medicaid-dominant HMO penetration	1.007	1.059	1.007	0.933	1.154
Percent in PCCM	0.819	0.816	0.913	0.581*	1.005
Relative Medicaid/fee index	1.917*	1.758	3.194*	1.914	1.664
FQHC in county	0.766**	0.703***	1.022	0.652***	0.666**
Percent in SCHIP ($\times 100$)	1.216	1.163	1.765	0.997	1.367
Cumulative logit, participating MDs					
Commercial HMO penetration	1.540**	1.533**	1.189	1.749**	1.336
Medicaid-dominant HMO penetration	0.820	0.907	0.691	0.758	1.032
Percent in PCCM	0.801	0.774	0.836	0.671	0.773
Relative Medicaid/fee index	1.779	1.750	2.918	2.402	1.298
FQHC in county	0.809*	0.764**	0.945	0.736**	0.717*
Logit for most/all, all MDs					
Commercial HMO penetration	1.369*	1.495*	0.924	1.522	1.454
Medicaid-dominant HMO penetration	1.029	1.022	1.172	0.886	1.156
Percent in PCCM	0.844	0.904	0.740	0.513*	1.365
Relative Medicaid/fee index	2.526**	2.411	4.051	2.110	2.838
FQHC in county	0.749**	0.686***	0.961	0.623***	0.643**
Logit for most/all, participating MDs					
Commercial HMO penetration	1.502**	1.514*	1.110	1.763	1.263
Medicaid-dominant HMO penetration	0.852	0.897	0.791	0.748	1.057
Percent in PCCM	0.831	0.856	0.642	0.553	1.159
Relative Medicaid/fee index	2.412*	2.631*	3.262	2.891	2.523
FQHC in county	0.789**	0.748**	0.889	0.683**	0.728*

Note: Significance:

*** $p < .0001$,

** $p < .0010$,

* $p < .0500$,

* $p < .1000$.

PCCM, primary care case management; SCHIP, State Children's Health Insurance Program; HMO, health maintenance organization; FQHC, federally qualified health center.

turn, for office-based physicians, increases in the penetration of commercial Medicaid HMOs over time within the market area increased the odds that physicians served *new* Medicaid patients during the year. In these equations, however, we find no effect of increased penetration of Medicaid-dominant

plans on whether physicians increase their participation by seeing new patients. Moreover, the results for the sample of participating physicians (i.e., the second and fourth panels in Table 3) are similar to those for all physicians, although there is now a significant effect of commercial HMO expansion in Medicaid on increased participation specifically for office-based primary care physicians. Increased participation among these physicians seems integral to accomplishing the goals of managed care as the preventive and primary care needs of enrollees are perhaps better served and unnecessary utilization or ER use can be reduced. This suggests an increase in office-based practices that are not limiting their Medicaid caseload and, it would appear, a true increase in access for Medicaid enrollees.

Multivariate Results for Other Factors

It is clear from Table 2 that the individual characteristics of physicians practicing in the market will matter in terms of their participation decisions. In particular, younger physicians, and to some extent, male, office-based physicians are more likely than their counterparts to both see any patients and accept new Medicaid patients. Foreign Medical Graduates and nonboard-certified physicians are more likely to see Medicaid patients.

The type of practice the physician is in also matters. In Table 2, we present a series of ORs for physicians that are in ownership practices of varying size, practices in which they do not share ownership of varying size and those employed in various settings. Each of these is measured against the omitted category of a solo practice physician. These results show that the size of the practice, not ownership per se, matters in terms of increasing the odds of participation; the larger the practice, the more likely the physician is to accept some Medicaid patients. Being employed markedly increases the odds that the physician will accept some Medicaid patients into their practice. Those who are employed at a university, hospital, or clinic have odds of serving Medicaid patients that are two to five times those of solo practitioners.

Remaining market characteristics included in the equations presented in Table 2 were often insignificant. One exception is our measure of competition, the number of MDs/capita within the CTS-PS market; this variable is positive as expected, indicating that as more competition reduces the level of private demand per physician firm, the odds that they would accept at least some Medicaid patients into their practice increases.

There are policies other than Medicaid managed care that can influence physician participation in Medicaid. The presence of at least one FQHC in the

physicians' market area serves to significantly reduce the odds that physicians in the market area will accept at least some Medicaid patients. This substitution effect holds for both primary (OR = 0.652) and specialty care (OR = 0.666) office-based physicians. Moreover, a FQHC reduces the odds of prior-participating office-based physicians operating what might be called an "open" Medicaid practice. There are positive and significant effects on participation from increased relative Medicaid fees, mainly for office-based physicians already participating to some extent in the Medicaid market and for nonoffice-based physicians. Finally, consistent with the earlier study of PCCM and physician participation in two southern states (Adams, Bronstein, and Florence 2003), we observe a negative effect of increased use of PCCM at the state level on participation of office-based primary care physicians.

Simulations

While the ORs are informative on the direction and significance of the effect, the true impact that the policy change has had, or will have, is often difficult to interpret. We use the logit models to derive predicated probabilities to further inform the policy issue. We show predicted participation rates "as if" an alternative policy had been in place, and compare these with the actual participation rates in 2000. Specifically, we first derive predicted probabilities of "open" participation (accepting all/most new) among all physicians, all office-based physicians, prior participating physicians, and prior participating office-based physicians at the actual 2000 penetration rates of commercial Medicaid HMOs. These values are shown in the first column of Table 4. In the next column, we derive predicted probabilities "as if" the commercial Medicaid HMO penetration rate had continued along a trend line suggested by the actual growth from 1996 to 1998. That is, if states had been able to keep attracting commercial plans into the Medicaid market, what would participation rates have looked like? In the last column of Table 4, we show the predicted participation rates as if this commercial growth had continued *and* states had increased real relative fees by 25 percent.

What these results show is that there is very little movement in the overall percentage of physicians with "open" Medicaid practices under these differing policy scenarios. If growth in commercial plan penetration had continued on trend, for example, our simulations indicate that unlimited participation among office-based physicians would have remained virtually constant: 49.3 percent at 12.5 percent commercial penetration versus 49.9 percent at 20.5 percent commercial penetration. Commercial penetration

Table 4: Predicted Percentage of Urban Physicians Accepting All/Most New Medicaid Patients under Alternative Policy Scenarios

	<i>Probability of Participation at Actual 2000 Commercial Penetration Rates (%)</i>	<i>Probability of Participation Commercial Penetration Rate "As If" Growth Trend Continued (%)</i>	<i>Probability of Participation Commercial Penetration Rate "As If" Growth Trend Continued and 25% Higher Medicaid Fees (%)</i>
All physicians	56.4	56.9	59.2
All office-based physicians	49.3	49.9	52.0
Prior participating physicians	64.1	64.8	66.8
Prior participating office- based physicians	57.9	58.7	60.7

Note: These results are based on the cumulative logit regression results shown in the first and second columns of Table 2 and the top panel of Table 3. The actual 2000 commercial Medicaid HMO penetration rate was 12.5%, whereas the "trended" value would have been 20.5% if the commercial penetration rate had continued to increase. (The 1996 commercial Medicaid HMO penetration rate was 8.5% and the 1998 penetration rate was 14.5%.)

would have to increase significantly for there to be a nontrivial increase in participation; for example, 50 percent commercial penetration would yield 51.9 percent participation among office-based physicians (not shown). More movement (than that observed at the "trended value") would have occurred if fees were increased along with this continued growth of commercial plan participation. The percentage of office-based physicians with open practices would increase from 49.3 to 52.0 percent, and among those already participating, the increase predicted by our models would be from 57.9 to 60.7 percent. While this is only a two percentage point change, it may still have a nontrivial impact on increasing access to care among enrollees.

DISCUSSION

A key hope of Medicaid managed care was that it might increase access to office-based physicians and "mainstream" enrollees into private provider networks through participation of commercial plans. Our results indicate that there is indeed a positive effect from increased commercial plan participation within urban markets. This effect is somewhat stronger among physicians

already participating, which means commercial plans do not necessarily bring in new providers into the Medicaid network but rather, increase the caseloads of network physicians already serving some Medicaid clientele. This finding holds for the odds that office-based physicians will accept *all/most new* Medicaid patients, a strong indicator of an increase in access.

As Medicaid managed care grew, commercial plan penetration grew but for a number of reasons, peaked and declined over our study period. This decline continued for the CTS-PS markets, as only about 11 percent of Medicaid enrollees were served by commercial plans in 2002. Thus, while our categorization of plans “fits” our study period, our data are too old to capture all of the recent market developments in which the exit of commercial plans was followed by growth in a new “breed” of for-profit, publicly traded, Medicaid-focused plans (Draper, Hurley, and Short 2004). Medicaid-dominant plans tend to form their provider networks around physicians and community health centers with practices historically focused on low-income populations (Felt-Lisk and Yang 1997). This is consistent with our inability to find a significant effect of Medicaid-dominant plan penetration on participation or accepting *all/most new* Medicaid patients as this was the practice of physicians in these networks before they entered into a capitated managed care arrangement.

A question for state and federal policy makers is what the newer Medicaid market developments mean for attracting adequate numbers of qualified physicians. As our results show, there are issues regarding the quality of participating physicians: those with board certification are less likely to participate. While commercial plan networks could improve access to these types of physicians research indicates that Medicaid enrollees do not necessarily see the same physicians as commercial enrollees within commercial plans (Gold et al. 2003); among commercial participating plans, only 19 percent require Medicaid participation from their network and 81 percent pay different rates for Medicaid than for commercial enrollees. If states still want to use commercial plans to increase access to physicians with different credentials, they may need to consider the adequacy of reimbursement and what contract language could be used to assure access to all physicians within a plan’s network. Other incentives such as lowering administrative costs through electronic billing might also increase provider participation (Gavin et al. 1998).

States may also find ways to help physicians see how managed care could be advantageous for them in terms of sharing the additional risks and costs that come from serving low-income populations who

have a high “no show” rate. Those with a mature level of Medicaid managed care may maintain provider networks by moving to risk adjustment of rates as their programs have more fully penetrated their enrollee population. Some states however, such as Georgia, are just now moving into mandated capitated managed care and must look anew at these issues. It is interesting to note that this state chose only the “new breed” of specialty firms. This may reflect in part, a belief that they are better able to incorporate safety net providers which, with their hallmark of nonclinical support services, may produce better outcomes for some Medicaid populations (Marquis and Long 2002).

It is important to note that many of the early fears about FQHCs and managed care did not evolve; FQHCs have survived to become active participants, if not owners, in the newer market (Hoag 2000; Draper, Hurley, and Short 2004). Our results on the apparent substitution between FQHCs and private office-based physicians is pertinent to the federal requirement that plans include or contract with FQHC providers as they form their networks. While safety net providers are critical to enrollee access this mandate may also allow office-based physicians to limit their Medicaid practices even when part of an HMO network. Indeed, this requirement may mean that commercial plans cannot use their expanded leverage with added Medicaid lives to negotiate provider rates as they wish and hence, help explain their exit. In turn, their exit may impact the ability of states to use Medicaid managed care to meet their objective of lowering costs as commercial plans are expected to serve clientele more efficiently (Cutler, McClellan, and Newhouse 2000).

While it appears that providers and health care plans have adapted to market changes, there is recent concern about the profits of the new breed of Medicaid-focused plans and their potential for skimping on care (Martinez 2006). Concerns have also again been raised about the adequacy of their physician payment rates. Our results indicate that variation in the local costs of doing business is one of the issues that states and plans must consider in setting these rates. In addition, the composition of physicians located within the market area can affect states’ abilities to provide access. That is, it appears that is easier to attract younger physicians and Foreign Medical Graduates into Medicaid. Regardless of the type of plans chosen, states must set up data systems to monitor measures of the access and quality provided to their enrollees under Medicaid managed care to ascertain how it compares with traditional fee-for-service delivery and to remain an active participant in affecting outcomes.

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NOTES

1. We use fee indices for a similar set of Medicaid services published by state for 1993 and 1998 by researchers from the Urban Institute (Norton and Zuckerman 2000) and for 2000 by researchers at the Lewin Group (Menges et al. 2001). We first make a simple interpolation of the 1993 and 1998 data to get a relative fee index for 1996. We then use the Medicare geographic physician cost index (for the weighted average of work expense, practice expense, and malpractice), available for each year from CMS to adjust these fee indices by costs. For example, the cost-adjusted relative fee index for Atlanta in 2000 is determined by dividing the Georgia relative fee index [0.826] by the Atlanta Medicare geographic cost index [1.016] to get 0.813 for that market/year; the Medicare cost index varies across urban areas within some states. This Medicaid fee index therefore proxies the generosity of Medicaid fees relative to Medicare fees and adjusts for underlying practice costs.
2. It is worth noting that physicians during this time period were in urban markets with almost half of the privately insured in HMOs (43.4 percent) and 16.6 percent were in states that used another form of Medicaid managed care, PCCM, as shown in Table 1. We test for an independent effect of these two measures of managed care on physician participation across the CTS-PS markets.
3. We also found no effects of HMO penetration on seeing any patients for subsamples of physicians based on whether they are office-based or primary care physicians. These results are available upon request.

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