Effects of Medicaid Managed Care Programs on Health Services Access and Use

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Objective. To estimate the effects of Medicaid managed care (MMC) programs on Medicaid enrollees' access to and use of health care services at the national level.
Data Sources/Study Setting. 1991–1995 National Health Interview Surveys (NHIS) and a 1998 Urban Institute survey on state Medicaid managed care programs.
Study Design. Using multivariate regression models, we estimated the effect of living in a county with an MMC program on several access and use measures for nonelderly women who receive Medicaid through AFDC and child Medicaid recipients. We focus on mandatory programs and estimate separate effects for primary care case management (PCCM) programs, health maintenance organization (HMO) programs, and mixed PCCM/HMO programs, relative to fee-for-service (FFS) Medicaid. We control for individual and county characteristics, and state and year effects.
Data Collection/Extraction Method. This study uses pooled individual-level data from up to five years of the NHIS (1991–1995), linked to information on Medicaid managed care characteristics at the county level from the 1998 MMC survey.
Principal Findings. We find virtually no effects of mandatory PCCM programs. For women, mandatory HMO programs reduce some types of non–emergency room (ER) use, and increase reported unmet need for medical care. The PCCM/HMO programs increase access, but had no effects on use. For children, mandatory HMO programs reduce ER visits, and increase the use of specialists. The PCCM/HMO programs reduce ER visits, while increasing other types of use and access.
Conclusions. Mandatory PCCM/HMO programs improved access and utilization relative to traditional FFS Medicaid, primarily for children. Mandatory HMO programs caused some access problems for women.

Key Words. Medicaid, managed care, HMO, primary care case management, health care access

Through the 1990s, Medicaid managed care (MMC) grew to become the dominant form of health care delivery within Medicaid. Medicaid managed care covered 57 percent of Medicaid enrollees nationally in 2001, up from only 10 percent in 1991 (Centers for Medicare and Medicaid Services [CMS] 1998b, CMS 2002). This dramatic shift toward Medicaid managed care was fueled by states' desires to address problems of inadequate access to care and to curb high expenditure growth rates. Despite the rapid pace of MMC

expansion, little is known about the broad effects of Medicaid managed care on access to care and use of services at the national level, since nearly all of the empirical evidence to date is limited to single states or groups of states.

In this study, we produce national estimates of the average effects on access and use of MMC programs relative to fee-for-service (FFS) Medicaid. State Medicaid programs operate under a federal umbrella that allows substantial program variation across and within states. This study captures a major component of that variation by estimating separate effects for primary care case management (PCCM) programs, health maintenance organization (HMO) programs, and programs where PCCMs and HMOs both operate. We focus exclusively on programs in which enrollment in MMC is mandatory, which have become increasingly common. Because the effects of an MMC program in a particular state or county may be idiosyncratic, the average effect over groups of states within the same major program type is likely to be more indicative of what a state should expect if it switches from one program type to another. Thus national estimates provide an important complement to the state-specific studies that dominate the literature.

In PCCM programs, the state Medicaid agency contracts with a primary care gatekeeper entity (e.g., physician, clinic) that coordinates primary and specialty care for Medicaid beneficiaries. For HMO-type programs, a state Medicaid agency contracts with an existing HMO, prepaid health plan (PHP), or other institutional health care provider who, in addition to providing PCCM services, assumes insurance risk of providing covered services. Typically, PCCMs are paid on an FFS basis, plus a monthly case management fee per enrollee, while HMO plans are paid a capitation rate and are at full financial risk. There is notable variation, however, in payment methods and other arrangements within these groups (Hurley and Freund 1988; Hurley, Freund, and Paul 1993).

States have many approaches to implementing mandatory programs. They can implement statewide, or in selected counties. Programs and plan

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selection practices may vary by county. States and counties can use PCCM or HMO only, or they can use both. When both are used, a common arrangement is for a county to require Medicaid enrollees to choose either a PCCM or an HMO, but those who fail to make a choice are automatically assigned to PCCM. A less common arrangement (about 20 percent of cases in 1995) is for auto-assignment to be to a PCCM or to an HMO at random or depending, for instance, on which is closer. In this paper, we refer to such programs as mandatory PCCM/HMO programs or simply "mixed mandatory" programs.

Effects of MMC on access and use are likely to differ depending on the specifics of a state's or county's program and the characteristics of participating plans, and the fee-for-service base to which it is compared. Partly for this reason, reviews of state- and program-specific studies have arrived at notably few general conclusions. Comparing MMC (all plan types combined) to Medicaid FFS, the fairly consistent findings that emerge are that: (1) Medicaid managed care increases the likelihood of having a usual source of care (USOC), (2) Medicaid managed care reduces reliance on the ER, and (3) Medicaid managed care reduces rates of referrals to specialists for adults (Rowland et al. 1995). For physician visits, inpatient services, problems or delays in obtaining care, and preventive services the results vary across studies. Most studies find little effect on the proportion of children who receive adequate immunizations, but some show slight increases in immunizations under MMC.

Some reviews of the MMC literature have made comparisons across program types. Hurley, Freund, and Paul (1993) classified MMC programs across several dimensions in order to compare the effects of different program types. They found that gatekeeper PCCM programs increased the number of physician visits, and decreased inpatient stays, prescription drug use, and emergency room visits. The HMO/PHP programs decreased physician and emergency room visits, while results for inpatient stays and prescription drug use were unclear. One of the difficulties in making such comparisons across program types has been that the studies in the literature examine different populations and use different study designs.

Most of the studies included in these reviews analyze the MMC experience of the 1980s when programs were predominantly PCCM, with relatively few HMOs. But much of the growth in MMC since the early 1990s has been in mandatory HMO programs, thus less is known about their effects on access and use. It is difficult to draw general conclusions from the studies of mandatory HMO programs that do exist.

We know of only three other studies that have compared MMC to FFS Medicaid at the national level. Currie and Fahr (2002) examined the effects on children's utilization by pooling several years of cross-sectional data from the National Health Interview Survey (NHIS). The authors linked annual state-level MMC penetration rates to individual level data. This single state-level measure, however, does not allow an examination of the separate effects of different MMC types.

Zuckerman, Brennan, and Yemane (2002) used individual-level data from the 1997 National Survey of America's Families. They determined whether individual Medicaid recipients were enrolled in MMC plans based on whether they lived in a county with an MMC plan and whether they responded that they were enrolled in a Medicaid HMO or whether they must choose from a directory or list of doctors. Using a single year of data, the study relied solely on cross-sectional variation across counties within state. Finally, Kaestner, Dubay, and Kenney (2002) examined the effects of MMC on prenatal care use, birth outcomes, and cesarean section. The empirical approach was based on comparing effects of being in an MMC county of a given type versus FFS for two groups—one at high risk and the other at low risk of Medicaid enrollment.

This study contributes to this literature by (1) examining the effects of MMC programs nationally on several utilization and access measures using multiple years of data, (2) focusing on mandatory HMO programs, which emerged in the early 1990s, (3) focusing on differential effects for women and children, and (4) comparing different mandatory program types, with a consistent data source and a single study design.

Data and Methods

The National Health Interview Survey (NHIS) is an ongoing cross-sectional survey that contains individual-level data on access and use, demographic characteristics, health status, and insurance coverage. For this study, we pool data from up to five years (1991–1995) of the NHIS (the analyses use two to five years of data depending on the outcome measure). We use data from the core instruments as well as the Health Insurance and Access to Care supplements. We also use data from a special study of the adequacy of immunization for 19- to 35-month-old children in the NHIS, the National Immunization Provider Record Check Study (NIPRCS) that adjusted reported immunization information using provider records.

The NHIS does not contain information on managed care participation among Medicaid recipients before 1995. Instead, we use information on the type of MMC in the county, linked to sample individuals in the NHIS by the county in which they reside (we discuss the implications below). The county MMC measures come from an Urban Institute survey of state Medicaid program officials, which indicates whether the county has or had a voluntary or mandatory PCCM or HMO, and the month or year of implementation. Where possible, the survey data were cross-checked with information from other sources, such as MMC enrollment reports published by CMS and numerous case studies.

Using this information on the timing and location of MMC program implementation, we assign counties to one of five MMC types: no MMC, voluntary plan only (whether PCCM or HMO), mandatory PCCM only, mandatory HMO only, and mixed mandatory (PCCM or HMO). We distinguish counties with mandatory plans that are only PCCM or HMO from mixed mandatory to estimate the effects of these "pure" types. A program was considered to be mandatory if Medicaid enrollees who failed to choose a participating PCCM or HMO plan were auto-assigned to a plan.

Specification of Access and Use Models

Most of our dependent variables are binary. For these we estimate access and use regressions, separately for women and children receiving Medicaid, of the following form:

$$\begin{aligned} &Prob(Y_i = 1) = F(\beta_0 + \beta_1 MANDPCCM_i + \beta_2 MANDHMO_i + \\ &\beta_3 MIXEDMAND + \beta_4 ONLYVOL_i + \beta_5 X_i + \beta_6 CNTY_i \\ &\beta_7 ELIG_i + \beta_8 STATE_i + \beta_9 YEAR_i, e_i); \end{aligned} \tag{1}$$

where,

Yi = outcome measure for observation i,
$MANDPCCM_i$, and $MIXEDMAND_i$, and $ONLYVOL_i$ are binary variables for the type of MMC in the country,
X_i = vector of individual and family characteristics,
$CNTY_i$ = vector of county characteristics,
$ELIG_i$ = vector of state Medicaid eligibility variables,
$STATE_i$ = vector of state indicator variables,
$YEAR_i$ = vector of year indicator variables, and
β_{0-9} are parameters or parameter vectors to be estimated.

In the main regression results, we focus on the effects of mandatory MMC programs relative to traditional FFS Medicaid, and so we only report results for β_1, β_2, and β_3 in the regression tables. These parameters are estimates of the average effects of living in a county with the respective type of mandatory program, relative to counties with no MMC (the omitted category).

This "program effect" differs from the "individual effect" of being enrolled in an MMC plan versus being enrolled in FFS Medicaid. The program effect will be smaller in magnitude (in absolute value) than the individual effect to the extent that not all the Medicaid enrollees in an MMC county are enrolled in MMC. Even in counties with mandatory programs, exempted individuals may opt out, or programs may experience difficulties with enrollment. We have taken steps to bring the program effect we estimate closer to the individual effect by dropping various groups likely to be exempt (as we describe below). Because the existence of a mandatory program in a county will be highly positively correlated with enrollment in the program's participating plans, the program effect and the individual effect will be in the same direction.

Using county MMC measures rather than individual measures imparts some statistical advantages, though ideally we would have access to both. To the extent that individuals can opt out of mandatory MMC plans or choose between PCCM and HMO plans in the case of mixed programs, there will be selection bias if the choice to enroll in an MMC plan is related to unobserved characteristics. Evidence of favorable selection into MMC plans has been found by Leibowitz et al. (1992) and Glied et al. (1997). Estimates for mandatory programs will be less subject to this selection bias than estimates for programs where MMC enrollment decisions are completely voluntary.

For the PCCM and HMO only types, county-level measures of MMC could serve as instrumental variables (IVs) to account for the selection bias. They are IVs because they are positively correlated with the likelihood that a Medicaid recipient is enrolled in an MMC plan, but should not be correlated with the individual-level characteristics that cause a particular individual to choose not to enroll. For mixed mandatory MMC programs, where there may be a choice between PCCM and HMO plans, the county measure will capture the net effect of such a program, given whatever selection among plans may occur. Also, individual-level information on MMC participation from household surveys is likely to be measured with error. When there is measurement error in individual-level responses, county-level program information serves as IVs for individual-level responses, reducing the resultant bias.[1]

Defining the Analysis Samples

Mandatory program effects will equal the individual effects if all those in mandatory counties are enrolled in MMC (unfortunately, we do not know how many are exempted or don't enroll in each state). To bring the estimated program effects as close as possible to the corresponding individual effects, we restricted our analysis samples to groups very likely to be in enrolled in mandatory programs where they exist. The first analysis sample consists of nonelderly women enrolled in Medicaid through AFDC ("AFDC women") and the second consists of children enrolled in Medicaid through AFDC, federal or state poverty expansions, or Medically Needy programs ("Medicaid children").

We excluded those who were elderly or who received Medicare or SSI because MMC programs sometimes exempted these groups during the study period (Hurley and Wallin 1998). Such exemptions are now less common. We kept children in the sample who are non-AFDC Medicaid, most of whom are eligible for Medicaid through poverty expansions and are included in mandatory programs. Also, some of the Medicaid children in the sample are eligible through Medically Needy provisions. The Medically Needy were sometimes exempted from mandatory programs, but these observations cannot be identified reliably for exclusion.

In some states, pregnant women and women who had recently delivered who were eligible for Medicaid were exempted from mandatory MMC programs (CMS 1998a). Unfortunately the NHIS does not allow us to identify such women in the years we studied. Therefore, we excluded women who were receiving Medicaid through some mechanism other than AFDC because they are primarily pregnant women or women who had recently delivered. We excluded men because they tend to have very different usage patterns from women and there were not enough men to examine as a separate group.

Access and Use Measures

Many of the access and use measures we examined refer to the present or the past two-week period, while others refer to the past 12 months. For the latter, we further restricted the analysis sample to those who had been receiving Medicaid for at least 12 months. Not doing so would bias the effect of MMC downward. This comes at the cost of reducing the number of years in the 12-month analyses by two (1991 and 1992), because the requisite data were not available in the NHIS until 1993.

The dependent variables are described in Table 1. The number of years and observations for each variable differs for several reasons. In addition to the restrictions related to 12-month enrollment, some dependent variables were available only in certain years; and some measures were conditional on having any provider contact in the past two weeks. Finally, item nonresponse resulted in fluctuations in sample size across some dependent variables. The sample size for women and children is the number of observations in the defined samples with nonmissing observations for all explanatory variables.

A few measures require additional explanation. The basic standard of immunization adequacy measures for a child aged 19–35 months includes the following immunizations: four vaccinations for diptheria, pertusis, and tetanus combined, three oral polio vaccinations, and one mumps, measles, and

Table 1: Year Coverage, Sample Size, and Means of Dependent Variables

		Women Receiving AFDC		*Children Receiving Medicaid*	
Dependent Variable	*Years Covered*	*N*	*Mean*	*N*	*Mean*
Current Medicaid Sample					
Has usual source of care, not in the ER	1993–1995	3,249	0.851	14,386	0.907
Any ER visit in past 2 weeks (conditional on having any provider contact)	1991–1995	1,315	0.109	4,116	0.111
Any phone consultations with a provider in past 2 weeks (conditional on having any provider contact)	1991–1995	1,323	0.145	4,143	0.101
Any specialist visit in past 2 weeks (conditional on having any physician visit)	1991–1995	1,212	0.167	3,679	0.118
Immunization adequacy for children 19–35 months (4DPT/3OPV/1MMR)	1994–1995	—	—	1,262	0.705
Immunization adequacy for children 19–35 months (4DPT/3OPV/1MMR/3HIP/3HepatitutsB)	1994–1995	—	—	1,273	0.355
Full-year Medicaid Sample					
Unmet need for medical care in past 12 months	1993–1995	1,660	0.042	7,268	0.016
Unmet need for prescription drugs in past 12 months	1993–1995	—	—	6,627	0.015
Any physician or other provider visit in past 12 months	1993–1995	1,847	0.852	8,492	0.854
Log number of physician or other provider visits in past 12 months	1993–1995	1,643	1.393	7,325	1.014
Any inpatient stay in past 12 months	1993–1995	1,826	0.109	8,418	0.041

rubella vaccination (4DPT/3OPV/1MMR). The enhanced standard further includes three haemophilus influenzae type b vaccinations and three hepatitis B vaccinations (4DPT/3OPV/1MMR/3HIP/3HepatitisB). The unmet need measures are self-reported.

MMC Trends in the Current Medicaid Samples

As indicated in Table 2, the fraction of AFDC women and Medicaid children in the NHIS samples living in counties with MMC programs has increased steadily over time. The biggest change was for the fraction living in counties with some type of Medicaid HMO. The share living in a county with mandatory HMO increased only from 3.8 percent to 10.5 percent, and the share in mixed mandatory counties increased from 0.6 percent to 14.2 percent. About 25 percent lived in counties with some type of Medicaid HMO program by 1995.

Control Variables

Age, race/ethnicity, gender (for children), marital status, education, family size, income as a percent of the federal poverty level, self-reported health status, presence of health condition, and having a family member with a health condition are included in the regressions as control variables (X_i). Details and means for the control variables are available from the authors on request. We also control for county characteristics ($CNTY_i$) that may be related to access and use including urban residence, rural/urban status, income per capita, primary care physicians per capita, and private HMO penetration.[2]

Our controls for county characteristics are also likely to control for patterns of implementation of various forms of MMC within states. States are more likely to implement managed care programs first in urban areas (Slifkin et al. 1998), where access and use are higher, provider supply is greater, income is higher, and private managed care plans already exist. Failure to control for these characteristics might lead us to attribute the effects of these factors to the MMC program itself.

The generosity of a state's Medicaid program may also affect access and use and be related to MMC implementation. This could occur if states with more generous income cutoffs, and thereby higher Medicaid enrollment, are more likely to adopt MMC to reduce costs (Currie and Fahr 2002). For this reason, we control for state Medicaid generosity by including the AFDC payment standard which determines the income cutoffs for AFDC and varies by family size, state, and year. In the child models,

we also include the income threshold (as a percentage of the federal poverty level) under which the child is eligible for Medicaid, given the child's age, state, and year.

State fixed effects are included mainly to control for Medicaid policies at the state level, beyond the eligibility characteristics we include. Medicaid generosity, having a Medically Needy program, and state-specific features of Medicaid managed care program design and implementation will be picked up in the state fixed effects, as well as any other state characteristics that are fixed over time. Year fixed effects are included to control for national trends in access and use that might otherwise be inappropriately picked up by the county MMC variables.

Estimation and Identification

Most of the dependent variables were binary and for these we report the probit coefficients and the marginal effects. For the log number of doctor visits for those who had any visits, we used OLS (ordinary least squares). Because our main variables of interest were county-level MMC variables which were linked to individual-level data, the errors will generally be correlated within county. We allow arbitrary correlations among the error terms of observations within each county by adjusting the standard errors for county-level clustering. All the statistics reported here are unweighted. The regression controls for the (exogenous) factors used in sampling for the NHIS, and weighted and unweighted findings were very similar.

The effects of MMC programs are identified using within-state variation in MMC implementation over time and across counties. There is substantial shifting of program types within state and within county over time, as suggested by Table 2. There is also substantial variation across counties within

Table 2: Fraction of Sample Medicaid Recipients Living in MMC Counties, by MMC Type and Year

	Fraction of Medicaid Recipients				
Variable (N= 34,280)	*1991*	*1992*	*1993*	*1994*	*1995*
Lives in County with:					
No Medicaid managed care	0.706	0.565	0.538	0.475	0.404
Voluntary Medicaid managed	0.230	0.332	0.370	0.307	0.266
Mandatory PCCM only	0.020	0.037	0.030	0.085	0.084
Mandatory HMO only	0.038	0.031	0.034	0.055	0.105
Mandatory PCCM/HMO	0.006	0.035	0.029	0.078	0.142

states. Using cross-county variation within state to identify the MMC effects can lead to bias if there are unobserved factors that are correlated with county MMC type and also correlated with access and use (e.g., the factors that cause MMC to be implemented in certain locations). The inclusion of several county control variables should mitigate this source of bias. We conducted ANOVA tests that led us to conclude that using county fixed effects would leave too little variation to identify potential effects of MMC.

Selection into Medicaid

Using county level indicators addresses the potential bias caused by Medicaid enrollees systematically selecting themselves (or being selected by plans through their outreach or marketing practices) into MMC plans versus FFS. But the operation of an MMC program in a county may also affect enrollment into Medicaid, if MMC affects the expected value of enrolling in Medicaid. If county MMC characteristics are related to Medicaid enrollment, estimates of the effects of MMC may be biased. Currie and Fahr (2002) focus on this possibility, finding no effect of state MMC penetration rates on Medicaid coverage among low-income children overall, but finding evidence that MMC penetration reduces Medicaid coverage among African Americans and among young children (two to five years of age), suggesting that MMC plans may be actively discouraging enrollment among more costly individuals, with age and race serving as proxies for cost.

In preliminary analyses, we did not find significant effects of county MMC characteristics on Medicaid coverage for women covered through AFDC (overall, or limited to African American women only), and like Currie and Fahr, we do not find effects of MMC on Medicaid enrollment for children overall.[3] Thus any sample selection bias attributable to MMC affecting Medicaid enrollment should be small.

To confirm this, we computed Heckman selection terms (inverse Mill's ratios) based on first-stage models of Medicaid coverage through AFDC for women and Medicaid for children, and included them in the respective (second stage) access and utilization models (Heckman 1979; Vella 1992). None of the findings we report in the tables were altered by the inclusion of the selection terms, and thus we left them out of our final models.[4]

RESULTS

Tables 3–5 present the effects of mandatory MMC programs on access and use for each MMC type in turn. For the remainder of the paper we will refer to

Table 3: The Effects of Mandatory PCCM-Only Programs on Access and Use

	Women Receiving AFDC		*Children with Medicaid*	
Dependent Variable	*Coefficient*	*Marginal*	*Coefficient*	*Marginal*
Current Medicaid Sample				
Has usual source of care, not in the ER	0.198	0.045	0.232*	0.038
	(0.205)		(0.135)	
Any ER visit in past 2 weeks (conditional on having any provider contact)	0.229	0.043	– 0.267	– 0.044
	(0.363)		(0.199)	
Any phone consultations with a provider in past 2 weeks (conditional on having any provider contact)	– 0.201	– 0.041	– 0.219	– 0.032
	(0.432)		(0.198)	
Any specialist visit in past 2 weeks (conditional on having any physician visit)	– 0.426	– 0.085	0.003	0.0004
	(0.382)		(0.213)	
Immunization adequacy for children 19–35 months (4DPT/3OPV/1MMR)	—	—	0.238	0.075
			(0.242)	
Immunization adequacy for children 19–35 months (4DPT/3OPV/1MMR/3HIP/3HepatitutsB)	—	—	– 0.078	– 0.024
			(0.210)	
Full-year Medicaid Sample				
Unmet need for medical care in past 12 months	0.527	0.043	– 0.293	– 0.009
	(0.477)		(0.254)	
Unmet need for prescription drugs in past 12 months	—	—	– 0.459	– 0.009
Any physician or other provider visit in past 12 months	– 0.040	– 0.009	0.102	0.021
	(0.227)		(0.143)	
Log number of physician or other provider visits	0.116	—	0.040	—
	(0.149)		(0.064)	
Any inpatient stay in past 12 months	0.331	0.061	0.054	0.004
	(0.217)		(0.140)	

Notes: Probit coefficients and marginal effects are reported, except for log number of physician visits for which OLS coefficients are reported. Marginal effects are the percentage point difference in the access/use measure of MMC programs relative to traditional FFS Medicaid. Standard errors are in parentheses. Asterisks indicate that access/use is significantly different from traditional FFS Medicaid at $*p<.10$.

these simply as "the effects of MMC." In organizing the results in this way, coefficients from the same regressions appear across the three tables. We refer to results as significant if they are significant at the 5 percent level or better, unless otherwise noted.

Mandatory PCCM

Table 3 presents the effects of mandatory PCCM programs. For women, we do not find any significant effects of mandatory PCCM relative to FFS

Table 4: The Effects of Mandatory HMO-Only Programs on Access and Use

	Women Receiving AFDC		*Children with Medicaid*	
Dependent Variable	*Coefficient*	*Marginal Effect*	*Coefficient*	*Marginal Effect*
Current Medicaid sample				
Has usual source of care, not in the ER	– 0.253	– 0.070	0.038	0.007
	(0.172)		(0.146)	
Any ER visit in past 2 weeks (conditional on having any provider contact)	– 0.018	– 0.003	– 0.469**	– 0.069
	(0.305)		(0.199)	
Any phone consultations with a provider in past 2 weeks (conditional on having any provider contact)	– 0.222	– 0.045	0.045	0.008
	(0.330)		(0.203)	
Any specialist visit in past 2 weeks (conditional on having any physician visit)	– 0.574*	– 0.107	0.378**	0.076
	(0.327)		(0.189)	
Immunization adequacy for children 19–35 months (4DPT/3OPV/1MMR)	—	—	0.482	0.141
			(0.303)	
Immunization adequacy for children 19–35 months (4DPT/3OPV/1MMR/3HIP/3HepatitutsB)	—	—	0.287	0.095
			(0.260)	
Full-year Medicaid Sample				
Unmet need for medical care in past 12 months	0.784***	0.078	– 0.348	– 0.011
	(0.302)		(0.303)	
Unmet need for prescription drugs in past 12 months	—	—	– 0.301	– 0.007
			(0.332)	
Any physician or other provider visit in past 12 months	– 0.022	– 0.005	0.256	0.051
	(0.294)		(0.165)	
Log number of physician or other provider visits	– 0.328**	—	0.012	—
	(0.157)		(0.095)	
Any inpatient stay in past 12 months	– 0.673**	– 0.070	– 0.057	– 0.003
	(0.265)		(0.135)	

Notes: Probit coefficients and marginal effects are reported, except for log number of physician visits for which OLS coefficients are reported. Marginal effects are the percentage point difference in the access/use measure of MMC programs relative to traditional FFS Medicaid. Standard errors are in parentheses. Asterisks indicate that access/use is significantly different from traditional FFS Medicaid at $*p<.10$, $**p<.05$, and $***p<.01$.

Medicaid. For children, the only significant effect for mandatory PCCM (at the 10 percent level) is that it increases the likelihood of having a usual source of care that is not the ER by about 4 percentage points. While this finding is consistent with what the literature leads us to expect, one significant result (at 10 percent) out of 11 outcome measures is about what we would expect by chance in the absence of a true effect.

Table 5: The Effects of Mandatory PCCM/HMO Programs on Access and Use

	Women Receiving AFDC		*Children with Medicaid*	
Dependent Variable	*Coefficient*	*Marginal*	*Coefficient*	*Marginal*
Current Medicaid Sample				
Has usual source of care, not in the ER	0.392**	0.082	0.552***	0.074
	(0.177)		(0.169)	
Any ER visit in past 2 weeks (conditional on having any provider contact)	0.222	0.042	– 0.368**	– 0.057
	(0.276)		(0.167)	
Any phone consultations with a provider in past 2 weeks (conditional on having any provider contact)	– 0.374	– 0.070	0.258	0.049
	(0.283)		(0.177)	
Any specialist visit in past 2 weeks (conditional on having any physician visit)	0.117	0.029	0.023	0.004
	(0.260)		(0.185)	
Immunization adequacy for children 19–35 months (4DPT/3OPV/1MMR)	—	—	0.568***	0.161
			(0.214)	
Immunization adequacy for children 19–35(4DPT/3OPV/1MMR/3HIP/3HepatitutsB)	—	—	0.266	0.088
			(0.217)	
Full-year Medicaid Sample				
Unmet need for medical care in past 12 months	– 0.163	– 0.008	0.212	0.011
	(0.322)		(0.219)	
Unmet need for prescription drugs in past 12 months	—	—	0.467*	0.023
			(0.243)	
Any physician or other provider visit in past 12 months	– 0.036	– 0.008	0.243**	0.048
	(0.207)		(0.116)	
Log number of physician or other provider visits	0.078	—	0.105	—
	(0.139)		(0.069)	
Any inpatient stay in past 12 months	– 0.134	– 0.019	0.436**	0.039
	(0.231)		(0.184)	

Notes: Probit coefficients and marginal effects are reported, except for log number of physician visits for which OLS coefficients are reported. Marginal effects are the percentage point difference in the access/use measure of MMC programs relative to traditional FFS Medicaid. Standard errors are in parentheses. Asterisks indicate that access/use is significantly different from traditional FFS Medicaid at $^{*}p<.10$, $^{**}p<.05$, and $^{***}p<.01$.

Mandatory HMO

We find some significant effects of mandatory HMO-only programs relative to FFS Medicaid for women as indicated in Table 4. Mandatory HMO programs reduced the likelihood of seeing a specialist by about 11 percentage points (significant at 10 percent), increased reported unmet need for medical care by about 8 percentage points, reduced the number of physician visits for those who had any, and decreased the probability of having an

inpatient stay in the past 12 months by 7 percentage points. Overall, these findings of lower utilization coupled with higher reported unmet need suggests that mandatory MMC programs are reducing utilization, but some of this reduction is at least perceived by enrollees to be needed care. It is surprising that we do not find a positive effect of mandatory HMO-only plans on the likelihood of having a usual source of care, since Medicaid recipients in such counties are supposed to be assigned a participating plan provider. Disruptions in prior use patterns that resulted from the implementation of some MMC programs or problems associated with the MMC enrollment process in some locations may lessen this effect.

For children, we find that mandatory HMO-only programs reduced the probability of an ER visit by about 6.9 percentage points and increased the likelihood of a specialist visit by 7.6 percentage points. Mandatory HMO programs did not significantly affect other measures for children. These results suggest that the mandatory HMO only programs were generally beneficial for children, since they reduced costly ER use, improved access to specialists, and otherwise did not reduce access to care. The surprising lack of a USOC effect for mandatory HMO-only programs may be due to the same reasons mentioned above.

Mandatory PCCM/HMO

As indicated in Table 5, we find that mixed mandatory MMC programs increase the likelihood of women having a usual source of care that is not the ER by about 8 percentage points. None of the other effects for mixed mandatory MMC programs were significant. This suggests that such programs may be effective at connecting Medicaid recipients with a usual source of care, but do not otherwise increase or decrease use. One way this could result is if those with higher expected medical use opt out of HMO plans and enroll in PCCM plans instead—which as we found, have little effect by themselves.

Mandatory PCCM/HMO programs have several effects for children. They are found to increase the probability of having a usual source of care that is not the ER by 7.4 percentage points, reduce the probability of ER use by 5.7 percentage points, increase the probability of meeting the basic standard of immunization adequacy by about 16 percentage points, increase the probability of having a physician visit by 4.8 percentage points, and increase the probability of having an inpatient stay by about 4 percentage points.

These results all point to the conclusion that mandatory PCCM/HMO programs increase access and lead to more appropriate utilization, including preventive care as captured by immunizations. This conclusion is tempered by the finding that mandatory PCCM/HMO programs increase reported unmet need for prescription drugs (significant at the 10 percent level). The finding of an increased likelihood of having an inpatient stay is surprising. In light of the other results, it may suggest that increased access to primary care also increases the likelihood of identifying and more appropriately treating serious health problems for children that require inpatient stays.

Summary and Discussion

The findings of this study indicate substantial differences in the effects of Medicaid managed care for the different types of MMC programs and for children compared to women. One of the main findings is that nationally, mandatory Medicaid PCCM programs have no statistically significant effects, except for limited evidence of increasing USOC for children. These findings are surprising, since other state-specific studies have found that Medicaid PCCM programs are associated with an increase in physician visits and a decrease in emergency room use. Our results suggest that through the first half of the 1990s at least, PCCMs may have established better patient–provider relationships, but, on average, did not substantially change access and utilization patterns. Zuckerman et al. (2002) found few statistically significant PCCM program effects for adults, but found some positive effects for children. For adults at least, both national studies support the view that Medicaid programs that use PCCM may not be very different from the traditional Medicaid FFS programs (Hurley 1998). Another possible explanation is that private managed care may have affected physician practice patterns over time in such a way as to make Medicaid FFS more like less restrictive forms of managed care.

In contrast to PCCM programs, we do find significant effects of mandatory HMO-only and mixed mandatory MMC programs. For women, we find that mandatory HMO-only programs increase reported unmet need and reduce utilization, while we find no evidence that they increase having a usual source of care or reduce emergency room use. These findings are consistent with a situation in which HMO plans disrupt established patient–provider relationships or make it harder for enrollees to obtain care in a convenient location.

We find that the likelihood of having any physician visit or a specialist visit is lower for women in mandatory HMO counties relative to FFS counties. This result differs from other studies (Coughlin and Long 2000; Freund et al. 1989; Zuckerman, Brennan, and Yemane 2002). Freund et al. did not find such effects for having any visit, but did find negative effects on the number of visits, conditional on having any. We find that women were more likely to report unmet need for medical care in HMO programs versus FFS. Zuckerman et al. obtained a similar result.

Our finding that mandatory HMO programs reduce the likelihood of having an inpatient stay for women differs from other studies. This result may be a reflection of the enrollment problems experienced by some recipients in mandatory HMO Section 1115 programs that were implemented during the period evaluated in this study (Wooldridge et al. 1996). Such problems may have eased over time.

More generally, our overall conclusion that mandatory HMO-only programs negatively affected some aspects of health care for Medicaid women is largely supported by the literature. An evaluation of mandatory HMO programs in Section 1115 waiver programs found that all the negative effects associated with certain characteristics of HMOs were felt exclusively by adults (Brown et al. 2001). Tai-Seale et al. (2001) found length of stay for deliveries was reduced by MMC a few years after implementation. Consequently, as mandatory HMO programs become more the norm in states' Medicaid managed care programs, the evidence mentioned here and from the literature suggests that state policymakers should give due diligence to monitoring the health care of adults in these types of MMC programs.

For children, the effects of mandatory HMO programs are more positive given that they decrease ER use and expand access—a finding that is generally consistent with earlier state-level studies. We also find an increase in access to specialists for children in mandatory HMO. These results are consistent with the general finding of the literature that HMOs have relatively more positive effects on children than adults (Mauldon et al. 1994; Zuckerman, Brennan, and Yemane 2002).

The findings for mandatory PCCM/HMO programs are more favorable for women and children than those for mandatory HMO-only programs. For women, we found increases in the likelihood of having a USOC, but no significant differences in other measures. For children, the results are overwhelmingly favorable, with increases in access, use, and immunization adequacy. The relatively positive results for PCCM/HMO programs for both women and children may be because they are less likely to disrupt existing

relationships with providers than mandatory HMO-only programs. In many cases, Medicaid enrollees can choose between the HMO and the PCCM and are assigned to the PCCM if they make no choice. We might expect such arrangements to be superior to PCCM-only or HMO-only programs if individuals choose the option that is best for them. The behavior of the HMO programs themselves may be positively affected when their enrollees have more choices. Zuckerman et al. also found beneficial effects of mixed mandatory programs for Medicaid adults.

In interpreting these results it is important to recognize that in addition to variation across the program type categories we examine, there is also likely to be variation in program effects within our program type classifications, both across and within states, as evidenced by the heterogeneity of findings from state-specific studies. Thus, further analysis of more detailed MMC program characteristics at the national level should be an important and fruitful area for future research. This will require information across states and counties on the characteristics of different state programs, such as how PCCMs are organized, the types of HMOs (Medicaid versus commercial), the adequacy of capitation rates, and how effects change as programs and plans mature. Further studies of these effects would yield an even richer picture of the effects of MMC, and could help identify superior program characteristics. Our understanding will need to remain current as forms of Medicaid managed care shift and evolve.

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NOTES

1. Here, we include the county measures directly, not within a two-stage IV procedure since we do not observe individual-level responses.
2. Edited Interstudy data on private HMO penetration rates were provided by Dr. Douglas Wholey at the University of Minnesota. Other county control variables were obtained from the Area Resources File.

3. Consistent with the Currie and Fahr study, we do find a negative effect on Medicaid enrollment when we limit the sample to African-American children. However, the effect is only significant for mandatory PCCM programs. We actually find a positive (insignificant) effect for mandatory HMO programs. Unlike the prior study, we find no significant effects of MMC on child Medicaid enrollment when we limit to younger children.
4. For identification of the Heckman models, we included the AFDC payment standard and/or the Medicaid poverty threshold in the selection equation but not in the access and use equations. In most cases, the Heckman terms were not significant in the access and use models. When they were, they did not affect the findings for the county MMC variables.

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