

Managing the Gap: Evaluating the Impact of Medicaid Managed Care on Preventive Care Receipt by Child and Adolescent Minority Populations

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Abstract: The increased use of managed care in Medicaid warrants examination of any differential effects on care receipt by racial and ethnic minority populations. This paper explores such effects on preventive care use by children ages three through six years and adolescents ages 12 through 17. Enrollment, claims, and encounter data from the Maryland Medicaid program were analyzed. The period of study includes 1997, the year preceding the implementation of managed care, and two post implementation years, 2001 and 2004. Bivariate analyses establish patterns of use across racial and ethnic groups and trends over time. Difference-in-difference regression estimates the differential effects of managed care by race and ethnicity. Controlling for demographic and program characteristics, no disparities were observed prior to managed care. Under managed care, the probability of service receipt was increased for all but White adolescents. Black and Hispanic children and adolescents experienced greater gains than their White peers.

Key words: Medicaid, managed care, disparities.

Managed care (MC) has become the principal mechanism for financing and delivering care in Medicaid, with penetration of nearly 62% in 2004. States have adopted MC in Medicaid in an effort to control program costs, but also to enhance enrollee access to providers, encourage regular and timely use of preventive care, and improve coordination of specialty care. Under fee-for-service (FFS) payment systems, enrollees independently identify and seek care from Medicaid providers, limiting state influence over care-seeking behavior and control over the number and type of services provided. Traditionally low payment rates in many states limited the number of participating providers and made it difficult for enrollees to access services.¹ Capitated plans, on the other hand, are structured around the delivery of effective primary care, as prevention and early intervention are expected to be less expensive than emergency or acute care.²

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By providing networks of participating physicians, MC organizations facilitate access.³ Finally, by contracting with MC organizations, states have the ability to direct patient care practices, establishing expectations for access and quality.⁴

The potential role of MC in enhancing access to care must be considered within the broader framework of the racially and ethnically diverse population served by the Medicaid program, and the historic disparities in access for racial and ethnic minorities. Medicaid plays a disproportionate role in covering racial and ethnic minorities,⁵ covering 18% of White children, but 45% of Black, and 40% of Hispanic children.⁶ The presence of disparities in access to care and use of services between Black or Hispanic and White children has been well documented, even when controlling for insurance coverage.^{7,8,9,10,11,12} In addition to differences in insurance, potential sources of disparity include discrimination,¹³ lack of provider cultural competence or sensitivity,¹⁴ limited health literacy, and limited local health care resources.¹²

The increased use of MC in Medicaid raises the question of whether such delivery systems will have differential positive or negative effects on racial and ethnic minorities. With lower levels of socioeconomic status, English language fluency and health literacy, there is concern that minorities may have difficulty navigating MC structures such as "restricted provider networks, utilization review, specialist referrals, and other managed care cost containment mechanisms."¹⁵[p. 136] Managed care may, however, improve access to care by linking enrollees to primary care physicians responsible for care coordination.¹⁶ The increased likelihood of having a usual source of care under an MC plan has been found to increase preventive and primary care receipt among minority recipients.¹⁷ In addition, plans may be required to provide specific enabling services, such as translation, which are directed at meeting the unique needs of ethnic minorities. Overall, if plans are held accountable for specific quality or access standards, they may be more likely to tackle necessary provider and systems barriers faced by minorities.

In this paper, we address the question of whether a transition from FFS to a capitated MC program has differential effects on service use for racial and ethnic minority youths. We examine the case of Maryland, which implemented a mandatory capitated MC program via a section 1115 waiver* in 1998, covering nearly 80% of Medicaid enrollees. Maryland's program provides a useful case study, as the state requires plans to implement a variety of features designed to enhance access for new enrollees. The claims, encounter, and enrollment data available through reporting systems employed by the state also provide a unique resource to address this critical issue. Since Maryland implemented its MC program in 1998, the most recent year available for analysis of the FFS program is 1997. In an effort to create a reasonable comparison period with the FFS program in 1997, the MC analysis is limited to 2001 and 2004, the final years prior to the first and second 1115 waiver renewal. Although a third waiver renewal was granted in late 2008, data for 2007 could not be obtained in time for inclusion in this analysis.

Prior literature and background. There is extensive literature examining the effects

*Section 1115 of the Social Security Act provides the U.S. Secretary of Health and Human Services authority to approve experimental, pilot, or demonstration projects intended to promote the objectives of the Medicaid program.

of MC on access to care for children, as summarized in multiple reviews,^{18,19} but very few studies explicitly address the question of differential effects on minorities. Tai-Seale et al. used claims data to compare the experiences of Black and White Medicaid recipients in a single county who were required to enroll in capitated MC with peers served under FFS in a separate county. The authors concluded that Black children experienced greater declines in physician visits relative to White peers under MC and Black peers under FFS.²⁰ Although the study relied on claims and enrollment data, it was limited to a single MC county. Hargraves, Cunningham, and Hughes used data from the 1996–1997 Community Tracking Survey to examine the effect of enrollment in MC on access to primary care.²¹ They found that enrollment in MC did not eliminate disparities in service use, but was associated with improved access to care relative to non-MC plans.

Lê Cook used data from the National Health Interview Survey (NHIS) (1997–2001) and found that MC enrollment at the metropolitan statistical area (MSA) level was associated with reduced disparities between Black and White adult Medicaid recipients in receiving a doctor visit.⁵ Enrollment in MC was further found to reduce the disparity in having a usual source of care between Black and Hispanic adult recipients relative to Whites. However, this study did not distinguish enrollment in mandatory compared with voluntary programs, leaving open the possibility that the results were affected by selection bias. Currie and Fahr used NHIS data to assess the impact of Medicaid MC on children and found that higher levels of Medicaid MC penetration resulted in lower coverage rates for black children and therefore a decrease in physician visits. Conversely, higher Medicaid MC penetration rates resulted in a decrease in the number of Hispanic children who went without care.²² Finally, Balsa, Cao, and McGuire examined effects of race on selection into MC and access to care in Medicare.²³ While finding that minorities were more likely to enroll in MC plans, the study did not find differential effects of MC enrollment.

Maryland's Medicaid program changed to a mandatory MC delivery system in response to growing program enrollment and cost escalation in July 1998.⁴ Under the plan, participating managed care organizations (MCOs) are paid a capitated rate per enrollee based on the nationally recognized Adjusted Clinical Group (ACG) risk adjustment methodology.²⁴ Individuals dually eligible for Medicare and Medicaid as well as the long-term institutionalized are excluded from the MC program,²⁵ but nearly 80% of all Medicaid recipients are eligible.²⁶ As of December 2004, seven MCOs participated in the Maryland Medicaid MC program delivering care to over 600,000 state residents.

Maryland's MC program includes several features designed to increase access to care for program enrollees. Participating MC plans are required to schedule an initial health assessment for new enrollees⁴ and state regulations require that MC plans guarantee access to primary care services (including obstetrics/gynecology), pharmacy, and diagnostic laboratory services. Provider network capacity standards were also established.²⁴

Early assessments of the effect of the Maryland program suggest that Black-White disparities narrowed under MC, but initial descriptive assessments did not focus on children or adolescents and did not control for differences in population characteristics.²⁷

Methods

Analytic overview. We use multiple years of claims and encounter data from the Maryland Medicaid program to examine baseline disparities in use of preventive care and to assess the effect of the MC transition on the direction and magnitude of any disparities. The research approach in this study draws upon the recommendations of Nerenz²⁸ and Newacheck and Stein²⁹ by relying upon indicators of preventive care use based on established HEDIS measures.³⁰

The underlying model for the current study is a variant of the Andersen-Aday behavioral model of health care service utilization.^{31,32,33,34,35} The Andersen-Aday framework integrates a range of individual, environmental, and provider-level factors when considering the variables that affect health care utilization. Aday et al.³¹ categorize individual, environmental, and provider-level (or system) characteristics into predisposing factors, enabling factors, and need. As Phillips et al. put it,^{36[p.574]} “the behavioral model is a framework for analysis rather than a mathematical model, and therefore it does not dictate the precise variables and methods that must be used.” The inclusion and categorization of specific elements may vary depending on the research questions and purpose, and data availability.

The period of study includes 1997, the year immediately preceding the implementation of MC, 2001, a period reflecting a relatively new but stable MC program, and 2004, reflecting a mature MC program. 2001 and 2004 also correspond to the years immediately preceding the state’s first and second 1115 waiver renewals, making each year a natural benchmark for study.

We begin by analyzing data from the pre-MC period to describe patterns of preventive care use across racial and ethnic groups and establish the extent of baseline disparities. We then pool data from the pre- and post-MC periods and use a multivariate difference-in-difference (DD) approach to estimate the differential effects of the MC transition on racial and ethnic groups, while controlling for child, family, and area characteristics. We expect that regulatory access requirements⁴ will increase levels of preventive care use for all groups, and that disparities in receipt of preventive care will be reduced. As a final step, we estimate multivariate models from 2004 only, to examine whether selected MCO characteristics play a role in preventive service use.

States transitioned to Medicaid MC in an effort to control ever rising costs associated with the program; unknown was the impact MC would have on racial disparities in service use. As states face renewed pressure to realize cost savings, further reforms to Medicaid are likely to be considered. To the extent that states have hesitated to implement MC programs owing to uncertainty about the impact on racial disparities, the present research should prove useful in reaching decisions.

Data sources. The primary sources of data are claims and encounter data from the Maryland Medicaid program linked to state enrollment data. Claims data were submitted routinely by providers under the FFS program to obtain reimbursement from the Medicaid program, and include limited demographic and identifying information, and detailed information on diagnoses and services provided. Providers participating in Medicaid MCOs are required to submit comparable information through encounter records, although payment is based on a capitated monthly amount and is not linked

to individual submissions. All MCOs participating in the Maryland program submit encounter data and the state reports that greater than 90% of all physician encounters are reflected in the data.²⁵ The missing data appear to be randomly distributed across participating plans suggesting that its omission should not bias any findings derived from the submitted data. Information from the claims or encounter data is summarized by person and year, and linked to Medicaid enrollment files. The enrollment files contain detailed demographic information on gender, age, race/ethnicity, family income, primary language, adult (parent/guardian) educational attainment, length of Medicaid enrollment, prior participation in the voluntary Medicaid MC plan, type of plan, and auto-assignment. To capture the availability of providers in the Medicaid program, we use link data provided by the Medicaid program on the number of participating physicians practicing within a ZIP code with Medicaid enrollment data by ZIP code to calculate the number of participating physicians per 100 Medicaid enrolled persons in any given ZIP code. This ratio approximates physician supply relative to an enrollee's neighborhood.

Analytic sample. The analysis focuses on preventive care use for two age groups, children aged three through six years and adolescents age 12 through 17.* The sample includes children and adolescents in each age group as of December 31st of the measurement year who were enrolled in the Maryland Medicaid program continuously for at least 10 months during that measurement year. Pregnant adolescents were excluded from the analysis as their care regimen would likely differ significantly from that of a typical adolescent. Children and adolescents in 1997 who would not have met the subsequent eligibility criteria for the mandatory MC program due to institutional status were excluded. We excluded from the study approximately 17,000 children aged three to six and 13,800 adolescents aged 12 to 17 who were enrolled in a voluntary MC program in 1997, because there were no encounter or claims data available for them in 1997, making it impossible to measure use of services. Enrollment data indicate that this group was disproportionately Black, female, and from one region of the state—Baltimore City. Furthermore, we excluded children in 2001 and 2004 who would not have been income-eligible in 1997, but became eligible as a result of Maryland's SCHIP expansions during this period.** The remaining sample included 129,777 younger children and 126,361 adolescents across the three years. Of the children aged three-to-six, none were represented in more than one year of data. Among the adolescents, an estimated 20% of youths enrolled in 1997 were also included in the sample in 2001, with 6.1% in 2004. The sample of adolescents available both pre- and post-MC-transition is too small to analyze separately.

Measurement of key variables. The dependent variables are the presence of any well-child or an adolescent well-care preventive visit during each 12-month period

*The age ranges are selected to be consistent with the specifications of the HEDIS child and adolescent well-care measures. The adolescent population was limited to ages 12 to 17 rather than the HEDIS recommendation of 12 to 21.

**In 1998 Maryland implemented its State Children's Health Insurance Program (SCHIP) as an expansion to its Medicaid program, enrolling children with family incomes up to 200% of the federal

under study. Preventive care visits are defined according to the 2005 HEDIS Technical Specification Guidelines (year-specific procedure codes were included where appropriate)* and include services such as an annual checkup and immunizations.

Information on race and ethnicity is from self-reported data included in state enrollment records. Race and ethnicity are reported as mutually exclusive categories; no option is available to report a multiracial identity. We create four summary categories, non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic Asian or other. Estimates of family income are derived from enrollment application and eligibility records that require program participants to report family income from all sources. Income is measured in total dollars and not adjusted for family size.

The claims and encounter data are also used to characterize individual health status based on the Ambulatory Care Group risk adjustment methodology. Using diagnostic codes from reported claims or encounters, children are assigned to one of 93 mutually exclusive health status categories, which are collapsed into five Resource Utilization Bands (RUB). The five RUBs range from users with no prior services or tracked diagnoses to those deemed to be of high morbidity.³⁷

Multivariate analysis. Three models were estimated for each age group. Model 1 is estimated using data from the pre-MC period (1997), providing an estimate of baseline disparities with controls for individual and family characteristics. The model includes dummy indicators for each race and ethnic group relative to White non-Hispanics, age, gender, health status, and family income. The model includes a ZIP code level measure of physician supply (number Medicaid recipients per participating physicians in a given ZIP code). We include region of residence, which may affect physician distribution and access by public transportation. We also capture length of total enrollment, a person-program characteristic likely to affect relationships with a primary care provider. Length of enrollment is expected to increase as a result of a policy change, implemented with the MC transition, which guarantees six months of continuous eligibility.

To examine differential effects of MC enrollment by race and ethnicity, we estimated difference-in-difference (DD) models (Model 2) of the form:

$$\Pr [Y=1] = \alpha + \beta_0 2001 + \beta_1 2004 + \gamma RACE + \delta 2001 * RACE + \phi 2004 * RACE + \kappa DEMOG + \lambda HEALTH + \varepsilon$$

where 2001 and 2004 represent observations in the two periods post-MC implementation, with the 1997 FFS year as the reference category; RACE is a vector of the race and ethnicity variables, with White as the reference category; 2001*RACE and 2004*RACE are vectors of interaction terms between the race and ethnicity indicators and the two post-period years; DEMOG is a vector of demographic and area characteristics; HEALTH is a vector of health status measures.

The estimated coefficients for the vector of race and ethnicity variables capture the differential effect of being in each category, relative to Whites, in the FFS period. The coefficient estimates for the interaction terms capture the effects of being in each racial or ethnic group in each of the post-implementation periods (2001 and 2004) compared

*Developed by the National Committee of Quality Assurance (NCQA), HEDIS is the most commonly used and recognized set of performance measures for managed care programs.

with FFS. Because we estimate linear probability models, the reported parameter estimates for each variable measure the percentage point increase or decrease in the probability of the dependent variable associated with a change in category from the reference case.

In Model 3, we use data from the later post-MC period (2004) to estimate models exploring the effects of race and ethnicity under the MC regime, with the inclusion of two additional MC-specific characteristics (type of plan and auto-enrollment). When last reported by the Centers for Medicare and Medicaid Services in 2004, approximately 40% of Medicaid participating health plans were established and operated by health care providers, referred to as provider sponsored organizations (PSO).³⁸ These providers directly deliver a significant amount of the health care services to recipients and have a financial stake in their care management³⁹ suggesting that individuals enrolled in a PSO may receive more appropriate preventive care. Auto-enrollment may be associated with lower rates of well-care, since the failure to select a provider may indicate less active use of the delivery system. Additionally, Model 3 includes a variable that controls for prior participation in the voluntary MC program in 1997. Given that participants in the voluntary MC program were excluded from the 1997 sample but eligible for inclusion in the 2001 and 2004 samples, this variable is included to control for any bias that may result from their exclusion from the 1997 sample, given that the propensity to enroll in MC may be a predisposing factor.

The output/code/data analysis for this paper was generated using SAS software, Version 9.1 of the SAS System for Windows.⁴⁰ All results discussed are significant at $p < .05$, unless noted otherwise. We focus on results for the three largest races/ethnic groups: non-Hispanic White and Black, and Hispanic (as they constitute 95% of the population).

Results

Child and adolescent characteristics. Observed differences in use of well-child care across racial and ethnic groups may reflect differences in other child, family, and/or program characteristics across groups. The data presented in Tables 1 and 2 reveal some important differences between the enrolled populations over time and across races/ethnic groups. First, it should be noted that there is a considerable difference between 1997 and 2004 in the size of the study population and significant change in its racial and ethnic composition. The changes reflect differential population growth among racial/ethnic minorities, increased enrollment rates among eligible children and adolescents, and the exclusion of the voluntary MC participants from the 1997 study population. In the 1997 sample, 37.8% of Medicaid children were White, 54.6% were Black, and a very small proportion were Hispanic (3.8%). By 2004, the proportion of White children had fallen to 25.7%, Black children's population share was little changed at 57.4%, but the proportion of Hispanic children had almost tripled (10.8%). The increase in the number of Hispanic children is not surprising given that the Hispanic population in Maryland grew by 55% between 1990 and 2000, and by 60% between 2000 and 2007, even as the non-Hispanic White population in the state declined by just more than 1%.⁴¹

Table 1.**CHARACTERISTICS OF MARYLAND MEDICAID ENROLLED CHILDREN AGED 3-6,
BY YEAR AND RACE-ETHNICITY**

N	All		White		Black		Hispanic	
	1997 23,919	2004 61,614	1997 9,037	2004 15,858	1997 13,057	2004 35,341	1997 903	2004 6,644
Share of enrolled children			0.378	.257*	.546**	.574***	.038**	.108***
Age	4.491	4.400	4.470	4.414*	4.525**	4.449**	4.322**	4.224**
Male	0.524	.504*	0.527	0.516	0.519	0.500	0.546	.505*
Morbidity								
Low	0.377	0.372	0.372	0.369	0.382	0.375	0.346	0.373
Moderate	0.231	.257*	0.299	0.310	.183**	.231***	0.268	0.264
High	0.036	0.033	0.047	0.045	.028**	.027**	0.033	.029**
Very high	0.003	0.003	0.004	0.005	.001**	.003	0.002	0.004
Family income (\$)	395.00	522.00*	457.00	710.00*	350.00**	475.00***	345.00**	334.00**
English	0.802	.986*	0.861	.993*	.775**	.993*	.769**	0.929
Region								
Baltimore City	0.326	.291*	0.227	.097*	.425**	.440***	.063**	.061**
Western MD	0.092	.076*	0.207	0.208	.020**	.026**	.016**	.035**
DC Suburbs	0.215	.255*	0.067	.054*	.263**	.244**	.755**	.731**
Central MD	0.214	.235*	0.302	.378*	.162**	.182***	.090**	.120**
Eastern Shore	0.100	0.097	0.130	.187*	.085**	.070**	.063**	.042**
Southern MD	0.053	.046*	0.068	0.076	.045**	.040**	.013**	.011**
Months enrolled	20.18	19.80*	21.08	22.09*	19.34**	17.83***	20.30	23.11*
Auto enrolled		0.337		0.351		0.359		.179**
Enrollees per physician(100s)	136.8	135.9	127.9	124.9	142.2**	138.4***	147.7**	153.9**
Provider sponsored MCO		0.510		0.402		.510**		.712**
Prior MCO enrollment		0.000		—		—		—

*Denotes significant difference from 1997, p<.05

**Denotes significant difference from White recipients within years, p<.05

MCO = managed care organizations

Table 2.

CHARACTERISTICS OF MARYLAND MEDICAID ENROLLED ADOLESCENTS, AGED 12-17, BY YEAR AND RACE-ETHNICITY

	All		White		Black		Hispanic	
	1997	2004	1997	2004	1997	2004	1997	2004
N	17,926	63,811	6,544	16,925	10,475	41,744	284	3,025
Proportion enrolled adolescents			0.365	.265*	.584**	.654***	.016**	.047***
Age	14.078	14.298*	14.065	14.345*	14.081	14.294***	13.894	14.063**
Male	0.523	0.521	0.550	.525*	.507**	0.518	.609**	.520*
Morbidity								
Low	0.337	.355*	0.322	.343*	.347**	.362***	0.331	0.350
Moderate	0.221	0.234	0.296	.316*	.175**	.206***	0.310	.195***
High	0.047	.037*	0.064	0.060	.038**	.028***	0.046	.026**
Very high	0.009	.005*	0.010	0.009	0.008	.004***	.004**	.003**
Family income (\$)	715.00	1,163.00*	994	1,427.00*	540.00**	1,060.00***	722.00**	606.00**
English	0.812	.909*	0.882	.917*	.777**	.906***	0.894	.956***
Region								
Baltimore City	0.376	.354*	0.228	.116*	.492**	.485**	.162**	.052***
Western MD	0.085	.068*	0.197	0.197	.017**	.019**	.042**	.034**
DC Suburbs	0.198	.224*	0.088	.062*	.236**	.242**	.644**	.749**
Central MD	0.204	.218*	0.306	.376*	0.144	.155*	.081**	.118**
Eastern Shore	0.088	.096*	0.118	.186*	.070**	.066**	.056**	.039**
Southern MD	0.05	0.041	0.063	0.064	.041**	.033***	.014**	.008***
Total months enrolled	29.75	29.33	31.95	32.05	28.30**	28.25**	28.78	28.13**
Auto enrolled in MCO		0.278		0.210		0.313**		0.209
Enrollees per physician (100s)	1.333	1.342	1.238	1.250	1.395**	1.372***	1.281	1.501***
Provider sponsored MCO		0.498		0.411		.511**		.719**
Prior Medicaid HMO		0.341		.196*		.427***		.122***

*Denotes significant difference from 1997, p<.05

**Denotes significant difference from White recipients within years, p<.05

MCO = managed care organizations

HMO = health maintenance organization

There were few significant changes in characteristics within race and ethnic sub-populations over time, although family incomes were higher for White and Black children, and the urban/rural distribution changed for Whites. These changes in characteristics are consistent with a spillover effect on Medicaid enrollment associated with SCHIP, which targeted higher-income families.⁴² There was also a great deal of variation across populations, especially with regard to residence.

As for the enrollment of children, adolescent enrollment grew between 1997 and 2004, and White adolescents constituted a smaller share of the Medicaid program in 2004 than in 1997 (Table 2; 24.6% and 36.5% respectively). The proportion of Black adolescents increased from 58.4% in 1997 to 65.4% in 2004 and the proportion of Hispanic adolescents nearly tripled (1.6% in 1997 and 4.4% in 2004), but was still quite small. Family incomes were significantly higher for White and Black adolescents by 2004. There were also increases in the share of Low and Moderate Morbidity recipients among Black and White adolescents.

Differences in use rates across groups and over time. In 1997, 58.3% of Medicaid enrolled children received at least one well-child service (Table 3). Service use rates were indistinguishable for Black (56.9%) and Hispanic (57.1%) children, but White (60.5%) children received care at a higher rate than Black children—a gap of 3.6 percentage points.

Black and Hispanic children experienced an increase in well-child use rates under MC. For example, 62.5% of Hispanic children received a well-child visit in 2001, increasing to 71% in 2004. White children experienced a decline in 2001, but rebounded in 2004. By 2004 there was no significant difference between Black (64.8%) and White (64.3%) children, while Hispanic (71.1%) children experienced higher service use rates.

In contrast, there was no evidence of disparate levels of service receipt among minority adolescents under FFS Medicaid. As shown in Table 3, use rates among White (39.9%), Black (38.8%), and Hispanic (44.0%) adolescents were statistically indistinguishable. White adolescents experienced a significant decrease in service receipt relative to FFS in 2001, but rates rebounded by 2004. Hispanic adolescents experienced no change in service receipt under MC in 2001 or 2004. There were no significant differences in service receipt rates for Black adolescents between 1997 and 2001, but they received services at significantly higher rates in 2004. Black and Hispanic adolescents had higher rates of well-care services than their White peers in both MC periods: 39.0% of White adolescents, compared with 45.0% of Black and 49.1% of Hispanic adolescents received well-care visits in 2004.

Multivariate results. Table 4 presents the results from the three multivariate models we estimated for children aged three to six. The results from Model 1 indicate that adding controls for individual, family, and selected area characteristics eliminates discernable disparities between White and Black children, suggesting an absence of racial or ethnic disparities in care receipt under FFS. As expected, health status significantly affected the probability of service receipt, as did age and gender. Residence in all regions of the state was associated with having a lower probability of service receipt, relative to Baltimore City. This pattern may reflect greater availability of public transportation, or safety net systems better geared towards treating the Medicaid population. Longer enrollment was associated with a small positive effect on receipt of well-care.

Table 3.**MEAN ACCESS RATES, WELL CHILD VISITS FOR CHILDREN 3 THROUGH 6 AND WELL CARE VISITS FOR ADOLESCENTS 12 THROUGH 17**

	Children 3 through 6						Adolescents 12 through 17					
	FFS 1997		MC 2001		MC 2004		FFS 1997		MC 2001		MC 2004	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
All	0.583 [^]	0.003	0.583	0.002	0.653 [*]	0.002	0.392	0.004	0.386 [^]	0.002	0.435 ^{*^}	0.002
White	0.605	0.005	0.570 [*]	0.005	0.643 [*]	0.004	0.399	0.006	0.365 [*]	0.005	0.390	0.004
Black	0.569 [^]	0.004	0.584 [#]	0.003	0.648 ^{*#}	0.003	0.388	0.005	0.394 ^{^#}	0.003	0.450 ^{*^#}	0.002
Hispanic	0.571	0.016	0.625 ^{*^#}	0.008	0.711 ^{*^#}	0.006	0.440	0.030	0.438 ^{^#}	0.014	0.491 ^{^#}	0.009
Other	0.574 [^]	0.016	0.556	0.012	0.643 [*]	0.008	0.376	0.019	0.321 [^]	0.014	0.413 [*]	0.011

^{*}Denotes significant difference from 1997, p<.05
[^]Denotes significant difference from White recipients within years, p<.05
[#]Denotes significant difference between Black and Hispanic recipients within year, p<.05

Table 4.**EFFECTS OF FFS AND MANAGED CARE ON ACCESS TO WELL CHILD SERVICES FOR CHILDREN 3 TO 6**

Variable	Pre and post regressions				Difference in difference model	
	(Model 1)		(Model 3)		(Model 2) Adjusted for individual and programmatic characteristics	
	Base year		Post year			
	FFS 1997 N=23,891 R2=0.072		MMC 2004 N=61,579 R2=0.046		N=129,727 R2=0.057	
	Parameter	S.E.	Parameter	S.E.	Parameter	S.E.
Intercept	0.596**	0.018	0.733**	0.012	0.656**	0.008
Black	-0.014	0.007	0.028**	0.005	-0.005	0.006
Hispanic	-0.000	0.018	0.079**	0.008	-0.006	0.017
Other	0.007	0.017	0.008	0.009	-0.001	0.016
MC01 (White)					-0.020**	0.007
BlackMC01					0.035**	0.008
HispanicMC01					0.087**	0.019
OtherMC01					0.008	0.021
MC04 (White)					0.039**	0.006
BlackMC04					0.030**	0.008
HispanicMC04					0.090**	0.018
OtherMC04					0.010	0.018
Age	-0.025**	0.003	-0.046**	0.002	-0.040**	0.001
Male	-0.021**	0.006	-0.003	0.004	-0.009**	0.003
Morbidity ^a						
Low	0.231**	0.007	0.149**	0.004	0.178**	0.003
Moderate	0.275**	0.008	0.190**	0.005	0.220**	0.004
High	0.285**	0.017	0.196**	0.011	0.236**	0.008
Very high	0.301**	0.060	0.170**	0.033	0.210**	0.025
Family income (in 1000s) ^b	-0.015**	0.002	-0.006**	0.001	-0.007**	0.001
Region ^c						
Western MD	-0.079**	0.013	0.009	0.008	-0.014**	0.006
DC Suburbs	-0.090**	0.010	-0.031**	0.006	-0.050**	0.004
Central MD	-0.088**	0.009	-0.036**	0.006	-0.049**	0.004
Eastern Shore	-0.075**	0.012	-0.031**	0.008	-0.026**	0.005
Southern MD	-0.113**	0.015	-0.042**	0.010	-0.060**	0.007

(Continued on p. 104)

Table 4. (continued)

	Pre and post regressions				Difference in difference model	
	(Model 1)		(Model 3)		(Model 2)	
	Base year		Post year		Adjusted for individual and programmatic characteristics	
	FFS 1997		MMC 2004		N=129,727	
	N=23,891		N=61,579		R2=0.057	
	R2=0.072		R2=0.046			
Variable	Parameter	S.E.	Parameter	S.E.	Parameter	S.E.
Prior Medicaid HMO			-0.546	0.465		
Months enrolled	0.001**	0.000	0.002**	0.000	0.000**	0.000
Auto enrolled in MCO			-0.008*	0.004		
Enrollee/physician ratio (100s) ^d	-0.004	.006	-0.007	0.004	-0.007**	0.003
Provider sponsored MCO			0.014**	0.004		

*Denotes significant difference at .05 level
**Denotes significant difference at .01 level
^aUsers with no prior services or tracked diagnoses comprise the reference group.
^bEstimates the impact per \$1,000 increase in annual family income.
^cBaltimore City is the reference group.
^dEstimates the impact per 10 enrollee increase.

The estimates from the DD model (Model 2) reveal that the transition to MC was associated with a differential positive effect on the probability of care receipt by Black and Hispanic children relative to their White peers. Estimates of the early effects of MC (2001) indicate that White children actually lost ground, with a two percentage point reduction in service use, whereas Black and Hispanic children experienced gains in the probability of use over the FFS period. By 2004, all three groups of children posted an increased probability of service use relative to FFS. White children (MC04) posted an increase of 3.9 percentage points relative to FFS, while Black (BlackMC04) and Hispanic (HispanicMC04) children realized differential increases of 3.0 and 9.0 percentage points respectively. Although race and ethnicity were found to have significant effects on service use, health status was found to have a greater impact. Older-aged and higher-income families had a lower probability of service use. Region of residence was also found to be significant, with children residing outside of Baltimore City less likely to use services.

The results from Model 3 are consistent with those of the DD analysis. Black and

Hispanic children had a higher probability of care receipt under MC than did their White peers. Being auto-enrolled, as opposed to actively selecting a provider, and enrollment in a provider sponsored MCO were associated with a reduced probability of preventive service use.

Table 5 presents results from the three models estimated for adolescents. Estimates from Model 1 confirm that in the pre-MC period there were no disparities in preventive care use. As with younger children, age, health status, and region were important determinants of service use. Lower physician supply, as reflected in the enrollee per physician ratio, was associated with lower levels of use. Estimates from Model 2 reveal that the transition to MC had a negative impact on the probability of service receipt by White adolescents in 2001 and no measurable impact in 2004. Black and Hispanic adolescents experienced differential increases during both 2001 and 2004. The magnitude

Table 5.

EFFECTS OF FFS AND MANAGED CARE ON ACCESS TO WELL CARE SERVICES FOR ADOLESCENTS AGED 12 TO 17

Variable	Pre and post regressions				Difference in difference model	
	(Model 1)		(Model 3)		(Model 2)	
	Base year		Post year		Adjusted for individual and programmatic characteristics	
	FFS 1997		MMC 2004		N=126,274	
	N=17,914		N=63,762		R2=0.077	
	R2=0.072\3		R2=0.077			
Variable	Parameter	S.E.	Parameter	S.E.	Parameter	S.E.
Intercept	0.683**	0.033	0.492**	0.018	0.520**	0.013
Black	0.003	0.008	0.090**	0.005	0.015	0.008
Hispanic	0.032	0.029	0.151**	0.010	0.051	0.029
Other	0.034	0.020	0.076**	0.011	0.042*	0.020
MC01 (White)					-0.018*	0.007
BlackMC01					0.038**	0.009
HispanicMC01					0.064*	0.032
OtherMC01					-0.034	0.025
MC04 (White)					-0.007	0.007
BlackMC04					0.070**	0.009
HispanicMC04					0.100**	0.030
OtherMC04					0.035	0.023

(Continued on p. 106)

Table 5. (continued)

Variable	Pre and post regressions				Difference in difference model	
	(Model 1)		(Model 3)		(Model 2)	
	Base year		Post year		Adjusted for individual and programmatic characteristics	
	FFS 1997 N=17,914 R2=0.072\3		MMC 2004 N=63,762 R2=0.077		N=126,274 R2=0.077	
	Parameter	S.E.	Parameter	S.E.	Parameter	S.E.
Age (continuous)	-0.027**	0.002	-0.017**	0.001	-0.018**	0.001
Male	-0.009	0.007	-0.034**	0.004	-0.031**	0.003
Morbidity ^a						
Low	0.211**	0.008	0.228**	0.004	0.223**	0.003
Moderate	0.280**	0.010	0.289**	0.005	0.286**	0.004
High	0.298**	0.017	0.322**	0.010	0.320**	0.007
Very high	0.240**	0.037	0.321**	0.027	0.316**	0.019
Family income (in 1000s) ^b	-0.009**	0.002	-0.008**	0.001	-0.007**	0.001
Region ^c						
Western MD	-0.085**	0.015	-0.060**	0.009	-0.062**	0.006
DC Suburbs	-0.047**	0.011	-0.051**	0.006	-0.055**	0.004
Central MD	-0.046**	0.010	-0.026**	0.006	-0.034**	0.004
Eastern Shore	-0.058**	0.014	-0.031**	0.008	-0.028**	0.005
Southern MD	-0.089**	0.017	-0.060**	0.010	-0.078**	0.007
Prior Medicaid HMO			-0.004	0.004		
Months enrolled	-0.000	0.000	0.001**	0.000	0.001**	0.000
Auto enrolled in MCO			-0.029**	0.004		
Enrollee/physician ratio (100s) ^d	-0.014*	0.007	-0.005	0.004	-0.006*	0.003
Provider sponsored MCO			-0.003	0.004		

*Denotes significant difference at .05 level
**Denotes significant difference at .01 level
^aUsers with no prior services or tracked diagnoses comprise the reference group.
^bEstimates the impact per \$1,000 increase in annual family income.
^cBaltimore City is the reference group.
^dEstimates the impact per 10 enrollee increase.

of the differential gains by Hispanic adolescents (HispanicMC04) in 2004 was 10.0 percentage points and Black adolescents (BlackMC04) posted a differential gain of 7.0 percentage points. Length of enrollment is associated with a small, positive effect on preventive care use. As with their younger peers, health status was found to have a far greater effect on service use than race or ethnicity. Age was negatively associated with the probability of service receipt as was being male and residing outside of Baltimore City.

Estimates from Model 3 are generally consistent with the results from Model 2. We fail to find effects associated with enrollment in a provider-sponsored MCO and physician supply is not significant in Model 3. Auto enrollment was found to have a negative impact on the probability of service use.

Discussion

The results of this study suggest that there were disparities in use of well-child care, but no disparities for adolescents enrolled in the Maryland Medicaid program prior to implementation of MC. The introduction of controls for child and family characteristics helped to explain the observed disparities for children. Thus, within a Medicaid program where all children are faced with potentially equal access, the problem of disparities may be muted, relative to comparisons across groups with different types of insurance. The results also indicate that the implementation of MC had a disproportionately positive effect on well-child and adolescent care for Blacks and Hispanic children, creating new disparities, but in the reverse direction, where the typically disadvantaged minority children benefited more than White children and adolescents.

The results from this study confirm the findings of other studies, suggesting that disparities in access to care may be at least partially explained by observed differences in characteristics that may independently affect service use.⁴³ Consistent with expectations, we find baseline evidence of lower well-child preventive care use rates for young Black and Hispanic children and an increased probability of service use for children after the transition to MC; unadjusted baseline differences were minimized or reversed by 2004. After controlling for child, family, and program characteristics, baseline disparities under FFS were eliminated. Consistently with recent findings, however, disparities persisted under MC, disparities that favored Black and Hispanic children.⁵

These findings control for observable child, family, and program characteristics, many of which have significant effects on the probability of well-child or adolescent care, but there is the potential for changes in unobserved characteristics, such as in the underlying propensity to seek medical care. For example, our sample selection process attempted to maintain comparability in groups in the pre- and post-MC periods, by using common income eligibility rules in both periods. Research has shown, however, that the SCHIP expansion had positive spillover effects on Medicaid participation.⁴⁰ Although Medicaid income-eligible, these spillover enrollees may differ in unobserved ways from those who were enrolled in Medicaid prior to the SCHIP expansion, and these differences may vary across race and ethnic groups.

Additionally, we could not include nearly 30,000 children in the 1997 sample as they participated in a voluntary Medicaid MC program and no utilization data was

available. These children were disproportionately Black, female, and from Baltimore City. To address concerns that their inclusion may bias our results we controlled for race, gender, and region of residence. Additionally, we included a variable (Model 3) that controlled for prior participation in the voluntary MC program. Given that the participants in the voluntary MC program almost exclusively resided in Baltimore City, separate regressions were run that excluded Baltimore City from all study years. These regressions did not alter the findings presented in this analysis.

There are myriad possible interaction effects that we did not examine, but which might explain some of the findings.

These results raise questions concerning how to interpret the effects of the MC transition in Maryland and the lessons for policymakers in other states. That managed care had a positive impact on care receipt by children seems evident, however, enrollee characteristics such as urban residence and enrollee-to-physician ratio were also significant determinants of well-care service use and may have differed across various race/ethnic groups and over time.

Since this study lacks an explicit control group, we look to trends during this period in other state Medicaid programs as well as in commercial HMOs, which serve a predominantly privately-insured population.* No FFS data are available for comparison. The national data suggest that both the levels of well-child service use in Maryland's program, and the increases observed between 2001 and 2004 are generally similar to other state Medicaid MC plans and commercial plans. The increased use of quality monitoring and measurement, typically associated with managed care, also may be affecting service delivery in Medicaid MC as states set performance standards for MC plans to employ quality monitoring.^{44,45}

In addition to quality monitoring, the structure of MC may serve to explain the differentially positive gains for Hispanic children and Black adolescents relative to their White peers. Lack of a usual source of care has been shown to contribute to disparities in health care use by racial and ethnic minorities^{46,47} and minority individuals covered by FFS Medicaid are less likely to have a usual source of care relative to those in Medicaid MC. Medicaid MC may alleviate disparities by providing a medical home, a usual source of care, for recipients. Managed care implementation may affect variables such as physician supply and length of enrollment and there may be differential effects by race and ethnicity.

Although this study demonstrated improved use of preventive services, no conclusions can be made regarding either the quality or the appropriateness of the services rendered. Further study is required to determine whether any improvements in the receipt of preventive services resulted in improved health outcomes or in the receipt of specialty services.

Though limited to an examination of the effects of a transition to MC in a single mid-Atlantic state, the results of this analysis should be informative to state policymakers in other states. Maryland is home to a racially, ethnically, and geographically diverse populace, and Maryland's Medicaid program is similar to programs in other

*For more details see the HEDIS Archives: Information from HEDIS 2000–2004 available at <http://www.ncqa.org/Programs/HEDIS/HEDIS%20archives.htm>.

states. Maryland is one of 27 states to enroll at least two-thirds of Medicaid recipients into MC, and one of 20 states with 100% full-risk MC plans. Six states and the District of Columbia have the same income eligibility criteria for children. Maryland is one of fourteen states with Medicaid enrollment equal to about one-sixth of total state population.⁴⁸

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