

# Medicaid Prenatal Care: A Comparison of Use and Outcomes in Fee-for-Service and Managed Care

## ABSTRACT

**Background.** To control rising costs, state Medicaid agencies are enrolling recipients in managed care health plans (MCPs). We performed this study to assess this policy's impact on accessibility and outcomes of Medicaid-funded prenatal care.

**Methods.** We performed a retrospective, controlled study with three cohorts: a study group of 1106 Medicaid recipients enrolled in three MCPs, a matched comparison group of 4830 recipients receiving care in the fee-for-service (FFS) system, and a second matched comparison group of 4434 non-Medicaid enrollees of the same MCPs. Data on prenatal care use and birth outcomes were obtained through linkage of claims and discharge files with birth certificate files.

**Results.** Medicaid recipients enrolled in MCPs used prenatal care similarly to those in the FFS system and showed equal or modestly improved birth-weight distributions. However, Medicaid MCP enrollees showed poorer use of prenatal care and birth outcomes compared with non-Medicaid enrollees of the same plans.

**Conclusions.** Enrollment in MCPs has a neutral or small beneficial effect on the prenatal care received by the Medicaid population. However, providing financial access and modifying the system of care for this population did not result in parity with the general population. (*Am J Public Health*. 1992;82:185-190)

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### Introduction

Concern about access to health care, particularly among uninsured Americans, has been in the forefront of health policy discussions in recent years.<sup>1-5</sup> Diminishing access to prenatal care and a slowing of the rate of decline of infant mortality have focused attention on obstetrical care.<sup>6,7</sup> Numerous states have expanded their Medicaid programs in efforts to address these issues. In the early 1990s, Medicaid will cover approximately one quarter of all births.<sup>8</sup> This expansion of Medicaid will increase the already substantial costs of the program, rising at an annual rate of 6.2% since 1968 and now accounting for 36.4% of all state health spending.<sup>9</sup>

Many state Medicaid programs have initiated managed care systems in efforts to increase access while controlling costs. In these systems, the Medicaid agency contracts with a group of providers who deliver specified services to enrolled Medicaid recipients, generally in return for capitated payments.<sup>10</sup> Recipients may receive care only from participating providers. Medicaid managed care enrollment has increased from 187 340 in 1981 to 2 837 500 in 1991, and this growth is expected to continue.<sup>9,11-14</sup> Of those enrolled in managed care, 36% are health maintenance organization (HMO) members and 45% are in primary care case management fee-for-service programs. Approximately 11% of all Medicaid recipients are currently enrolled in managed care programs. Most of the enrollees are young women and children eligible through the Aid to Families with Dependent Children (AFDC) category, and obstetrical care accounts for a large proportion (33% to 41%) of Medicaid-AFDC expenditures.<sup>15</sup>

Available evidence indicates that Medicaid managed care may change use patterns and generate cost savings of 2% to 15% relative to fee-for-service care.<sup>12,16-19</sup> Less is known about the effects of managed care on accessibility and outcomes of care for Medicaid and low-income populations. Some observers have expressed concern that mandatory enrollment in designated health plans may jeopardize the quality of care received, while others suggest that managed care may improve access and continuity of care.<sup>20-23</sup> The Medicaid competition demonstration evaluation found no differences in the timing of initiation of prenatal care or in the distribution of birth weights between members of two mandatory enrollment managed care programs and the general AFDC population.<sup>18</sup> A recent study limited to Medicaid managed care members receiving care at one institution reached similar conclusions.<sup>24</sup>

In light of the likely continued expansion of Medicaid managed care and the large proportion of such care accounted for by maternity services, we performed this study of the impact of managed care on prenatal care for the Medicaid popula-

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tion in Washington State. The study addresses two issues. First, does enrollment of pregnant Medicaid recipients in managed care plans result in different use and outcomes of prenatal care relative to Medicaid recipients receiving care in the fee-for-service system? Second, does managed care enrollment further the goal of promoting equity in prenatal care use and outcomes between Medicaid and non-Medicaid populations?

## Methods

We conducted a retrospective, controlled study involving three cohorts: (1) women whose care was financed by Medicaid and provided by a managed care plan (the Medicaid managed care study group), (2) women whose care was financed by Medicaid and provided by the fee-for-service sector (the Medicaid fee-for-service comparison group), and (3) women whose care was financed by private enrollment payments and provided by a managed care plan (the non-Medicaid managed care comparison group).

### Subject Selection

To select the two managed care groups, we used computerized discharge records to identify all women who delivered live infants between July 1983 and September 1988 while enrolled in three of the four managed care plans in Washington State that enrolled Medicaid recipients. (One of the four plans was unable to participate because of difficulties with its data system. One of the three participating plans declined to provide data on its non-Medicaid enrollees.) These records indicated the source of payment for each woman (Medicaid or non-Medicaid). To select the Medicaid fee-for-service group, we extracted from the Washington Medicaid Management Information System all hospital claims records of women who delivered live infants between February 1985 and January 1988 and who lived in counties in which the three managed care plans were operating. We excluded multiple births and stillbirths from all cohorts because of their distorting effects on birth weight.

We used data from both state Medicaid eligibility files and managed care plan enrollment files to characterize the system of care used by each individual during each month of pregnancy, that is, whether a woman (1) was enrolled in a managed care plan with either Medicaid or private financing, (2) was enrolled in fee-for-service Medicaid, or (3) had no identified sys-

tem of care. Of the 1552 women identified from the managed care plans who had any months of Medicaid funding, 19% also had periods of private financing. To avoid misclassification, these women with mixed enrollment were excluded.

The length and timing of enrollment of each woman determines, in part, the degree of influence the source of care has on her pregnancy. Therefore, we determined the initiation and duration of each woman's enrollment in her system of care. Because nearly all (94%) women were continuously enrolled, we used the number of months enrolled to control for the degree of exposure to the system of care.

To control for local differences in Medicaid populations and for local variations in use of prenatal services, we frequency-matched by county of residence nine non-Medicaid managed care and nine Medicaid fee-for-service controls to each of the Medicaid managed care subjects in two plans. (For the remaining plan, no non-Medicaid managed care controls were available, and the limited number of available Medicaid fee-for-service controls permitted matching only one control for every two Medicaid managed care subjects. Overall, we were able to include approximately four controls for each case.)

### Data Linkage

We used the Washington State birth certificate files as the source of dependent and confounding variables for all subjects. A computerized algorithm was created to find a unique birth certificate that matched each claim or discharge record. (Details of the linking process are available from the authors.) More than 90% of the claims and discharge records were linked with a unique birth certificate. We manually validated the accuracy of record linkages for all 1106 Medicaid managed care subjects and for a 10% random sample of the two comparison group subjects, and found 1.7% of the matches in error. The unlinked records did not differ significantly from the linked records with respect to maternal age, race, or enrollment history.

### Analysis

We assessed the adequacy of the process of prenatal care with three indicators, each evaluating different aspects of care. To measure inadequate initiation of care, we computed the percentage of women whose care began in the third trimester or who received no care at all (late or no prenatal care).<sup>25,26</sup>

To measure the adequacy of use of care *once care was initiated*, we employed an expected visit index developed by Kotelchuck<sup>27</sup>: the ratio of the actual number of prenatal visits to an expected number, based on standards developed by the American College of Obstetricians and Gynecologists.<sup>28</sup> Use is inadequate if fewer than 50% of the expected visits occur.

Third, we computed a modification of the standard Kessner Index<sup>29</sup> that takes into account the current American College of Obstetricians and Gynecologists standards (available upon request). It establishes an optimal standard of care combining both initiation and use and does not adjust use for late initiation.

The outcome of prenatal care was measured by the percentage of low-birth-weight (<2500 g) infants in each group.<sup>25,30</sup>

For univariate analyses, we tested for differences between proportions by calculating an odds ratio (OR) and its 95% confidence interval (CI).<sup>31,32</sup>

Because of the potential for selection bias (the Medicaid beneficiaries chose whether to receive care from fee-for-service or managed care providers), we controlled for factors other than source of care that may have affected the use of prenatal care and birth weight in two ways. First, as explained above, we frequency-matched by county. Second, we used multivariate logistic regression to control for potential confounding by age, race, smoking, parity, marital status, interbirth interval, prior preterm deliveries, and length of enrollment, as these have all been associated with the use of prenatal care and/or low birth weight.<sup>25,33-38</sup> We structured regression equations in a standard fashion.<sup>39</sup> In the final model, an OR was considered significantly different from one if its 95% CI did not include one.

## Results

### Medicaid Managed Care Compared with Medicaid Fee for Service

We first present the results of the comparison of Medicaid recipients enrolled in managed care plans and Medicaid recipients receiving care in the fee-for-service sector.

In general, the Medicaid beneficiaries in the managed care and fee-for-service systems of care were similar with respect to age, months of enrollment in Medicaid, race, marital status, smoking, parity, and prior preterm deliveries. They differed in that the Medicaid fee-for-ser-

vice group had a significantly shorter average interbirth interval than the managed care cohort (Table 1). Shorter interbirth intervals are associated with lower birth-weight infants, but only when less than 18 months.<sup>37</sup> The managed care members enrolled in their system of care later than those in the fee-for-service cohort: 25.3% of the former enrolled in the third trimester compared with 15.2% of the latter ( $P < .001$ ).

Differences in the use and outcomes of prenatal care between the managed care and fee-for-service groups varied among the three managed care plans. Therefore, we analyzed the data stratified by plan and cannot present aggregate results for all managed care plans. All ORs in Table 2 express the risk of inadequate care in the managed care group relative to the fee-for-service group. Adjustment for months of enrollment, maternal age, and maternal race did not greatly change these ORs. Also, additional adjustment for marital status, parity, smoking, number of prior preterm pregnancies, and interbirth interval did not further change the ORs.

Two of the managed care plans had fewer women with late or no prenatal care relative to fee-for-service care (only one significantly so). Members of the remaining plan received significantly later care than their fee-for-service counterparts. This finding did not change when we confined the analysis to the subset of women who were enrolled for all 9 months of pregnancy (38% of the total sample of Medicaid subjects). Any impact of the source of care would be most unambiguously demonstrated in this group.

For all three plans, we found no important or significant differences in the expected visit index between women in the managed care and fee-for-service systems. Thus, once a woman initiated care, it appeared that she received a similar number of visits in both systems (Table 2). In the subset of women enrolled for 9 months, a nonsignificant trend showing fewer women with inadequate numbers of visits in the managed care system emerged (adjusted ORs ranged from 0.41 to 1.00).

The modified Kessner Index indicated that two managed care plans had fewer women with overall inadequate care (one significantly so), while the remaining plan had significantly more (Table 2). Restricting the analysis to those women enrolled for all 9 months of pregnancy did not substantially alter these results.

Two of the managed care plans showed improved outcomes, as measured by the proportion of low-birth-weight in-

Descriptor	Medicaid Managed Care	Medicaid Fee for Service	Non-Medicaid Managed Care
Total subjects	1106	4435	4820
Mean age, y	23.9	23.6	28.3*
Mean months enrolled during pregnancy	6.2	6.7*	8.4*
Maternal race, %			
White	76.1	71.5	87.1*
Black	17.4	17.4	4.3*
Other	6.5	11.5	8.2
Smokers, %	54.3	56.3	13.6*
Unmarried, %	74.2	81.3**	12.7*
Mean no. of prior pregnancies	1.9	1.7***	1.3*
Mean no. of preterm pregnancies	0.47	0.40****	0.30*
Mean interval between births, mo	32.4	20.5*	28.2*

Significant difference between Medicaid managed care group and comparison group:  
 \* $P < .001$ .   \*\*\* $P < .01$ .  
 \*\* $P < .005$ .   \*\*\*\* $P < .05$ .

fants (one significantly so). The remaining plan showed a nonsignificant trend toward poorer outcomes (Table 2). Restricting the analysis to those women enrolled for all 9 months of pregnancy did not importantly alter these results.

#### Medicaid Managed Care Compared with Non-Medicaid Managed Care

We next examined whether differences existed in the use and outcomes of prenatal care between Medicaid and non-Medicaid enrollees of managed care plans.

Members of the Medicaid group differed notably from the non-Medicaid managed care plan members. The Medicaid group was younger, had enrolled in care for fewer months of pregnancy, and had a higher prevalence of smokers, single mothers, non-Whites, prior pregnancies, and prior preterm pregnancies. While 25.3% of Medicaid managed care members enrolled during the last trimester of pregnancy, only 2.3% of the non-Medicaid members did so ( $P < .001$ ).

Medicaid beneficiaries showed significantly poorer indices of use and birth outcomes than non-Medicaid enrollees. We present aggregated data from two plans because interaction between plan and source of care was not significant. As the remaining plan did not provide data on its non-Medicaid enrollees, it is not included in this analysis.

Medicaid enrollees experienced significantly higher rates of late or no prenatal care, an inadequate visit index, inadequate overall care as measured by the

modified Kessner Index, and low-birth-weight infants. In Table 3, the ORs indicate the risk of poor-quality care among Medicaid enrollees relative to non-Medicaid enrollees.

The unadjusted ORs reflect the experience of the Medicaid population (which is younger and has a higher proportion of Black and single mothers) relative to the non-Medicaid group. This is the appropriate measure to use when examining whether managed care can compensate for these risk factors of poor access and outcomes and actually bring the Medicaid group to the same level as the non-Medicaid group. The managed care plans were unable to do so.

The adjusted ORs address the question of whether there were differences in use and outcomes if the two groups had equivalent risk factors (age, race, marital status). After adjustment, Medicaid members continued to receive inadequate care at higher rates but no longer differed significantly in the proportion of low-birth-weight infants.

Additional adjustment for plan, parity, interpregnancy interval, prior preterm births, and smoking did not cause further changes in the ORs.

#### Discussion

Enrollment of Medicaid beneficiaries in three managed care plans in Washington State was, on balance, associated with equal use of prenatal care relative to that of women served by the fee-for-service



**TABLE 2—Medicaid Managed Care (MMC) vs Medicaid Fee for Service (FFS): Risk of Inadequate Prenatal Care and Low Birth Weight by Plan**

Index	Plan 1			Plan 2			Plan 3		
	FFS	MMC	OR <sup>a</sup> (95% CI)	FFS	MMC	OR <sup>a</sup> (95% CI)	FFS	MMC	OR <sup>a</sup> (95% CI)
No. of subjects	2785	310		1647	183		338	618	
Late or no prenatal care, %	18.9	29.3	1.92 (1.45, 2.63)	21.1	13.9	0.59 (0.32, 1.07)	15.9	12.7	0.69 (0.48, 0.99)
Inadequate expected visit index, %	7.2	5.9	0.80 (0.45, 1.42)	4.5	5.8	1.56 (0.69, 3.57)	12.3	13.3	1.03 (0.68, 1.54)
Inadequate modified Kessner Index, %	23.1	32.3	1.75 (1.32, 2.38)	30.1	16.9	0.49 (0.27, 0.87)	20.8	19.0	0.84 (0.58, 1.12)
Low birth weight, %	8.4	4.6	0.40 (0.21, 0.78)	5.6	7.3	1.15 (0.52, 2.57)	7.1	6.0	0.83 (0.49, 1.25)

*Note.* OR = odds ratio; CI = confidence interval.  
<sup>a</sup>OR (and 95% CI) for inadequate outcome in managed care relative to fee for service, adjusted for months enrolled, maternal age, and maternal race.

**TABLE 3—Medicaid Managed Care (MMC) vs Non-Medicaid Managed Care (NMMC): Risk of Inadequate Prenatal Care and Low Birth Weight**

Index	NMMC	MMC	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
No. of subjects <sup>a</sup>	4435	493		
Late or no prenatal care, %	9.9	23.6	2.83 (2.24, 3.56)	1.86 (1.39, 2.17) <sup>b</sup>
Inadequate expected visit index, %	1.2	5.8	5.21 (3.18, 8.54)	2.45 (1.33–4.50) <sup>b</sup>
Inadequate modified Kessner Index, %	10.7	26.7	3.03 (2.42, 3.81)	1.93 (1.50–2.56) <sup>b</sup>
Low birth weight, %	3.3	5.6	1.74 (1.14, 2.66)	0.88 (0.52–1.49) <sup>c</sup>

*Note.* OR = odds ratio; CI = confidence interval.  
<sup>a</sup>Subjects from plans 1 and 2; plan 3 did not contribute non-Medicaid data and was excluded.  
<sup>b</sup>OR (and 95% CI) for inadequate outcome in Medicaid vs non-Medicaid groups, adjusted for maternal race and marital status (adjusting for maternal age did not change the OR).  
<sup>c</sup>Adjusted for maternal age, maternal race, and marital status.

sector and equal or modestly improved rates of low birth weight. These findings are consistent with those of previous studies.<sup>18,24</sup> In light of the data showing modest cost savings associated with managed care enrollment,<sup>12,16–19</sup> this policy appears promising. However, any attempt to generalize about the potential of managed care to improve birth outcomes and access to prenatal care must be tempered by the recognition that its impact differed within each of the managed care plans. Medicaid managers must carefully consider each plan in which they enroll recipients and monitor quality of care on a continuous basis.

Enrollment of the Medicaid beneficiaries in “mainstream” managed care did not eliminate the large gap in prenatal care use and birth outcomes between the Medicaid population and the general population of managed care enrollees. More Medicaid enrollees delivered low-birth-

weight infants and more had inadequate access to prenatal care than general plan members. Even after adjusting for several risk factors, Medicaid members showed poorer use of care. Simply ensuring the availability of providers or extending eligibility is not sufficient to equalize the rates of adequate prenatal care use and good birth outcomes between the Medicaid and non-Medicaid populations.<sup>18,40</sup> The structure and content of the care offered by providers seems critical in promoting improved outcomes.

Our data demonstrated late enrollment in Medicaid by pregnant women regardless of system of care. This suggests that additional efforts are needed to facilitate earlier enrollment, such as improvement of the capacity of the maternity care system, public education, case finding, and enhanced social support services.<sup>26</sup>

We noted generally equal numbers of prenatal visits among Medicaid managed

care and fee-for-service users once care was initiated, as reflected in the expected visit index. This finding agrees with several studies that found equal use of ambulatory services (not specifically prenatal care) among Medicaid beneficiaries in managed care and fee-for-service systems of care<sup>17,41,42</sup> while differing from others showing decreased<sup>19,43,44</sup> or increased<sup>16</sup> use of outpatient services in managed care systems. Several studies of non-Medicaid populations have compared the quality of maternity care received by HMO members relative to fee-for-service users. Their results are consistent with our findings of equal or better care in the managed care setting.<sup>45–52</sup>

There was not a consistent association of earlier initiation of prenatal care and lower rates of low birth weight. Among members of plan 1, while more women in the Medicaid managed care group had late or no prenatal care, they

also had fewer low-birth-weight infants than their fee-for-service counterparts. Medicaid recipients enrolled in plan 2 showed no significant differences in initiation of care and low-birth-weight rates relative to their fee-for-service counterparts. Recipients in plan 3 had improved timing of initiation of care (with borderline statistical significance) but equal rates of low birth weight.

These findings may be explained by noting that the association between prenatal care and birth outcomes is best studied with the individual as the unit of analysis, rather than the group. Consistent with this hypothesis is the study by Quick et al.<sup>51</sup> that found that members of the Kaiser-Permanente HMO in Oregon started care significantly later and received fewer visits but had modestly heavier infants relative to the general population. Despite this inverse relationship between use and outcomes, Quick et al. found an overall association of prenatal care with heavier infants in their study population when using the individual as the unit of analysis. This may reflect a "start-up" phenomenon among new users of managed care in which delays occur in establishing contact with a primary provider because of the more complex organizational structure of managed care plans. Or perhaps the women who chose managed care plans had other associated characteristics that were related to lower use of prenatal care yet better birth outcomes.

The most important caveat in interpreting the results of this study is that we were probably unable to control completely for the confounding introduced by selection bias. The potential for confounding by selection bias was strongest in the comparison of the Medicaid managed care and fee-for-service cohorts. However, eligibility for Medicaid in itself ensures a great deal of economic and social homogeneity. Additionally, we were able to control for the potential confounding effects of many covariates using available data from the birth certificates. The characteristics of the two Medicaid groups (Table 1) offer some evidence that the two cohorts are, in fact, similar.

Although several authors have questioned the reliability of some elements of birth certificate data,<sup>25,29,53</sup> the data we used in this study appear to be reasonably accurate. P. Starzyck (personal communication, August 1989) compared information from birth certificates with data in medical records for 765 births taking place in Washington State. The certificate and

record disagreed in 3.4% of entries for birth weight, 4.2% for month of initiation, and 9.3% for number of visits. Furthermore, we had no reason to suspect a differential miscoding or error rate in one of our study groups relative to the others.

Failure to link all claims to birth certificates might have introduced ascertainment bias into this study. We fell short (by less than 10%) of linking all claims and discharge records to birth certificates. Because the linkage rates were similar among the different sources of care, introduction of bias was unlikely.

Our sample sizes for some comparisons were smaller than we had anticipated, primarily because the necessity of conducting a stratified analysis prevented us from pooling the data from the three plans. The small sample sizes in the stratified analysis raise the possibility that the lack of differences between some managed care and fee-for-service providers for some dependent variables may have been due to a type II error. For most comparisons, our sample size was large enough to detect a 50% difference between fee for service and managed care but too small to find reliably a significant difference of 25% when setting  $\alpha$  equal to 0.05 and  $\beta$  equal to 0.80. The comparison of Medicaid managed care enrollees and their non-Medicaid counterparts used a larger sample (pooled across plans) and detected significant differences in most of the dependent variables.

In conclusion, managed care may offer an opportunity for modest cost savings while promoting modest improvements in prenatal care, or at least doing no harm. However, managed care alone will not substantially narrow the differences in prenatal care access and birth outcomes between the Medicaid and general populations. Facilitating earlier enrollment in Medicaid programs may increase the proportion of low-income women with timely initiation of prenatal care. Designing prenatal care programs whose content addresses the specific needs of Medicaid beneficiaries may also narrow the gap. □

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